# A participative management approach for the improvement of a safety culture in the forestry industry


## AS Greeff

orcid.org/0000-0003-2614-9551


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Supervisor: Prof LJ van Staden

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Student number: 21664315

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# ABSTRACT

The forestry industry is one of the key contributing industries toward gross domestic product (GDP), as well as one of the most successful exporting industries in South Africa. Overall, the forestry industry has a significant economic, community and environmental impact in South Africa. The industry employs almost 157 000 people, has various and significant community engagement and upliftment projects, and is also considered to be one of the most sustainable industries in South Africa.

Based on the literature, participative management has been recognised as a management style that actively promotes workforce involvement in areas such as decision-making and communication. Safety culture is considered to be a good reflection of the state of safety within an organisation at any point in time, where it has been argued that workforce involvement is one of the key elements in promoting a positive safety culture.

Therefore, the primary objective of this study was to investigate the effect of participative management on the safety culture of contract workers in the forestry industry of South Africa. In doing so, it identifies the benefits that a more involved approach to the management of safety has in the forestry industry. There is a definite need to improve the overall management of safety in South Africa, particularly among workers who operate in high-risk environments. The evidence in this study provides concerning injury and fatality statistics, particularly in the mining and construction industries of South Africa. However, the forestry industry is a shining light in this regard which is also supported by the results of this study.

The sample used in this study included forestry workers from the Mpumalanga Province, male and female, who participate in operational activities (OHS in particular) in the forestry industry. To obtain this sample a combination of non-probability convenience and judgemental sampling was used. To gather the data for this study a quantitative research strategy was used. Consequently, a combination of an exploratory and descriptive research design was adopted. This study involved the collection of data through a combination of the self-administered survey method and structured interview method, thus incorporating the mixed-mode survey method, and feedback was obtained from 280 respondents. The survey data were analysed by the Statistical Consultation Services of the North-West University's Potchefstroom Campus to look for relationships between the dimensions of participative management and safety culture.

The results of this study show a significant positive association between participative management and safety culture. It, therefore, supports the theory that a more involved approach by management towards safety can lead to an improvement in the safety culture of workers in the

forestry industry. According to the researcher's knowledge at present, this is the first study to show the effect of participative management on safety culture in the forestry industry, which also contributes to developing literature by further extending the knowledge on how safety is managed in high-risk environments.

Based on the results it is recommended that senior management in the forestry industry as well as the owners of contracting companies working in the forestry industry, look at improving their involvement in the leadership, motivation, communication, decision-making, goal setting and control of safety, as this will possibly lead to the improvement in the knowledge, compliance, attitude, and participation of forestry workers towards safety.

Suggestions for future research include conducting the same study in other high-risk industries such as construction and mining and also obtaining the viewpoint from senior management, as this study focused on the view of forestry workers.

**Keywords:** Participative management; Safety management; Employee involvement; Safety culture; Forest management.

# OPSOMMING

Die bosbou industrie is een van die sleutel-bydraende bedrywe tot die bruto binnelandse produk (BBP), sowel as een van die mees suksesvolle uitvoerbedrywe in Suid-Afrika. Oor die algemeen het die bosboubedryf 'n beduidende ekonomiese, gemeenskaps- en omgewingsimpak in Suid-Afrika. Die bedryf het byna 157 000 mense in diens, het verskeie en beduidende gemeenskapsprojekte, en word ook as een van die mees volhoubare industrieë in Suid-Afrika beskou.

Gebaseer op die literatuur, word deelnemendebestuur gekenmerk as 'n bestuurstyl wat aktiewe werknemer-betrokkenheid in areas soos besluitneming en kommunikasie bevorder. Veiligheidskultuur word beskou as 'n goeie maatstaaf waarteen die veiligheid van ’n onderneming op enige gegewe tyd gemeet kan word. Daar word ook aangevoer dat werknemer-betrokkenheid ’n groot bydrae tot die bevordering van 'n positiewe veiligheidskultuur lewer.

Die primêre doel van hierdie studie was om die effek van deelnemende bestuur op die veiligheidskultuur van kontrakwerknemers in die bosboubedryf van Suid-Afrika te ondersoek. Sodoende, is die voordele wat 'n meer deelnemende benadering tot die bestuur van veiligheid in die bosboubedryf inhou aangespreek. Daar is 'n besliste behoefte om die algehele bestuur van veiligheid in Suid-Afrika te verbeter, veral in werkers wat in hoërisiko-omgewings werk. Die bewyse in hierdie studie verskaf kommerwekkende beserings- en sterftestatistieke, veral in die mynbou- en konstruksiebedrywe van Suid-Afrika. Die bosboubedryf is ’n uitskieter in hierdie geval, en toon indrukwekkende gehalte van veiligheid wat ook deur die resultate van hierdie studie ondersteun word.

Die steekproef wat in hierdie studie gebruik is, het bosbouwerknemers van die Mpumalanga Provinsie, manlik en vroulik, ingesluit wat aan operasionele aktiwiteite (veral in terme van veiligheid) in die bosboubedryf deelneem. Om hierdie steekproef te verkry, is 'n kombinasie van nie-waarskynlikheid en oordeelkundige steekproefneming gebruik. Om die data vir hierdie studie in te samel, is 'n kwantitatiewe navorsingstrategie gebruik. Gevolglik is 'n kombinasie van 'n verkennende en beskrywende navorsingsontwerp aanvaar. Hierdie studie het die insameling van data behels deur 'n kombinasie van die self-geadministreerde opname metode en gestruktureerde onderhoud metode te gebruik, en dus die aanneming van die gemengde modus opname metode behels het. Terugvoer is verkry vanaf 280 respondente. Die opname-data is deur die Statistiese Konsultasiedienste van die Noordwes-Universiteit se Potchefstroomkampus ontleed om te kyk na die verwantskappe tussen die dimensies van deelnemende bestuur en veiligheidskultuur.

Die resultate van hierdie studie toon 'n betekenisvolle positiewe verband tussen deelnemendebestuur en veiligheidskultuur. Ter ondersteuning van die teorie, wil dit voorkom dat 'n meer betrokke benadering deur bestuur tot veiligheid kan lei tot 'n verbetering in die veiligheidskultuur van werknemers in die bosboubedryf. Tot die beste kennis van die navorser is dit die eerste studie wat die effek van deelnemendebestuur op veiligheidskultuur in die bosboubedryf bepaal het, en dus dra hierdie studie by tot die ontwikkeling van literatuur deur verder uit te brei op die kennis van hoe veiligheid in hoërisiko-omgewings bestuur word.

Op grond van die resultate word daar aanbeveel dat senior bestuur in die bosboubedryf sowel as die eienaars van kontrakterende maatskappye wat in die bosboubedryf werk, kyk na die verbetering van hul betrokkenheid by die leierskap, motivering, kommunikasie, besluitneming, doelwitstelling en beheer van veiligheid, aangesien dit moontlik sal lei tot die verbetering in die kennis, voldoening, houding en deelname van bosbouwerknemers ten opsigte van veiligheid.

Voorstelle vir toekomstige navorsing sluit die uitvoer van dieselfde studie in ander hoërisiko-bedrywe soos konstruksie en mynbou in, sowel as die verkryging van die standpunt van senior bestuur, aangesien hierdie studie gefokus het op die siening van bosbouwerknemers.

**Sleutelwoorde:** Deelnemende bestuur; Veiligheidsbestuur; Werknemersbetrokkenheid; Veiligheidskultuur; Bosbou.

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# CHAPTER 1

# INTRODUCTION

## 1.1 INTRODUCTION

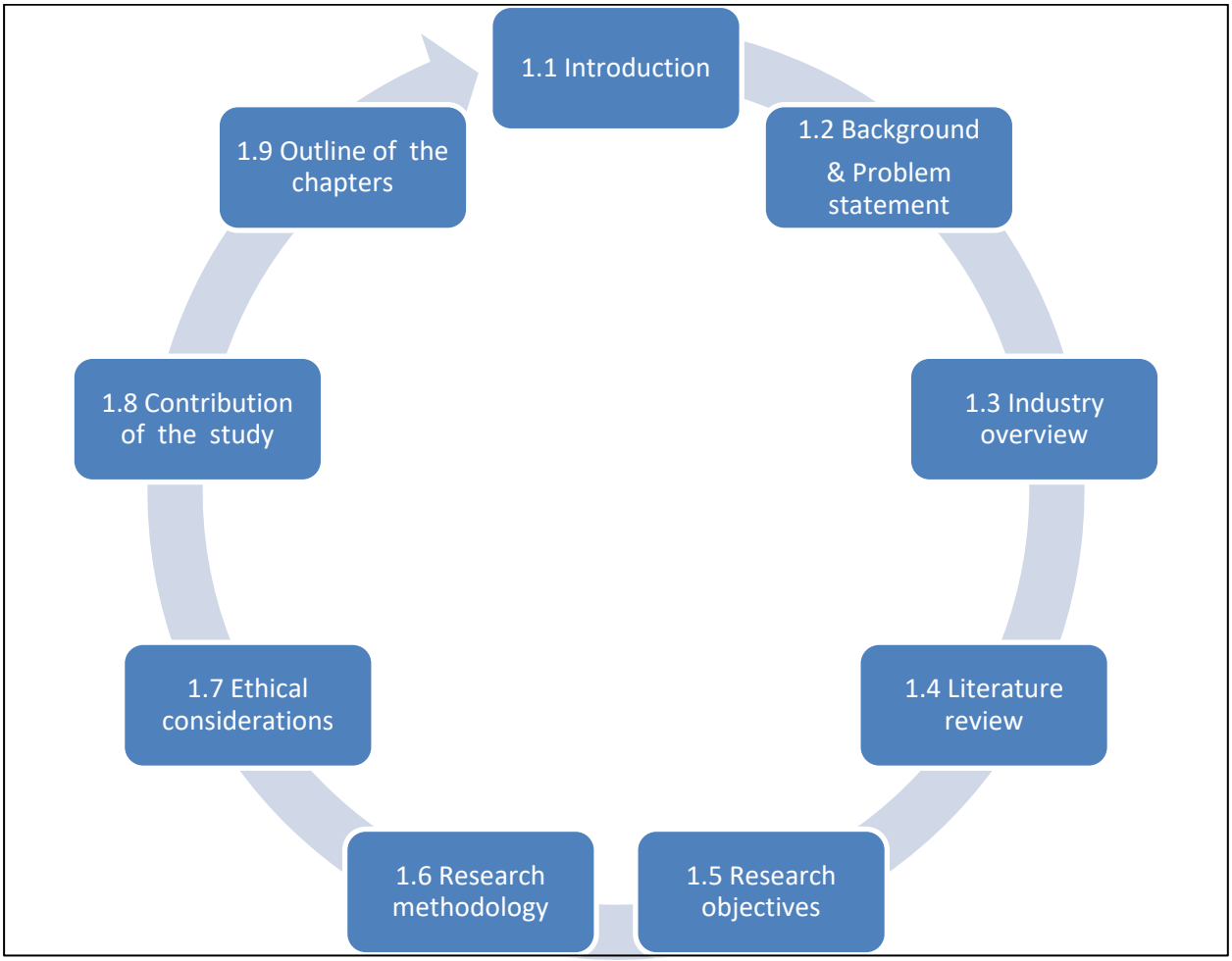
The South African workforce has often accused their employers of not involving them in matters affecting them, which creates unhappiness and a negative culture within these organisations (Tchapchet *et al.*, 2014:291). In terms of safety management, it is no different. Potgieter (2017) indicated that employees are seldom involved in decision-making processes related to safety matters and, in turn, create a negative safety culture in such an environment.

According to Steenkamp (2015:71), organisations that achieve better integration of the management of safety will achieve better safety results. There are different management styles one can use to approach the management of safety; however, it is considered that the most effective is a style that encourages employees to be actively and positively involved in achieving a healthy and positive safety culture (Tsao *et al.*, 2017:53). Involving employees in aspects of the safety management system is also the most effective approach one can adopt in order to promote an effective safety culture (Zhang *et al.*, 2020:87). Employee involvement is essential in hazardous environments such as construction, mining and forestry, and employees who are involved in decision-making regarding safety in these environments are more likely to support and apply these decisions in their everyday tasks (Bohan & Laing, 2012:188; Harrington, 2021:88).

According to Madinda (2015:26), participative management involves the process whereby employees play a direct role in planning and decision-making in the business. In contrast to a directive management approach where managers act alone as decision-makers, participative management includes the opinions and suggestions of subordinates in the decision-making process (Fassin *et al.*, 2017:589). The benefits of the participative management approach in terms of safety are: that it inspires employees to consider safety to be a lifestyle rather than just a process of complying with policies; it builds strong relationships that promote employee engagement with safety aspects; and it allows employees to clearly understand what is expected of them in terms of safe work behaviour (Tristan, 2016). It can be argued that, from a management perspective, participative management, is a style that would fit the above-mentioned criteria best. Therefore, the focus of this study was to determine whether participative management has an influence on the safety culture in the forestry industry of South Africa.

Outlined in the Figure 1-1 below is a summary of the sections that will be discussed in Chapter 1:

**Figure 1-1: Summary of sections for Chapter 1**




Source: Researcher's own compilation

## 1.2 RESEARCH PROBLEM

The safety of employees and the implementation thereof are reasons for concern in some industries of South Africa (Esterhuyzen, 2017a:10). The incidence where crises, mishaps and accidents happen is a sufficient indication that organisations still need to improve their abilities to manage safety through a proactive and systematic approach (Kontogiannis, Leva, Balfe, 2017:128). According to the Department of Mineral Resources (DMR), statistics from the mining industry showed that 73 fatalities were reported in 2016, 90 in 2017 and 81 in 2018; in addition, total injuries decreased from 2 669 in 2017 to 2 350 injuries in 2018 (DMR, 2020:8). Although there is a visible decline, there is still a considerable number of fatalities each year. In the construction industry, a statement released by government in 2017 indicated that there are at least 1,5 to 2,5 fatalities per week in the construction industry (Thejane, 2017). However, the statistics in the forestry industry seem to fare a lot better in comparison with mining and construction industries. In their 2022 annual sustainability report, South African Pulp and Paper

Industries (SAPPI) had no fatalities for the year 2021 (SAPPI, 2021:80). The South African Forestry Company Limited (SAFCOL) also recorded zero fatalities for the year 2020 to 2021 (SAFCOL, 2021:15). Mondi South Africa indicated that they had one fatality for the year of 2020 (Mondi Group, 2020:10). Because most forestry companies in South Africa make use of contractors to perform their operations, it makes it difficult to evaluate and monitor safety levels in this industry. Therefore, given the structure of this industry, it can sometimes lead to a misrepresentation of the actual results (Pogue, 2008:88). Nevertheless, the statistics of the forestry industry are still impressive compared to other industries in South Africa, and it is worthwhile to investigate why this might be the case, as little research regarding safety and the management thereof is present for the forestry industry of South Africa. There is a considerable amount of research that points to a positive safety culture and employee involvement as the main contributing factors to reduce fatalities, specifically in the mining and construction industries (Hermanus, 2007; Jansen & Brent, 2005; Okorie *et al.*, 2014). Little research, however, could be found in other industries in South Africa, especially in the forestry industry.

Pogue (2008:10) noted that the main factors that raise the safety dangers in the forestry sector are the lack of training and the use of outdated equipment; however, studies done in other sectors such as mining and construction might suggest otherwise, because these studies identify factors such as lack of commitment from management, behavioural aspects, lack of awareness, and workforce involvement as barriers to safety implementation (Al-Najjar & Jawad, 2011; Alkilani *et al.*, 2013; Loosemore & Andonakis, 2007). Other studies also added the effects of workforce involvement on organisational performance (Guthrie, 2001; McNabb & Whitfield, 2000; Truss *et al.*, 2013). Raines (2011:36) indicated that involving employees in the safety decision-making process would benefit the overall organisational performance. Another study, done by Brijlall (2015), also concluded that involving workers in the safety management decision-making processes significantly reduces injury rates.

O'Dea and Flin (2001:50) identified workforce involvement as an outstanding safety issue in offshore environments and that managers are not getting the workforce to participate in safety activities. Kaufman (2011:55) further indicated that a fundamental issue frustrating United States of America-based companies is the lack of employee engagement. He also stated that two-thirds of Americans are “disengaged in the workplace”. Raines (2011:36) emphasises the fact that if changes are made that have an influence on safety without employees’ input or participation, it may be difficult to improve safety performance in such an organisation over time. Brijlall (2015:9) indicated that, in South Africa, there is a lack of employee participation in two areas; firstly, employees are not involved at all levels of decision-making in terms of work processes and activities; and secondly, managers do not include, encourage or support employee involvement

in decision-making. Potgieter (2017) further recognises that if workers are not involved in decision-making processes in terms of safety, it can lead to a negative safety culture in such an environment. Esterhuyzen (2017b) agrees by highlighting that the current tendency in South Africa is that workers are not included or participating in decision-making in relation to safety management. Considering all of the above, there is a definite need for a more participative approach to the management of safety in South African industries; however, there is no clarity on the current use of this approach and its effect on safety management in South Africa, particularly in the forestry industry. Therefore, the research question arises:

"Does a participative management approach have an influence on the management of safety in the forestry industry of South Africa?"

## 1.3 INDUSTRY OVERVIEW

This section provides a comprehensive discussion of the South African forestry industry. It starts off by defining the forestry industry, followed by a brief industry analysis.

### 1.3.1 Defining the forestry industry

One of the key contributing sectors to South Africa's gross domestic product (GDP) is agriculture, which include forestry and fishing (Sats SA, 2021:3). According to Godsmark and Oberholzer (2019:145), the sector forms 2,1% of the total annual GDP in South Africa. The forestry industry is also considered to be one of the most successful exporting industries in South Africa and, according to the latest Forestry South Africa (FSA) report, the industry exported R29.7 billion forest products in 2018 (Godsmark & Oberholzer, 2019:154). The forestry industry also plays a significant part in job creation, and employs about 157 500 people (Godsmark & Oberholzer, 2019:121).

From an operational perspective, forestry is associated with two activities, namely silviculture and harvesting (Nolet *et al.*, 2018:1218). Silviculture is explained by Hinze *et al.* (2021:305) as the process of growing and preparation of ground for the planting of trees, with a focus on the quality of the end product that is being produced. The authors further argue that the main processes involved in silviculture are thinning and pruning. Harvesting is the process of felling, skidding, and storing or stacking wood within the boundaries of the commercial forest (Dimou *et al.*, 2020:233). The focus of this study will be on silviculture and harvesting, as it is extremely demanding, hazardous and psychologically tough, which makes it challenging to manage from a health and safety perspective (Dimou *et al.*, 2020:233; Hodges & Kennedy, 2011:1-7).

### 1.3.2 Role players in the South African forestry industry

The three largest employers in the industry are briefly described in Table 1-1 below:

**Table 1-1: Summary of role players in the South African forestry industry**

| Company | Core business | Locations |
|---|---|---|
| SAFCOL | SAFCOL employees 1 500 direct employees and 3 500 indirect employees.<br>SAFCOL owns and manages 189 747 hectares of forestry plantations in South Africa.<br>Its main business is forestry, timber harvesting and timber processing and the production of saw-timber.<br>SAFCOL was the first company in South Africa to become certified by the Forest Stewardship Council (FSC). | Limpopo, Mpumalanga, KwaZulu-Natal, Mozambique. |
| Mondi South Africa | Mondi owns and manages over 254 000 hectares of forestry plantations and has 1 400 employees in South Africa.<br>Their core businesses include forestry, and the production of pulp for paper.<br>All Mondi's plantations are certified by the FSC. | KwaZulu-Natal, Mpumalanga. |
| Sappi Forests | Sappi Southern Africa own and manage 394 000 hectares of plantation and have 4 752 employees. They are one of the biggest suppliers to the pulp and paper industry.<br>All Sappi Forests plantations are FSC certified. | KwaZulu-Natal, Mpumalanga. |

Source: Adopted from Sappi (2021), SAFCOL (2021) and Mondi Group (2020).

### 1.3.3 Trends and challenges in the forestry industry

Various trends in the forestry industry are identified to have a significant effect on forestry in the future if one looks at the latest sustainability reports from the two largest timber growers in South Africa: Mondi and Sappi. The most apparent aspects worth mentioning for the future include

greater transparency in the industry, technological innovations, the focus on circular economies, sustainable resource management, and anti-plastic sentiments (Mondi Group, 2018; Sappi, 2018b). There are several challenges identified to have an effect on the forestry industry including the role of social inequality, ongoing labour issues, the effects of climate change, the issue of land, the general lack of afforestation in the industry, and timber theft (PMG, 2015). The trends and challenges facing the forestry industry will be discussed in more detail in Chapter 2 (see Section 2.4).

## 1.4 LITERATURE REVIEW

This literature review provides a brief overview of management and the relevant disciplines (namely participative management and safety culture), as well as the key constructs associated with these disciplines.

### 1.4.1 Background of management

It is considered that management only started to develop as a discipline approximately 125 years ago (Witzel, 2017:2). In the early years, business was very trade-based and work was self-organised with no strong need for management (Thompson & McHugh, 2009:4). The manner of doing business changed radically as the world started to experience the industrial revolution. This caused more work and production that were previously performed manually to be taken over by machines, which resulted in the mass production of goods and required the division of labour to oversee different tasks of the production process (Benedict, 2015:21). While workers focused on their specific activities, a need developed for a person to coordinate these different activities, leading to the establishment of a manager (Subba & Kumar, 2010:21). Today, the ways in which business is performed and managed have changed dramatically, and different management theories have been developed over time.

In the early years of management, from 1911-1947, theorists focused on classical approaches, which include administrative, bureaucratic and scientific management perspectives. These theories focus on ways for workers to better perform their tasks (Benedict, 2015:22). Between the 1940s and 1960s, two types of approaches emerged, i.e., the behavioural and quantitative approaches. Behavioural theories are concerned with the social and group interactions that occur in the workplace, and quantitative theories focus on the use of statistics, computer technology, mathematics and other quantifiable techniques that assist management in decision-making (Alsemgeest, Booysen, Bosch, Boshoff, Botha, Cunningham, Henrico, Musengi-Ajulu & Visser, 2017:109-112). Contemporary management theories started in the 1960s and focused on the expansion and integration of the key concepts from the classical management theories

(Alsemgeest *et al.*, 2017:113). The development of these approaches can be summarised in Table 1-2 as follows:

**Table 1-2: Summary of management theories**

| | Overview | Types of approaches | Time period |
|---|---|---|---|
| Classical approaches | Focused on ways for workers to perform their tasks better. | Scientific, bureaucratic and administrative. | 1911-1947 |
| Behavioural approaches | Concerned with the social and group interactions that occur in the workplace. | Human relations & human resources. | 1940-1960 |
| Quantitative approaches | Focus on the use of statistics, computer technology, mathematics and other quantifiable techniques. | Operations management & information management. | 1940-1960 |
| Contemporary approaches | Expansion and integration of the key concepts from classical management theories. | Systems approach, contingency approach & total quality management. | 1960-onwards |

Source: Adopted from Benedict (2015:22).

With the background of the different management theories, the focus of the next section will be on the aspects of participative management as an important part of this study.

### 1.4.2 Participative management

Participative management is a term developed from the four management systems as proposed by Rensis Likert in the 1960s (Likert, 1967:3-12). Likert's management systems consist of four systems, with each system reflecting a certain level of employee involvement. System one is associated with a high autocratic management style, and system four is associated with a high participative management style (Likert, 1967:4-10). According to Likert (1967:11), in order to achieve better productivity or performance, organisations should strive to function at system four. The four different management styles are summarised in Table 1-3 below:

**Table 1-3: Summary of Likert's four systems**

| System | Description |
|---|---|
| System 1: Exploitative authoritative | • This system uses an autocratic top-to-bottom approach in terms of management.<br>• Employee evaluations are based on punishment and sometimes rewards.<br>• Communication is one-directional (downwards) and little teamwork is present.<br>• Decision-making and control happen at top levels with no input from other employees.<br>• Generally, low performing organisations. |
| System 2: Benevolent authoritative | • Similar to System 1.<br>• Employees are given a little more freedom.<br>• Limited boundaries defined by managers for communication, interaction and decision-making. |
| System 3: Consultative | • Employees are more involved with interaction, communication and decision-making.<br>• Although they are consulted with issues relating to these aspects, management still makes the final call.<br>• Generally considered well-performing organisations. |
| System 4: Participative management | • This system makes broad use of employer involvement and participation.<br>• Employees are highly involved in decision-making, setting goals, improving methods and evaluating results.<br>• Two-way communication occurs horizontally between departments and vertically through levels of management.<br>• Generally considered high-performing organisations. |

Source: Adopted from Morris and Pavett (1992:173).

As stated earlier in the introduction, participative management (System 4) is key when it comes to building an effective safety culture, as it has a high focus on employee involvement.

Participative management is a management style that dynamically seeks the input of employees, allowing them to contribute to the resolution of work-related problems (Usadolo, 2020:1). It is a style that encourages employees to be involved in various aspects of decision-making, participate in performance planning, and partake in performance evaluation (Paros, 2021:2). Information is shared throughout all levels and a high degree of transparency is achieved, which, in effect, builds stronger relationships between employees and promotes responsibility for the outcomes for these decisions (Belas *et al.*, 2020:132).

There are some challenges associated with participative management, and it is not an approach that can be achieved overnight (Hejres, 2014:147). Using this style requires time, commitment, resources and the willingness of managers to include employees in decision-making and share their ideas and information. However, managers who use a participative style find that employees are more receptive to change (Muindi, 2011:10). The benefits of this approach, if achieved, are rewarding to any company. Participative management increases the commitment and productivity of employees, it boosts morale, changes are implemented more effectively, and most importantly, it creates an environment that encourages innovative and creative solutions to complex problems that might occur (Muindi, 2011:10).

Likert (1967:4-10) describes participative management in terms of six organisational variables, namely leadership, motivation, communication, decisions, control and goals. The independent variables that has the most relevance to Likert's theory from a safety management perspective include leadership, motivation, communication, decision-making, control and goal setting (Kim *et al.*, 2019; Tappura *et al.*, 2017; Wang *et al.*, 2017; Wu *et al.*, 2017). These six dimensions will be used to determine the level of employee involvement in an organisation and will be discussed in the following paragraphs.

#### 1.4.2.1 Leadership

According to Barclay and Barclay (2011:21), leadership can be defined as influencing employees to voluntarily pursue organisational goals. True leadership must be considered in terms of its ability to influence organisational performance. It would therefore seem that an effective leader is someone who can increase organisational performance without the use of threat or violence (Dyczkowska & Dyczkowski, 2018:201).

Some theories regarding leadership are described in the literature (Allio, 2013; Bennett, 2009; Martin, 2017), and they seem to describe leadership in terms of two distinct paradigms: one being a leader with an autocratic approach, and the other a leader with a more consultative approach.

Perhaps the most popular theory in terms of these two paradigms is McGregor's Theory X and Theory Y (McGregor, 1960).

According to Manning and Curtis (2012:210-211), McGregor's leadership theories can be divided into two types of leadership styles, namely Theory X and Theory Y. Theory X leaders have a very directive leadership approach. Such a person would lead their subordinates by telling them what to do, instructing them what to do, insisting they meet certain standards, and making sure they know who the boss is (Hughes, Ginnet & Curphy, 2012:152). Theory Y leaders, on the other hand, have a more participative leadership approach; subordinates are consulted rather than instructed, their opinions are sought and they are encouraged to take part in planning and decision-making (Manning & Curtis, 2012:210-211). As this 'inclusive' behaviour is an essential part of participative management, a participative leader would therefore be more effective in implementing the concepts of participative management (Likert, 1967:72).

It would therefore be reasonable to argue that, based on the above, and on the view of Van Loggerenberg (2015b:107) in terms of the importance of employee involvement on the creation of a safety culture (see Table 1-6), a participative leader would therefore be the most effective to promote and establish a positive safety culture.

#### 1.4.2.2 Motivation

Motivation can be defined as a condition or state that triggers a person's behaviour and directs it towards accomplishing a task (Cai, 2016:20). Within a work-related context, motivation can further be defined as a set of active forces that are created within an individual to initiate work-related behaviour; in other words, motivation leads to action in employees and explains the intensity, direction and duration of their behaviour (Dwivedula, Bredillet & Muller, 2012:44).

When it comes to motivating employees, there are two types of approaches one can use: an extrinsic approach or an intrinsic approach. An extrinsic approach involves motives triggered from outside the individual, such as providing bonuses for performance; whereas an intrinsic approach involves motives triggered from inside the individual, such as self-esteem and a feeling of accomplishment (Benedetti, Diefendorff, Gabriel & Chandler, 2015:39).

To understand what motivates employees better, it is important to look at employee needs in terms of job fulfilment (Taormina & Gao, 2013:157). These needs are divided into different levels and are summarised in Table 1-4 below:

**Table 1-4: Summary of Maslow's hierarchy of needs**

| Need hierarchy | Fulfilment on the job |
|---|---|
| Self-actualisation needs | Opportunities for training, advancement, growth and creativity. |
| Esteem needs | Recognition, high status and increased responsibilities. |
| Belongingness needs | Recognition, high status and increased responsibilities. |
| Safety needs | Safe work, fringe benefits and job security. |
| Physiological needs | Heat, air and base salary. |

Source: Adopted from Daft, Marcic, Griffin and Van Fleet (2015:204).

According to Daft *et al.* (2015:216), the most basic needs (physiological needs) take first priority. As the first-level need is met, the focus shifts to the next level of needs until the highest level of needs have been met (self-actualisation needs). These higher-level needs, such as belongingness, self-actualisation and esteem, are usually influenced by motivators such as responsibility, personal growth, work itself, recognition and achievement. Lower-level needs, such as safety and physiological needs, on the other hand, are usually satisfied by hygiene factors, such as pay, work conditions and interpersonal relationships (Alshmemri, Shahkwan-Akl & Maude, 2017:13). It should be noted that higher levels of employee satisfaction and performance are associated with higher levels of job satisfaction and an intrinsic reward-based system (Benedetti *et al.*, 2015:39).

Other important factors in motivating employees are employee empowerment and employee engagement. Empowerment can be viewed as sharing the power of authority and delegation with subordinates in the organisation; employee engagement means that people contribute actively to meeting team and organisational goals (Daft *et al.*, 2015:223).

Therefore, based on the above, an effective participative management system in terms of the motivation of employees would therefore be a scenario where employees' higher-level needs are met through an intrinsic reward system, while focusing on the empowerment and engagement of these employees.

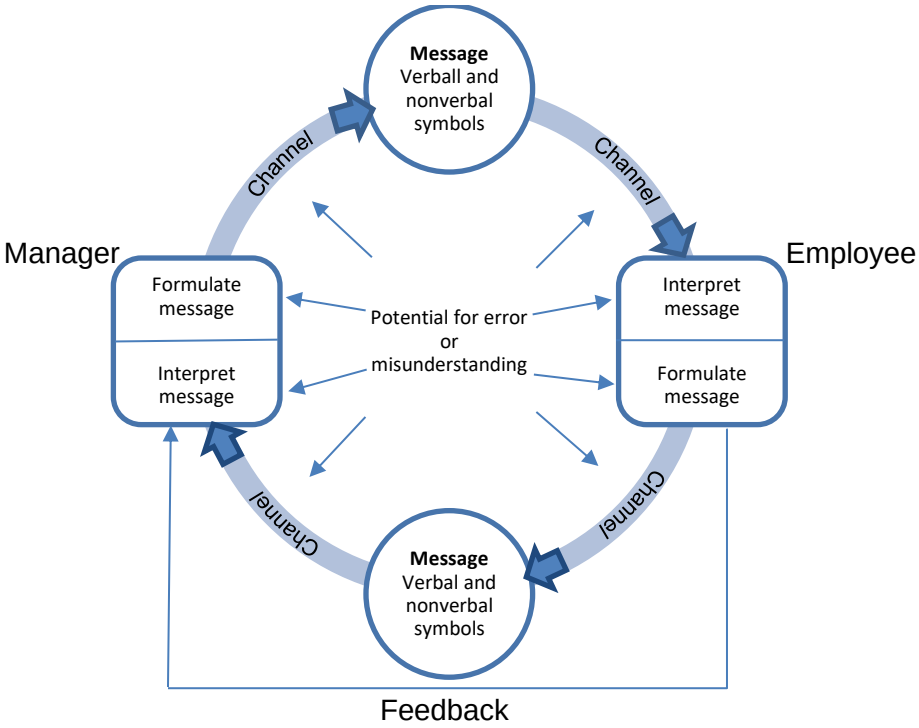
#### 1.4.2.3 Communication

According to Robbins and Coulter (2014:506), communication can be defined as the transfer and understanding of meaning. They further state that it is important to notice that if information and ideas are not conveyed and the meaning has not been imparted and understood, communication has not taken place. Esterhuyzen (2015b:13) explains that communication can be defined as the

sharing of information and ideas with others so that it is understood. These definitions emphasise the importance of understanding and one could therefore argue that being understood requires feedback from the other party. Consequently, communication is a two-way street where there a mutual flow of information is necessary in order to determine whether true communication has taken place (Esterhuyzen, 2015b:13).

According to Robbins and Coulter (2014:506), there are two types of communication, namely interpersonal and organisational communication. Interpersonal communication involves communication between two or more people and, as shown in Figure 1-2, is where a manager converts ideas and thoughts into a message, the message is channelled through a communication medium (nonverbal or verbal) and interpreted by the employee (Robbins & Coulter, 2014:508). This process of converting thoughts and ideas into a message that is interpreted by the employee can sometimes cause communication errors, and therefore the concept of feedback is important as it enables the manager to determine whether the employee correctly understood the message being conveyed (Daft *et al.*, 2015:128).

**Figure 1-2: Interpersonal communication process**




Source: Adopted from Daft *et al.* (2015).

Organisational communication, on the other hand, involves the networks systems as well as patterns of communication within organisations (Robbins & Coulter, 2014:506). Communication flow in organisations can be downwards, upwards, laterally or diagonally (De Nobile, 2016:381). Downward communication involves information that moves from the manager to employees

(Raina & Roebuck, 2016:106). Examples of downward communication include pointing out problems that need attention, informing employees about policies and procedures, discussing objectives, and evaluating performance. Upward communication is communication that flows from employees to managers (Sadia, Salleh, Kadir & Sanif, 2017:174). It is important, as it helps managers to keep track of how employees feel about their co-workers, jobs, and the organisation in general, as well as for gathering new ideas and suggestions from employees (Kadous, Proel, Rich & Zhou, 2017:7). Examples of upward communication in the organisation include discussion sessions with managers, performance reports and grievance procedures. Lateral communication, on the other hand, takes place between employees at the same organisational level (Liang, 2014). An example of lateral communication in an organisation would be where a sales manager communicates with the human resources manager, and *vice versa*. Furthermore, diagonal communication happens when information is exchanged across organisational levels and work areas. Diagonal communication also allows information to flow upward and downward through different hierarchal levels as well as between managers of the same level (Unsar, 2014:50).

Considering the above, a high level of participative management in terms of communication would therefore be a scenario where information is shared downward, upward and across organisational levels, and where communication is initiated by top-level managers to encourage lower-level employees to willingly share information.

#### 1.4.2.4 Decision-making

Decision-making is a process by which numerous possibilities are considered and prioritised, resulting in a clear choice of one option over others. Not only does it play a significant role in our daily lives, but also in business in general (de Janasz, Dowd & Schneider, 2012:306).

Decision-making can happen on group or individual level (Boshoff, 2015; Spicer, 2013). On an individual level, decision-making styles have an effect on the way managers make decisions, whereas group decision-making has its own set of styles, where each decision-making style affects the group in its own unique way (Boshoff, 2015:124-125). To achieve the primary aim of this study, the focus will be on group-level decision-making.

Spicer (2013:189) identifies four types of group decision-making styles, namely autocratic group decision-making, democratic group decision-making, collective group decision-making and consensus group decision-making styles. These four decision-making styles are summarised in Table 1-5 below:

**Table 1-5: Summary of group decision-making styles.**

| Decision-making style | Description |
|---|---|
| Autocratic group decision-making | • The autocratic decision-making style is where the leader or manager takes complete control and ownership of the decision and takes full responsibility for the result or outcome.<br>• In this scenario, no suggestions or ideas are asked from other members of the team.<br>• While this type of style is effective in an emergency situation, it is not ideal for situations where careful planning and time are required, as it might have a negative effect on employee morale. |
| Democratic group decision-making | • Democratic decision-making is ideal when quick decisions need to be made.<br>• It requires minimum group participation and the leaders give up ownership of the decision and allow the group to vote on the best course of action, where the majority vote will decide what action is taken.<br>• The disadvantage of this style is the lack of individual responsibility, as there is no one person who can claim responsibility for the decision or its outcome. |

**Table 1-5: Summary of group decision-making styles (continued).**

| Decision-making style | Description |
|---|---|
| Collective group decision-making | • In collective group decision-making, the leader or manager will involve members in all aspects of decision-making, encouraging full participation from team members by allowing them to give their perceptions, ideas, knowledge and information concerning the situation.<br>• This lets the leader gain an accurate understanding of the situation and results in better overall decision-making.<br>• However, in this scenario, the leader still maintains full control over and responsibility for the final decision.<br>• An advantage of this style is the high degree of group participation and involvement. The disadvantage of this style is the long time it takes for a decision to be made. |
| Consensus group decision-making | • In consensus group decision-making, the leader gives up full control of the decision.<br>• The group is thoroughly involved in the decision-making process, and there is no individual responsibility, as each member is devoted to the decision and has a stake in the outcome of that decision.<br>• This style is different from democratic decision-making, as each person must agree and reach consensus on the decision being made.<br>• Consensus group decision-making creates strong commitment from the group and increases the probability of success.<br>• It is however, a very slow process and it takes a great deal of time for the group to reach their full potential. |

Source: Adopted from Boshoff (2015:124-125).

Based on the discussion above, a high level of participative management in terms of decision-making would therefore be a scenario where members of a team are fully involved and invested

in the decision-making process. A final decision is reached based on consensus, and each member is responsible for the outcome of that decision.

#### 1.4.2.5 Control

Organisational control can be defined as a systematic process where organisational activities are controlled in order to make them consistent with the expectations established in targets, plans, goals and standards of performance (Jones & George, 2016:315).

The process of controlling stems from the strategic goals established by the organisation (Williams, 2012:303). The control process starts with establishing performance standards; the actual performance is then measured on a daily, weekly, or monthly basis against these standards (Du Toit, Erasmus & Stydom, 2011:231). These performance measurements from actual activities are then compared to the performance standards set in the beginning of the process, from which a course of action is determined. If adequate, no action is required; if inadequate, corrective action needs to be taken (Daft & Marcic, 2015:631).

Daft and Marcic (2015:642) identify two methods of control, namely hierarchical control and decentralised control. Hierarchical control, according to them, involves the use of formal policies, rules, documentation, reward systems and other formal methods to influence employee behaviour, and decentralised control relies on shared values and goals to control employee behaviour. With hierarchical control, there is a strong focus on authority, and therefore responsibilities of outcomes and quality rest on supervisors and managers (Pride, Hughes & Kapoor, 2012:264). With decentralised control, there is shared authority among different levels of the organisation when it comes to the process of setting performance standards and measuring actual performance. This gives employees the responsibility to control themselves (Griffin, 2012:2012).

Based on the above, it would therefore be reasonable to argue that in terms of effective participation management, a decentralised control method would be best as it promotes employee involvement in all aspects of the control process, from setting goals and standards to measuring actual performance.

#### 1.4.2.6 Goal setting

Goal setting can be defined as a method of establishing clear and usable targets or goals, and developing strategies to attain them (Beal, 2017:21; de Janasz *et al.*, 2012:52). One important aspect, which is important for the process of achieving goals, identified by Unger-Aviram and Erez (2016:240), is that of shared values. Shared values can be seen as the rules for the expected

behaviour of team members, and therefore have an effect on the way members interpret stimuli in their work environment; in other words, they guide the steps taken by the team when confronted with different scenarios (Park, Spitzmuller & Deshon, 2013:1351). Unger-Aviram and Erez (2016:240) also indicate that these shared values lead to higher engagement in activities, which is a key component of organisational effectiveness.

From the abovementioned, there are two important aspects of goal setting. Firstly, the establishment of clear goals, and secondly, the role of values in achieving goals. The most common method to establish clear goals is by using the SMART system. According to this system, these goals are Specific, Measurable, Attainable, Relevant, and Time-bound (Aghera, Emery, Bounds, Bush, Stansfield, Gillett & Santen, 2018:113). These goals are summarised by Erasmus, Strydom and Kloppers (2013:195) as follows:

- When goals are specific, it indicates what the goal relates to and the desired results of the goal.
- When the goal is measurable, it has been stated in a way that the result can be evaluated objectively in quantified terms.
- Attainable goals are achievable, yet it should still provide a challenge.
- Relevant goals are set in alignment with the organisation's mission and strategic goals.
- Goals that are time-bound have a specific deadline set to it. Setting deadlines creates the commitment to reach goals.

Shared values further imply that there should be an alignment between individual values and organisational values (Unger-Aviram & Erez, 2016:240). According to Hsu and Huang (2016:233), there are two types of values on an individual level, i.e. instrumental values and terminal values, where instrumental values are the role one's behaviour plays when determining how goals are set, and terminal values are the end state in terms of goals individuals would like to achieve during their lifetime. Organisational values, on the other hand, form the basis of an organisation's culture and are considered to be the set of values on how work should be done to achieve success that an organisation believes to be important (Avota, McFadzean & Peiseniece, 2015:126).

Therefore, according to Likert (1967:208), an organisation with a high level of participative management would therefore create an environment where there is a shared belief in the importance of group participation when setting high performance goals at different organisational levels, and where there is a full acceptance of the goals established. With the above as

background, the second part of the primary aim of this study is to see what the effect is on safety management; therefore it will be discussed in the following section.

### 1.4.3 Safety management

According to Yorio, Wilmer and Moore (2015:221), safety management can be defined as a system of institutionalised, interrelated and interacting strategic management practices designed to establish and achieve occupational safety and health goals and objectives. Moyo, Zungu, Kgalamono and Mwila (2015:498) mentioned that the governance of occupational health and safety in South Africa is shared by three government departments, namely the Department of Mineral Resources (DMR), the Department of Health (DOH), and the Department of Labour (DOL). The DMR administers the Mine Health and Safety Act (29 of 1996) for mines, the DOH oversees the National Health Act, and the DOL controls the Occupational Health and Safety Act (85 of 1993). All of these acts guide the way in which safety should be implemented in the workplace; however, if one takes a closer look at these acts, little is mentioned on how these guidelines should be implemented in the workplace.

Over the recent past, especially in South Africa, safety was very much managed in a reactive manner and implemented because of enforcement from these acts. However, today, new integrative proactive approaches are being promoted by regulatory bodies, such as the International Standards of Organisations (ISO), and it has resulted in many companies changing their safety management methods from a bureaucratic prescriptive style to a style that is more systems-based, participative and integrated with other business activities (Kontogiannis *et al.*, 2017:128).

An occupational safety and health management system (OSHMS) is a systematic approach to managing safety; it creates a quality of work life for employees, and includes accountabilities, organisational structures, policies and procedures (Bayram & Ünğan, 2018:2). The key aspect of this system is that the responsibility of safety in the workplace is not that of management alone, but should involve all stakeholders in the organisation. To achieve this, an effective OSHMS should display the following characteristics: Commitment from management, workforce involvement and a positive safety culture (Al-Najjar & Jawad, 2011; Esterhuyzen, 2015a; Unnikrishnan *et al.*, 2015), the latter being the main focus of this study as a tool used to measure safety performance.

#### 1.4.3.1 Safety culture

Culture can be defined as the basic assumptions held by members of an organisation, which influence the way they behave; in other words, it can be described as a shared understanding of

how things should be done among groups and organisations (Manley, Sanders, Cardiff & Webster, 2011:2). Safety culture can therefore be described as a set of safety-related values, attitudes and assumptions shared among members of an organisation (Antonsen, 2009:183). A company's organisational culture has a great impact on its employees and the quality of their life at work (van Schoor, 2015:17). Once again, as senior management is responsible for the implementation of a safety culture, their commitment towards this is very important (Esterhuyzen, 2015a:19).

Van Loggerenberg (2015c:5) identifies five attributes, namely shared beliefs, values, attitudes, artefacts, and behaviours that are associated with a positive safety culture. These five attributes are briefly summarised in Table 1-6 below:

**Table 1-6: Summary of the theory of safety culture**

| Attributes of safety culture | Description |
|---|---|
| **Shared beliefs** | • Described as human emotions and assumptions;<br>• Formed through experience and learning;<br>• Are essential for a successful safety culture within an organisation;<br>• Management's influence towards safety is valuable. |
| **Safety values** | • Consist of shared safety beliefs;<br>• Shape the safety culture of an organisation;<br>• Ensure the importance of employee involvement in matters of safety;<br>• Contribute to good safety practices and behaviours and add to the success of the organisation. |
| **Safety attitudes** | • Can be described as the state of mind towards an issue;<br>• Training is vital for new employees as it forms the correct attitude towards safe work actions;<br>• Alertness from employees is important as a careless attitude can become the accepted norm. |

**Table 1-6: Summary of the theory of safety culture (continued)**

| Attributes of safety culture | Description |
|---|---|
| **Artefacts** | • Includes the safety policy and procedures of an organisation;<br>• Are incorporated with the safety management system;<br>• Are written records of organisational values. |
| **Behaviours** | • Management communicates safety beliefs and values;<br>• Management shows visible leadership and commitment;<br>• Employees show engagement, commitment and motivation towards safety procedures and systems;<br>• Employees are actively involved in safety matters. |

Source: Adopted from Van Loggerenberg (2015c:6).

With the literature as background, the research objectives will be formulated in the next section.

## 1.5 RESEARCH OBJECTIVES

The section to follow entails the formulation of objectives based on the aforementioned research problem and literature review.

### 1.5.1 Primary objective

The primary objective of this study was to determine the effect that participative management has on the creation of a safety culture in the forestry industry of South Africa.

### 1.5.2 Secondary objectives

The secondary objectives derived from the primary objective as well as the research problem are:

1. to measure respondents' perception of participative management;
2. to measure respondents' safety culture;
3. to determine whether leadership has an effect on the establishment of a safety culture;
4. to assess whether motivation has an influence on the creation of a safety culture;

5. to determine whether communication has an impact on the construction of a safety culture;

6. to investigate the consequence of decision-making on the design of a safety culture;

7. to explore the value of goal setting on safety culture;

8. to examine the importance of control on safety culture; and

9. to determine the influence that the dimensions of participative management has on safety culture.

## 1.6 RESEARCH METHODOLOGY

This section provides a brief overview of the research methodology that was used in this study. The following will be discussed: the literature study, empirical investigation, target population, sampling frame, sampling method, sample size, measurement instruments, data collection, and data analysis.

### 1.6.1 Literature study

When conducting a research study, it is important for the researcher to use relevant theory (Bryman & Bell, 2015:92), because it includes a summary and recap of the specific areas of research, allowing the reader to understand the reason for conducting the research (Joubert, Hartell, & Lombard, 2016:26). In this regard, a literature study was conducted by using national and international literature. The abovementioned literature was obtained from a variety of sources, which include websites, academic books, journals, theses, departmental reports, and company reports. The researcher also consulted a variety of electronic databases, including Google Scholar, ProQuest, EBSCOhost, Social Sciences Citation Index (SSCI), Sabinet, and the National ETD Portal for extensive literature that served as the basis for this study.

### 1.6.2 Empirical investigation

The following sections will provide a detailed discussion of the research design, target population, sampling frame, sampling method, sampling size, measurement instrument, data collection and data analysis procedure that was used in this study.

#### 1.6.2.1 Research design

The research design provides the framework for the collection and analysis of data. It is therefore a plan outlining how observations were made and how the researcher carried out the project (de Vos, Strydom, Fouche & Delport, 2012:143). In the literature, two types of research methods can

be identified, namely quantitative and qualitative (Elman *et al.*, 2016; Olutuase, 2017; Pilcher & Cortazzi, 2016). Quantitative research involves the collection of numerical data, assumes the nature between theory in research as deductive, uses a natural sciences approach (positivism in particular), and adopts an objective approach to social reality (Maree & Jacques, 2016b:162). Qualitative research involves collecting, analysing and interpreting data by observing what people do and say; it uses an inductive approach where theory is an outcome of research (Burns & Bush, 2014:146). **A quantitative research strategy** was used for the purpose of this study, as it focused on the collection of numerical data through the administration of a set of structured questions with predetermined responses.

Bryman and Bell (2015:100) identify five types of research designs that are commonly used in business sciences, which are described in the table below:

**Table 1-7: Summary research design**

| Research design | Description |
|---|---|
| **Experimental design** | Relationships among control and experimental groups pertaining to a dependent variable. |
| **Cross-sectional design** | Social survey research on a sample at a single point in time. |
| **Longitudinal design** | Social survey research on a sample on more than one instance. |
| **Case study design** | Social survey research on a single case with the purpose to unravel distinctive features about its nature. |
| **Comparative design** | Social survey research in which there is a link between two or more cases, as well as cross-cultural research. |

Source: Adopted from Bryman and Bell (2015:117).

This study focused on the collection of quantifiable data related to the variables. The data was collected from more than one respondent at a single point in time and therefore followed a **quantitative cross-sectional research design.**

#### 1.6.2.2 Target population

A population is the entire group under study for analysis as defined by the research objectives. The target population can be defined as the population of interest (Burns & Bush, 2014; Lazar *et al.*, 2017:108). The target population for this study included all workers from the forestry industry in South Africa. The motive for choosing this sample is mostly due to the high extent of forestry

operations in South Africa, the labour intensiveness of harvesting and silviculture operations, and the importance of safety management in this field.

#### 1.6.2.3 Sampling frame

A sample frame can be defined as a list of all units in the population from which a research sample will be selected (Rahi, 2017:3). In the case of this study, it was difficult to obtain a list of all units as defined in the target population as most companies in this industry are bound to ensure the confidentiality of their employees. This is an important aspect one has to take into consideration as the availability of a sample frame has a direct impact on the sampling method that will be used. The method that will be used in this study is described in the section below.

#### 1.6.2.4 Sampling method

Sampling involves an extensive procedure when selecting units for analysis from a target population (du Plooy, 2014:108). There are two distinct categories to which sampling belongs: probability methods and non-probability methods (Maree & Jacques, 2016a:192). Probability sampling involves a sample that has been selected randomly from a list or database where every unit from the population has a known chance of being selected; on the other hand, non-probability sampling implies that a sample has not been selected randomly and some units from the population may have a better chance of being selected than others (Etikan, Musa & Alkassim, 2016:1). Techniques for probability sampling include simple random sampling, systematic random sampling, stratified random sampling, cluster sampling, and multi-stage cluster sampling (Rahi, 2017:3). Techniques for non-probability sampling include convenience sampling, snowball sampling, quota sampling and judgement sampling (Gogtay & Thatte, 2016:66). Convenience sampling is where individuals are selected based on their accessibility to the researcher; snowball sampling is when one individual refers the researcher to another individual with similar traits; quota sampling is a technique where the sample is chosen based on similar proportions as the population; and judgement sampling is when the researcher selects respondents based on their knowledge and professional judgement (Burns & Bush, 2014:255).

**A non-probability, convenience and judgemental sampling was used for the purpose of this study.** The purpose for the use of non-probability sampling is that a sample frame is not attainable, and therefore members of this population did not have an equal chance of being selected for this study. For this reason, **convenience and judgemental sampling** allowed the researcher better accessibility to respondents and also allowed the researcher to obtain a sufficient number of respondents (Gogtay & Thatte, 2016:67).

#### 1.6.2.5 Sample size

The sample size for this study contained 280 respondents. For statistical purposes, it is considered that a sample of 50 is very poor, while 100 is poor, 200 is reasonable, 300 is good, 500 is very good, and a 1 000 is brilliant (Rahi, 2017:4).

**Table 1-8: Summary of sampling plan**

| | |
|---|---|
| **Population** | Workers from the forestry industry in South Africa. |
| **Sample** | Workers from the Mpumalanga Province, male and female, who participate in operational activities (OHS in particular) in the forestry industry. |
| **Sampling frame** | Not available. |
| **Sampling method** | Non-probability, convenience sampling. |
| **Sample size** | 280 respondents. |

Source: Researcher's own depiction.

#### 1.6.2.6 Measurement instrument

A questionnaire is a research method that allows the researcher to state questions to a large number of individuals and record their responses (Swart, 2018:251). Due to the nature of the study, self-administered questionnaires together with the assistance of an interviewer and translator was used. A pilot sample was interviewed to test the validity of the questionnaire and to clear any uncertainties.

A part of the questionnaire also included a preface that provided respondents with information on the background of the study, their rights, and information on how the questionnaire needs to be completed. The questionnaire therefore included the following sections:

- Section A: This section captured the level of participative management experienced from respondents. Section A used an adopted version of Likert's management system questionnaire. This section implemented a five-point Likert-type scale (1 = strongly disagree and 5 = strongly agree) that was used in 24 questions, starting with Question 1 which measured leadership, and ending with Question 24 which measured control (Likert, 1967:8).

- Section B: This section measured the safety culture of respondents. This section implemented a five-point Likert-type scale (1 = strongly disagree and 5 = strongly agree) that was used in 12 questions, starting with Question 25 that measured management commitment and actions

towards safety, and ending with Question 36 that measured worker's participation and commitment towards safety.

#### 1.6.2.7 Data collection

This study used a quantitative research design where data was collected through a structured self-administered questionnaire with the assistance of an interviewer and translator. This allowed the researcher to account for any language issues that might occur should respondents not be fluent in English. The researcher, together with management, agreed upon a schedule running through the course of a week to collect data from respondents so that it did not interfere with the work of the respondents.

#### 1.6.2.8 Data analysis

In terms of data analysis, the researcher was assisted by the Statistical Consultation Services of the North-West University's Potchefstroom Campus, where data was analysed from gathered data off the completed questionnaires. After this, the recommendations pertaining to each of the secondary objectives of this study were made (see Sections 6.3).

The Statistical Package for the Social Sciences (SPSS) (Version 25) was used to clean, capture edit and analyse the data that was gathered from the questionnaires.

The following data analyses was conducted:

- Validity was determined through factor analysis by determining the Kaiser-Meyer-Olkin measure of sample adequacy (KMO), Bartlett's test of sphericity, checking the internal consistency of the questions loading onto the same factors, and by examining the amount of variance that the original variables accounted for by each component, through principle component analysis (PCA) (Hair *et al.*, 2020:428; Malhotra *et al.*, 2017:711; Mooi *et al.*, 2017:272).

- Cronbach alpha values were calculated in order to determine the internal consistency and reliability of the scales used in this study (Babin & Zikmund, 2016).

- Frequency distribution was presented with a summary of the frequencies for all the data values in a particular variable, with a summary of the percentage of the frequencies for all the data values in a particular variable as a proportion of a 100.

- The scale question was calculated using standard deviation and means scores.

- The Pearson's product moment correlation coefficient was used to look for relationships between the individual dimensions of participative management and safety culture (Martelli & Greener, 2018:89).

- Standard multiple regression was used to test the relationship between participative management and safety culture, with the dimensions of participative management as independent variables, and each of the individual dimensions of safety culture as the dependent variables (Hair *et al.*, 2020:395).

The following section further elaborates on the ethical considerations adopted for this study.

## 1.7 ETHICAL CONSIDERATIONS

It is important to consider ethical considerations for this proposed study as human respondents are involved, and ethical clearance was obtained from the ethics committee of the North-West University to administer the questionnaire, with the following ethics number: NWU – 0122 - 19-A4. The outcome of this study relied on the integrity and objectivity of the researcher; it was therefore important for the researcher to remain open, truthful, impartial, and accurate. The rights of all people were respected. No harm to any individual or business was caused by this study. Anonymity and confidentiality were ensured. No respondent was forced to complete this study and each respondent was informed that participation was voluntary.

The findings of this study were summarised according to individual responses; these results were made available to respondents and parties directly involved.

## 1.8 CONTRIBUTION OF THE STUDY

**This study** provided a better perspective on how participative management can lead to better safety management in the forestry industry. This can also lead to fewer incidents and fatalities in the forest industry and can reduce the risk involved in activities performed in such operations. **This study** also contributed to existing literature with regard to safety management in the forestry industry, as there is little information on how safety is managed in this specific industry, if any. It also gave clarity on the role that leadership, motivation, communication, decision-making, goal setting and control play in the management of safety in the forestry industry.

## 1.9 OUTLINE OF CHAPTERS

The following chapters were included for the purpose of this study:

• **Chapter 1:** Chapter 1 provided a brief background and introduction to this study. This chapter started off with presenting the research problem of the study, thereafter a brief analysis of the forestry industry is provided and followed by a brief literature review. The chapter concludes with an overview of the secondary objectives for this study and the research methodology that was adopted. It, then presents the ethical considerations for the study and ends with a discussion on the contribution that this study made.

• **Chapter 2:** In Chapter 2 an industry overview of the forestry industry is provided. In this instance the chapter starts with defining the forestry industry, after which the current state of global forestry is then deliberated. The chapter then discusses an in-depth overview of forestry in South Africa by focusing on the trends and challenges pertaining to forestry in South Africa and concludes with an overview on how forestry is managed in South Africa.

• **Chapter 3:** In this chapter the literature with regards to participative management and safety culture is provided. In this regard the chapter starts of by exploring management and the history of management, thereafter an in-depth overview of the constructs of participative management and how they relate to safety culture is provided. This chapter is then concluded with an overview of safety management, focusing on safety culture and more specifically on the constructs of safety culture.

• **Chapter 4:** Chapter 4 presents a discussion on the research methodology that was followed in this study. The research methodology section in this study starts off by presenting the research philosophy adopted for this study and forms the foundation for the sections to follow. After this an in-depth overview of the nature of business research and the business research process adopted for this study will be put forward.

• **Chapter 5:** This chapter further elaborates on the results and findings pertaining to the secondary objectives that were proposed for this study. In this chapter the results pertaining to the data that was collected for this study will firstly be analysed and then discussed. The chapter then concludes by presenting the main findings for each of the secondary objectives.

• **Chapter 6:** Chapter 6 provides the conclusion for this study. The aim of this chapter was to put forward the implications and recommendations from the main findings in Chapter 5. In this regard, implications and recommendations for senior management are made on how they can improve their safety culture through participative management. The chapter then provides the overall theoretical and practical contribution from this study, as well as the limitations that were experienced during the execution of this study. The chapter ends with a discussion on the suggestions for future research.

# CHAPTER 2

# FORESTRY OVERVIEW

## 2.1 INTRODUCTION

The purpose of this chapter is to provide insight into the forestry industry globally and in South Africa particularly. The chapter commences with a conceptualisation on forestry through definitions and history, introduces the various global terms used in forestry by providing the difference between the types of forests and how they are managed, discusses the role of sustainability in forestry globally, and finally describes the current state of forestry globally and in South Africa.

Outlined in Figure 2-1 is an abbreviated synopsis of the sections that will be discussed in this chapter:

**Figure 2-1: Chapter 2 structure flow**

Source: Researcher's own compilation.

## 2.2 CONCEPTUALISATION OF FORESTRY

The following subsections form an idea around what forestry entails by firstly providing the definition of forestry and then giving a brief history on how the concept of forestry started.

### 2.2.1 Forestry defined

There are various definitions used in the literature to define forestry. For this reason, an overview of some of these definitions will follow to provide a general context of forestry after which an overall definition for forestry will be formed that will be used in this study.

A fairly early definition defines forestry as the business and art of managing and conserving forests and associated lands for continuous social, environmental and economic benefits (Matthews, 1989:61). A more recent definition defines forestry as the science of planting, managing and caring for timber plantations and the management of the landscapes, communities, animal and plant species that form part of these plantations (FSA, 2017c). Parthiban *et al.* (2016:1) defines forestry as the theory and practice of all that constitutes the creation, conservation and scientific management of forests and utilization of their resources. Another definition refers to forestry as the science and craft of creating, managing, using, conserving and repairing forests, woodlands and associated resources to meet desired goals, and values for human and environmental benefits (Omodero & Ogbonnaya, 2018:132).

With the above definitions in mind, the following definition was compiled and will be used in this study:

*Forestry is the science of managing, using, repairing and conserving forests and the resources it provides for continuous social, environmental and economic benefit*.

### 2.2.2 The history of forestry

It is argued by Bennett (2015:20) that it is difficult to predict the true “origin” of forestry. He argues that rather than pinpointing the origin of forestry, forestry as it is seen today emerged from multiple geographical locations as a response to changes in the science and practise of forestry as a result of globalization. The science and management of forestry as a discipline in Europe was pioneered by the Germans, as they were the first to manage plantations scientifically by harvesting trees and replanting them with a commercially viable species. They wrote down their ideas in textbooks and taught these ideas in forestry schools between the 1780s and 1790s (Bennett, 2015:26). Their theories of forest management spread to different forestry schools in Europe in countries such as Russia (1803), Austria (1805), Hungary (1807), Poland (1816), France (1824), Sweden

(1828), Ukraine (1840), Spain (1848) and Switzerland (1855) who invited German-trained foresters to teach their students. It is therefore considered that Germany had the biggest influence on European forestry as well as on the rest of the world (Bennett, 2015:26). Forestry as a practise was largely influenced by the rapid state of deforestation experienced in the 18th and 19th centuries in order to support the growing demands of forest related products from emerging economies (Bennett, 2015:25).

The rise of commercial forestry in South Africa started in 1875 due to a growing demand in fuelwood for growing railways (Scott & Gush, 2017:160). The Cape colony, later to be referred to as the Union of South Africa, played an important role in the development of state forestry in South Africa, as they used their European colonial networks in conjunction with their knowledge of the scientifically based 'international model for forest management' which was established through European experiences, and adapted it to the local conditions of South Africa to establish the initial forestry practises for South Africa (Witt, 2014:1199). It was quickly realised that natural forest was not going to be enough to meet the demand for fuelwood, and it was during this period (1906) that South Africa's first school of forestry was established specifically to develop local expertise for afforestation purposes (Witt, 2014:1197). The popularity of tree planting increased and by 1910 almost 60 000ha of black wattle trees were planted commercially by the state, except for a couple of private land owners in KwaZulu-Natal (DAFF, 2019). In order to account for more diverse demands in terms of building materials, wind breaks and fuelwood, some other species such as pine and eucalyptus were also introduced. During World War II the South African government established the Department of Forestry to ensure better management of forests both naturally and commercially (DAFF, 2019).

## 2.3 FORESTRY GLOBAL OVERVIEW

The following sections will aim to provide an overview of forestry globally by explaining the different terms used, investigating the state of forestry globally and explaining the importance of sustainability.

### 2.3.1 Planted forests global terminology and definitions

The Food and Agriculture Organization of the United Nations (FAO) refers to forests as natural forests, planted forest or non-forest (FAO, 2018:58). They further divide natural forests and planted forests in four sub-categories which are summarised in Table 2-1 below:

**Table 2-1: Scope of different types of forest**

| Natural forest | | | | Planted forest | |
|---|---|---|---|---|---|
| Primary | Modified natural forests | Semi-natural forests | | Plantations | |
| | | Assisted natural regeneration | Planted component | Productive | Protective |
| Forest of native species where there is no clear indication of human activity. | Forest of naturally regenerated native species where there is a clear indication of human activity. | Natural forest where silvicultural management is present which include activities such as weeding, thinning and selective logging. | Forest of native species established through planting, seeding or coppice. | Forest of primarily introduced and native species established through planting and seeding to produce wood or non-wood products. | Forest of native or introduced species established by planting or seeding for provision & environmental purposes. |

Source: Adopted from Carle and Holmgren (2008:12).

Natural forests can be seen as forests with a high conservation value where there is a clear focus to sustain the forests ecological properties, native biodiversity, and dominance of native trees (Chazdon *et al.*, 2016:540). Semi-natural forests can be seen as natural forests that have had some kind of disturbance from human activity or as plantations that were established and left unmanaged for a significant period of time (Forest Uerope, 2015:141). Planted forests are considered to be the types of forests that require the highest intensity of management and can be defined as a forest that is mainly composed of trees that are established through the deliberate planting of seeds or seedlings of commercial trees for the use of mostly timber and paper (Payn *et al.*, 2015:58). Planted forest also include what is commonly understood as forest plantations or plantations and referred to as above as a forest that originate mainly from tree planting (Forest Uerope, 2015:141).

With the differences between natural forest and planted forest explained, the question arises on how natural forest and planted forest can be managed in a sustainable manner to ensure continuous economic, environmental and social benefit. The following section will focus on the current state of sustainable forest management globally.

### 2.3.2 The current state of sustainable forest management globally

Sustainable Forest Management (SFM) should involve a balance between social, environmental and economic aspects. SFM can be seen as the effort to promote and maintain the social,

environmental, and economic value of all types of forests for present and future generations (MacDicken *et al.*, 2015:47).

With the above in mind, according to the FAO (2020:125), the following conclusions can be drawn in terms of the current state of sustainable forest management globally:

- The global forest area is shrinking at a rate of 4.7 million ha per year.
- Deforestation remains a challenge and is currently occurring at a rate of 10 million ha per year.
- Africa is currently experiencing the most deforestation in comparison with other continents in the world, which is largely attributed due to the impacts of high population growth.
- Deforestation in Asia and South America is declining.
- Sustainable forest management is improving with long term management plans in place for almost half of the global forest area. There is however reason for concern in Africa and South America, where only 25 % of the forest area in these regions are considered to be under forest management plans.
- Globally, 18 percent of the world's forested area is considered to be legally established protected areas such as national parks, conservation areas and game reserves.
- About 30 percent of all forests globally is managed mainly for the production of nonwood and wood forest products – this has been the situation since 1990.

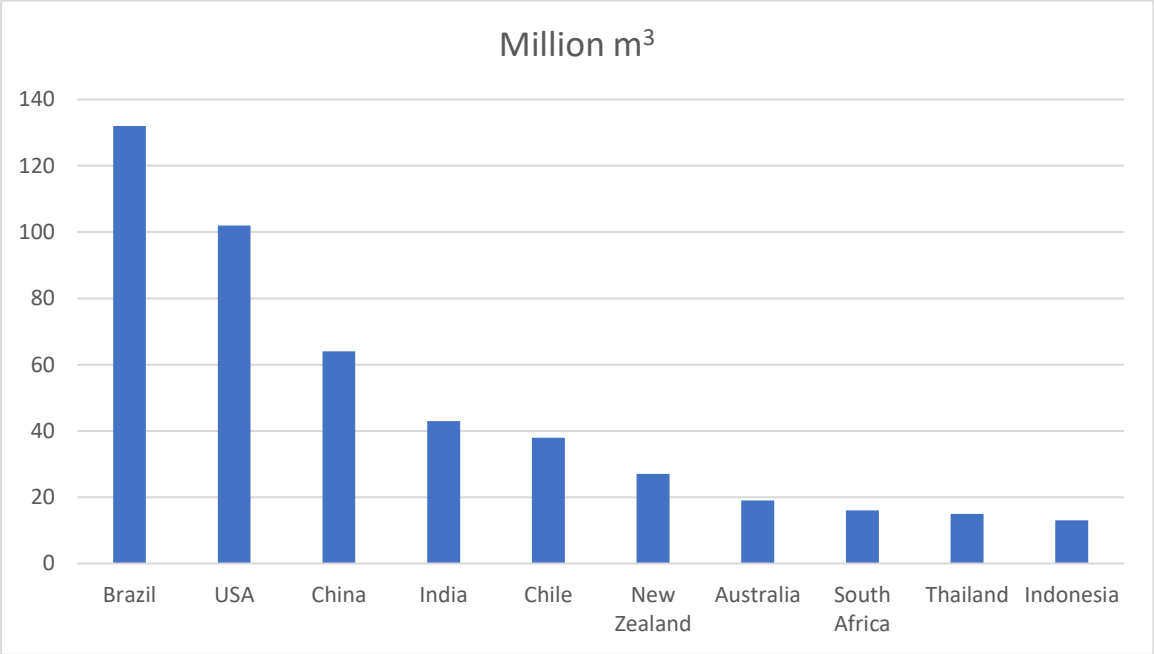
With an overview of the progress made towards global SFM, the following section will focus on the current state of forestry globally.

### 2.3.3 Current state of forestry globally

Planted forests play an important role to secure industrial round wood and wood fuel. As such, planted forest have formed the foundation for an increasing forest-based manufacturing and export industries (Jürgensen *et al.*, 2014:5). Forestry is one of the main contributors to the Gross Domestic Product (GDP) in both formal and informal economies. According to data from the 2015 Global FRA report, forestry contributed an estimated USD 117 billion to the global GDP (FAO, 2015b:35). Activities in forestry such as harvesting and silviculture operations also contributed to societies' social, environmental and economic welfare, and it is estimated that more than 12.5 million people are employed by forestry globally (FAO, 2020:104). The latest statistics the

researcher could find regarding the top 10 producing countries of round wood from plantations are shown in Figure 2-2 below. From this data the top 3 producers include Brazil, USA and China.

**Figure 2-2: The world's top 10 countries of producers of industrial round wood from plantations 2012**




Source: Adopted from Jürgensen *et al.* (2014)**.**

It can therefore be argued that forestry plays a significant role at an international level if one takes into account the amount of GDP contribution made by forestry globally. The total figure of employment the industry provides and the total production the industry delivers also supports this significant role (Jürgensen *et al.*, 2014:14). As shown in Figure 2-2, South Africa is one of the top 10 round wood producing countries globally and will be the country under focus from a national perspective. The following section will therefore further elaborate on the South African forestry industry.

## 2.4 FORESTRY IN SOUTH AFRICA

This section starts with the different industries in South Africa, followed by an overview of agriculture, forestry and fisheries in South Africa. Thereafter the current state of forestry in South Africa will be discussed, followed by the trends and challenges facing forestry in South Africa, and finally concentrating on the management of forestry in South Africa by focusing on silviculture, forest management guidelines through certification systems and the argument for participative safety management in the industry.

### 2.4.1 Different types of industries in South Africa

South Africa's key economic industries include: agriculture/forestry and fishing, mining, manufacturing, electricity/water and gas supply, construction, trade (wholesale, retail and motor trade), transport, finance, real estate and business services, as well as government and personal services (Stats SA, 2018:14). According to the latest industry statistics, South Africa's GDP grew by 1,2% in the fourth quarter of 2021 taking the annual growth rate towards 4,9% for the year (Stats SA, 2022). The top industry performers towards nominal GDP in 2021 include mining (11%), agriculture, forestry and fisheries (8,3%) and manufacturing (6,6%) (Stats SA, 2022).

The focus of this study was on the forestry industry. The forestry industry in South Africa falls under the umbrella of agriculture, forestry and fisheries, therefore before continuing with the forestry industry, the following section will give an overview on agriculture, forestry and fisheries in South Africa.

### 2.4.2 Agriculture, forestry and fisheries in South Africa

DAFF oversees the agriculture, forestry and fishing industries in South Africa (Asis *et al.*, 2016:1). These industries are important contributors towards food security, job creation, trade, GDP and natural resource development in South Africa (DAFF, 2018:7). South Africa is self-sufficient in most agriculture products except for poultry, red meat and wheat (Government Communication and Information System (GCIS), 2018:3). To improve food security, the DAFF has implemented initiatives such as the Fetsa Tlala programme and the Ilima/Letsema programme. The purpose of the Fetsa Tlala programme is to ensure that underused agricultural land is put under production to increase local access to food (City Press, 2013). The purpose of the Ilima/Letsema programme encourages communities to plough, plant and produce their own food by providing agricultural advice and agricultural starter packs to poor households and small scale farmers (Taylor, 2013:763). Both these programmes further focus on assisting smallholder producers, rural households and struggling households to produce their own products through incentives and grants (GCIS, 2018:3). These industries also contribute towards employment in South Africa and according to government statistics that the agricultural sector employees more or less 849 000 employs (DAFF, 2018:8). Exports of South African agricultural, forestry and fisheries products increased from a value of R527 million in 2008 to a value of R712 million in 2017 (DAFF, 2018:8).

From the above it can be seen that agriculture, forestry and fisheries in South Africa form an important part of the South African economy in terms of job creation and GDP in a country that is already sitting at a 35,3% unemployment rate (Stoddard, 2022). As mentioned in the previous

section, the forestry industry is the main focus of this study; the following section will therefore focus on the forestry industry in South Africa.

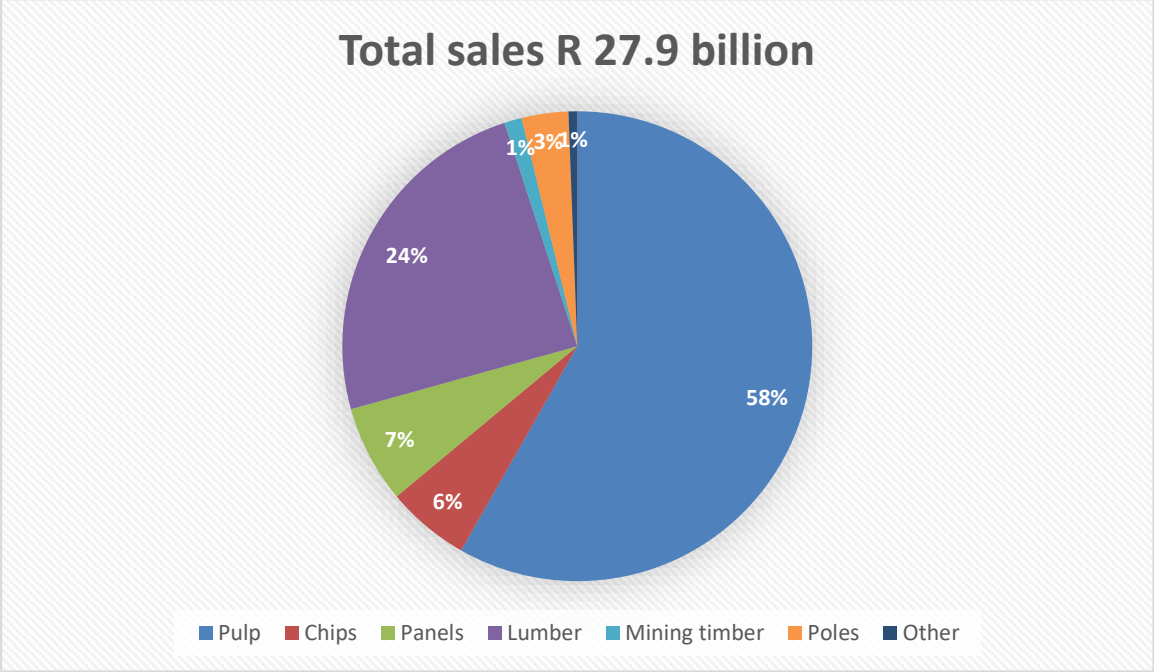
### 2.4.3 Current state of forestry in South Africa

This subsection provides an overview on forestry in South Africa by firstly discussing the economic impact it has, followed by the profile of ownership in the industry. Thereafter the impact the industry provides in terms of the community is addressed, then a picture is presented on the current progress towards transformation in the industry, succeeded by the effect of outsourcing in the industry, and finally the impact that mechanisation will have on the future of the industry.

#### 2.4.3.1 Economic impact

The forestry industry as a whole as calculated by government statistics contributes 2,1% to South Africa's total GDP, and employs roughly 157 500 workers (Godsmark & Oberholzer, 2019). According to the latest statistics, the gross value added by forestry is estimated to be R10 155 million (FAO, 2015a:80). From a regional perspective, forestry contributes the highest towards GGP in KwaZulu-Natal with 3,17% and Mpumalanga with 2,7% (Godsmark & Oberholzer, 2019:151). In terms of exports and imports of forestry products, there has been an increase in exports by 2,9% and a decrease in imports by 16,6% (Godsmark & Oberholzer, 2019:154). The core products in terms of sales volume in the South African forestry include pulp, chips, lumber, mining timber, panels and poles. The number of sales per product are summarised in Figure 2-3.

**Figure 2-3: Total sales by different types of products in the South African forest industry:**




Source: Adopted from Godsmark and Oberholzer (2019:110).

According to Figure 2-3 the top three products sold in South Africa include pulp (58%), Lumber (24%) and panels (7%), and this indicates that most forestry companies in South Africa are mainly involved with producing pulp or timber. The value of products sold was R27.9 billion, and this number of sales greatly aid the GDP contribution of the South African forestry industry towards the South African economy.

As the economic impact of the South African forestry industry has been established it is worth looking at the main companies that drive this industry. Outlined in the following section is an overview of the key role players in terms of ownership in the industry.

#### 2.4.3.2 Ownership

Statistics from Godsmark and Oberholzer (2019:16) indicate that of the 1 191 639 ha owned plantation area a total of 51,4% is owned by corporate companies, 14,8% by commercial farmers, and 10,57% by SAFCOL, a state owned company, whilst the rest is divided between the state and small growers. The significant role-players identified in terms of ownership in the South African forestry include Mondi, Sappi and SAFCOL (FP&M SETA, 2014:3).

Mondi has over 100 production sites across 30 countries with key operations located in North America, Western Europe, and Africa (Mondi Group, 2020:8). In South Africa Mondi has 1 400 direct employees and owns and manages 254 000ha of forest plantations between KwaZulu-Natal and Mpumalanga (Mondi Group, 2020:64). Mondi's core business in South Africa is to convert raw material such as wood into pulp to create products such as packaging and paper (Mondi Group, 2020:8). Employee engagement is an integral part of their culture and they consider open two-way communication as an essential part of their success (Mondi Group, 2020:48).

Sappi owns and manages 394 000 ha of plantations in South Africa (Sappi, 2021:5). Sappi's key operational areas in South Africa are located in the provinces of Mpumalanga and KwaZulu-Natal (Sappi, 2021:7). In South Africa, Sappi employs 4752 people directly and is considered to be the world's largest manufacturer of dissolving wood pulp (Sappi, 2021:6). Sappi's core products include raw material offerings, such as dissolving pulp, wood pulp, biomaterials and timber, and end-use products such as packaging and speciality papers, graphic papers, casting and release papers, and forestry products (Sappi, 2021:5). Sappi is also a firm believer in employee engagement and stated that their key to success depends on a committed and engaged workforce that takes ownership of their vision, mission and strategy. They further maintain that employee engagement is also key towards their safety performance (Sappi, 2021:14).

SAFCOL was established in 1992 as a state-owned company (SAFCOL, 2021:4). SAFCOL manages 290 861 ha spanning from Limpopo, Mpumalanga, KwaZulu-Natal, and Mozambique (SAFCOL, 2021:6). They also employ 1 500 direct and 3 500 indirect employees (SAFCOL, 2021:24). SAFCOL supplies the market with timber logs and processed timber which is mostly used for construction, pallets and packaging (SAFCOL, 2021:6). Their key objectives in terms of employee management are to ensure appropriate engagement with employees and build a more motivated workforce (SAFCOL, 2021:52).

#### 2.4.3.3 Community impact

Employees, along with their families and communities, form an integral part of any industry, and the companies in any given industry have always played a big part in the well-being of these stakeholders (Carroll & Bucholtz, 2015:27). For most forestry companies' corporate social investment (CSI) plays an important part in the sustainable development of the industry, seeing that it is an industry working with a renewable natural resource (Sahide *et al.*, 2016:81). If one looks at the industry, the areas worth considering that have a significant community impact include; education, health and welfare, community engagement and upliftment, and food security (FSA, 2018:1).

In terms of education there is a strong focus from forestry companies on providing support to local schools, rural schools, special needs schools and early childhood development. They also support many rural schools in remote areas of operations. A lot of companies also invest in skills development, as well as provide internships and full-time bursaries for tertiary education. These initiatives affect thousands of people each year and create a lot of opportunities for the communities involved (FSA, 2018:2).

The health and welfare of communities are also a high priority for FSA members. Companies such as Mondi, Sappi and SAFCOL have established their own clinics to deliver healthcare for communities in remote areas, they also focus on HIV/AIDS awareness and have various programmes in place to create awareness, as the disease has a big impact on these communities (Mondi Group, 2018; SAFCOL, 2018:129; SAPPI, 2018a).

The forestry industry also plays an important economic role through community engagement and upliftment in various rural communities. Examples of significant community engagement projects initiated from key role players in the industry, and include the Zimele programme from MONDI and the Abashintshi programme from SAPPI (Morgan, 2015:5; Poonusamy, 2018). The Zimele project provides small business entrepreneurs from the MONDI value chain in rural communities the opportunity to learn from their business success; this includes business plan development, entrepreneurial development and support, access to network events and market success; and industry knowledge from specialists (Mondi Group, 2018:107). The programme also provides financing opportunities to small businesses at prime minus 5%. The Abashintshi programme was established by SAPPI to bring about social change in rural communities It includes training life-skills and self-development skills to young members of the community so they can impart this knowledge to the rest of the community to bring about social change and mobilisation (Poonusamy, 2018).

One of the most significant challenges facing rural communities in the forestry industry is food security, as many adults and children still go to bed hungry. To help increase food security in rural communities in the industry various initiatives are employed which range from providing communities with land to farm vegetables, sharing company land for cattle grazing, providing training programmes to community members in terms of honey collection and bee-keeping methods and donating vegetables to elderly members of communities (FSA, 2018:4).

#### 2.4.3.4 Transformation in the industry

The Forest Sector Charter Council (FSCC) is assigned the responsibility to monitor and report on the annual status of transformation in the forestry industry (FSCC, 2016:6). As the only report

available in terms of transformation in the industry and its various sub-sectors is provided by the FSCC, this section will focus on summarising the findings on the latest FSCC report on transformation in the forestry industry. To determine the transformational performance in the industry, the FSCC analyse information in terms of Broad-Based Black Economic Empowerment (B-BBEE) in various sub-sectors in the industry, and these sub-sectors are divided as follows:

- Growers' sub-sector (plantations, nurseries and indigenous forests).
- Charcoal sub-sector (charcoal producers).
- Contracting sub-sector (forestry contractors in silviculture, harvesting, fire-fighting services and other contracting services not covered by their own Sector Charters).
- Fibre sub-sector (pulp, paper, paperboard, timber board product, woodchip and wattle bark manufacturers).
- Pole sub-sector (pole treatment plants).

The overall significant findings of the report indicate that the general B-BBEE level in the industry was recorded at a level 4 status at the end of 2016, which is fairly consistent with the level of previous years (FSCC, 2016:27). Other significant factors include management control, the black-women owned companies and the impact of technology in the industry. With regards to management control, it was found that the industry needs to consider better incentives to promote black people into management structures, as the general focus to do so is low. In terms of black women-owned companies, the industry is still male dominated, particularly in areas with more physical and technical requirements. The impact of technology is also becoming more evident and will influence sector development and employment opportunities (FSCC, 2016:48).

#### 2.4.3.5 Outsourcing

The forestry industry has seen a significant change in the past couple of decades in terms of employment practises such as outsourcing, especially amongst larger timber growers such as Sappi and Mondi. The tendency for companies to outsource their labour is common, as many other sectors in the South African economy have made a significant shift from direct employment to the outsourcing of labour (Brits, 2017). Between the period of 1990 and 2005, large forestry companies retrenched most of their workers to outsource all of its operational work, such as silviculture and harvesting operations, with the exception of nurseries acting as contracting companies. Sappi Forests was the first company to do so followed by Mondi, which led to more than ten thousand workers in the industry being retrenched (Khosa, 2000:1). The only State-

Owned Enterprise (SOE) in the forestry industry SAFCOL, back then referred to as Komatiland Forests, took a less drastic approach to outsourcing, using a more mixed approach by mostly retaining their permanent workforce and workers employed by contractors. Collectively between all three companies almost 83% of the workers in the industry were indirectly employed by contractors (Clarke, 2018:17). It is argued that labour outsourcing was a response to the risks associated with a more stringent legislative environment, increased labour costs, and South Africa's re-entry into the global economy at the time (Clarke, 2018:17; Khosa, 2000:3).

The initial impacts of outsourcing led to a high level of accident and injury statistics and insufficient productivity levels. This can be mostly attributed to companies' lack of oversight on contractors and insignificant contractor company relationships at the time (Clarke, 2018:17). The forestry industry has however made significant progress in improving their management and relationship with contractors. As according to Clarke (2018:18), the improvement of the relationship between contractors can be attributed due to the following reforms:

- The implementation of sectoral determination in 2006 for forestry workers, establishing better working conditions and minimum wages.
- Stricter legal compliance implemented from the FSC with regards to the monitoring of contractors by companies.
- Some contractors offering permanent employment, bursaries, pension plans and other benefits to their employees.
- A 52% minimum wage increase in 2012 for forestry and farm workers.

As is evident from above, it is important to recognise the role contractors play in the industry as most of the work is done through them from an operational perspective. Although it is encouraging to see the positive reforms in the management of contractors in the industry, it can be argued that increased minimum wages can lead to companies adopting a more mechanised approach to achieve their operational goals. The evidence of this will be discussed in the following section.

#### 2.4.3.6 Mechanisation in forestry

The increase of mechanisation in forestry can be seen as an inevitable response, not only due to modernisation but also to reduce injury and fatality rates and increase production (SA Forestry, 2019). From an operational perspective, mechanisation in forestry has a significant impact on forestry in two areas, namely harvesting and to a lesser extent silviculture. Early harvesting practises were relatively labour intensive with regards to the harvesting, extraction and the loading

of timber (Uys, 2018:19). Trees were physically harvested with workers using chainsaws, the barks from trees needed to be stripped physically by workers before it could be extracted, and before the timber could be loaded it had to be stacked manually by workers (Uys, 2018:22). Timber harvesting machines have replaced all of these physical activities and today these activities are being performed by highly modern machines, some examples which can be seen in a study done by Visser and Stampfer (2015:323-324).

Development of mechanisation in silviculture still remains a relatively slow process. This is mostly attributed to challenges which include the scale of operations and the social impact that reduced employment will have on the sector, especially in South Africa. There is however a growing interest in the mechanisation of silviculture operations especially amongst the larger companies in the sector (Ackerman & Rietz, 2014:2). Silviculture is still very much a labour intensive operation as a recent study concluded that typical silviculture activities such as planting, pitting, weed control and fertilizer application, to name a few, are still dominated by manual methods (Ramantswana *et al.*, 2018). However, Steenkamp (2017) argues that the modernisation of silviculture is imminent and unstoppable. There are already some examples in various countries such as Europe, Australia, South America and South Africa where agricultural and construction equipment is adapted to perform silviculture activities, and in countries were labour is a scarce resource, such as Australia, any activity that can be mechanised is mechanised (Steenkamp, 2017). Although South Africa still largely uses manual labour to perform most silviculture operations, it can be argued based on the above that it is only a matter of time before more mechanised practises will be used. For now, silviculture is still very much stuck in the past.

### 2.4.4 Trends influencing forestry

Various trends in the forestry sector are identified to have a significant effect on forestry in the future if one looks at the latest sustainability reports from the two largest timber growers in South Africa, Mondi and Sappi. The most apparent aspects for the future worth mentioning include greater transparency in the industry, technological innovations, the focus on circular economies, sustainable resource management, and anti-plastic sentiments (Mondi Group, 2018; Sappi, 2018b).

To show their commitment toward transparency, Mondi and Sappi are adjusting their policies in terms of supplier conduct where they require suppliers to commit to the same standards in terms of ethical behaviour, human rights, diversity and equal opportunity, health and safety, and environmental awareness followed by the company itself (Sappi, 2018b:6). Companies also work towards higher levels of forest certification such as the FSC, which in itself requires a high level of transparency to become certified (FSC, 2018:23).

Technological innovations continue to receive a lot of funding from big companies such as Sappi and Mondi, and they spend a lot of time in research and development to keep up with growing industry expansion. The industry is becoming more dependent on automation and ever more connected with its customers through technological advancements. This can already be seen from harvesting practises up until product manufacturing and communication methods used towards the engagement of stakeholders (Mondi Group, 2018:21).

There is a growing movement towards circular economies around the world (Nizami *et al.*, 2017:1102). In lay terms a circular economy can be seen as eliminating waste by reusing certain materials in a production process that promotes recycling and minimises resource inputs (Webster, 2013:542). Companies such as Sappi and Mondi have already committed to this trend by recycling fibre from used paper and wood and by committing to the recycling of plastic used in their packaging processes (Mondi Group, 2018; Sappi, 2018b).

Sustainable resource management continues to be a key driving force in the forestry industry (Carruthers, 2019). This includes the continuous focus on maintaining high conservation value areas such as natural forests, wetlands and grasslands, and implementing resource efficient forestry operations (FSA, 2017a). The most recent trend from Sappi in terms of managing resource scarcity is to focus on wood fibre as a renewable resource, and incorporate innovative package solutions that reduces environmental impact and promotes efficient resource utilisation (Sappi, 2018b:1).

There is also an increasing focus on the use of plastic world-wide and the negative effects associated with it (Parker, 2019). The forestry sector recognises this issue and the key role players in the sector such as Sappi and Mondi have already implemented plans to provide alternative packaging solutions that are recyclable and biodegradable (Mondi Group, 2018:11; Sappi, 2018b).

### 2.4.5 Challenges

There are several challenges identified which have an effect on the forestry industry; they include the role of social inequality, ongoing labour issues, the effects of climate change, the issue of land, the general lack of afforestation in the industry, and timber theft (Parliamentary Monitoring Group (PMG), 2015).

The first challenge this study will look at, is social inequality, as it is an ongoing issue in South Africa which is also recognised by many cooperate companies in South Africa (Sucheran, 2016:11). In the forestry sector there is a lot of effort from companies to address this. Sappi has invested in shared value initiatives, creating local economic opportunities and socio-economic

development, promoting diversity and inclusion in the workplace. Mondi continues to make good progress towards B-BBEE and was certified as a level 3 contributor against the new forestry sector code.

The forestry industry in South Africa is also facing several labour challenges, specifically around silviculture operations which is driving the push towards mechanisation (Steenkamp, 2017). The reasons for this include an aging rural workforce with the lack of younger workers showing any interest to perform silvicultural activities, continuous pressure from increasing labour cost and labour turnover, health issues that affect employee productivity, quality challenges in terms a fairly unskilled workforce, and safety challenges associated with the nature of the work (Ramantswana *et al.*, 2018:42).

Davis-Reddy and Vincent (2017:68) point out that forest resources in Southern Africa are subject to projected changes in climate, and that this can have far-reaching implications on the livelihoods and local communities that are dependent on these resources. In addition, they also add that there are possible damaging effects that climate change can have on the industry itself, which include the development of diseases and pests which could affect tree mortality, increased temperatures coupled with drought and water scarcity, and increased fire risk to plantations that could further add to tree mortality rates.

According to Clarke (2018:24) it is estimated that 40% of land owned by private forestry companies and 70% of state-owned plantations are subject to land claims and that advancement in settling these claims and transferring ownership to applicants has been slow. Clarke (2018:24) goes further by pointing out the challenges associated with the land claims process; first of all, there are very few land claims that have been settled, and those few that have been settled has been subject to agreements where the land is owned by the claimant and the timber owned by the companies, allowing them to continue their operations by leasing the claimed land from the new land owners. The second matter of concern is the sustainability of this process, as the claimants will never have the opportunity to generate sufficient income from the land owned after the timber has been harvested, as they do not have the funds to establish new plantations. Lastly the overarching challenge for the forestry industry is to find a sustainable model that supports effective redistribution of successful land claims.

Afforestation is seen as the establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest (Chazdon *et al.*, 2016:543). There are several benefits of afforestation which include the production of ecosystem goods such as biofuels and timber, which helps to decrease the detrimental effects of deforestation, the possible advantages of increased $CO_2$ uptake, and increased employment opportunities (Mykleby *et al.*, 2017:2493).

Afforestation licences in South Africa are issued on the basis of the availability of water and catchment suitable for afforestation purposes. These licences from DAFF is processed at a very slow pace, and as a result the opportunity for plantation expansion in South Africa is limited (Clarke, 2018:1).

Equipment and timber theft is an ongoing problem in the forestry industry, and although there have been various initiatives implemented such as timber theft forums and the co-operation from the South African Police Service (SAPS), the problem seems to be rising. Some future plans indicated in the FSA annual report for 2017 to counter the increase in theft include crime reporting apps, compulsory vehicle tracking systems for timber transporting contractors, and the use timber identification and tracking systems (FSA, 2017b:14).

### 2.4.6 Forest management in South Africa

Forest management as explained by Bettinger *et al.* (2016:2) includes the integration of business concepts such as timber harvesting and silvicultural practises to meet certain objectives as established by a certain land owner or company. Bettinger *et al.* (2016:2) also indicate that the management of forests should include a plan and assessment on how these objectives are going to be achieved, commonly referred to as a management plan. In the case of forestry, a management plan is primarily focused on sustainable forest management (Bettinger *et al.*, 2016:2).

Silviculture, deals with the methods for establishing and maintaining trees, deemed to be important by society, for forest goods and services (Kabrick & Pile, 2019:6). Silviculture is one of the critical elements of forestry that ensures the long term health and productivity of forested managed ecosystems, which are fundamental to the outcomes of sustainable forestry (Nyland, 2016:1). Activities in silviculture include site preparation for tree planting, weed control, pruning and thinning (Orndorff *et al.*, 2017:2).

Depending on the tree species and end product, commercial forest can generally be harvested after the age of 7-24 years (FSA, 2020a, 2020b). Timber harvesting is the process of felling, skidding, and storing or stacking wood within the boundaries of the commercial forest for transportation to the local mills for processing (Dimou *et al.*, 2020:223; Restrepo *et al.*, 2022:1).

The above-mentioned practises focus on the operational aspect of forestry and how they are performed and managed. As stated previously, forestry workers are very much exposed to the elements where there is fair amount of risk involved when performing these operational activities. The focus of this study is fixated on how to manage this risk through safety management practises. The management of safety is guided by forest certification systems. Larger forestry

companies such as Sappi and Mondi are bound to follow the rules of these systems in order to maintain their certification. These companies have very strict safety management policies and guidelines of their own, and usually exceed the requirements of FSC. Forest certification systems have led to major changes in management in the forestry industry, which includes the management of safety in the industry (D'Amato *et al.*, 2017:61). Before continuing with the general processes followed in terms of safety management in the industry, one first has to understand what guides the management of forestry, specifically looking at the acts that guide forestry in South Africa and the most prominent certification body used by most companies in South Africa. These acts and certification guidelines in management will be outlined and discussed in the section below.

### 2.4.7 Forestry management guidelines

In South Africa the majority of forestry operations is outsourced to contracting companies. This means that activities such as labour relations, supplementation of capital equipment, management techniques, training and production now become the responsibility of these contracting companies (Parker, 2013:11). There is however a system of proper guidelines in terms of forest management for contracting companies to follow provided by certification bodies and Acts.

Acts that give guidance towards forestry in South Africa include The National Forests Act (84 of 1998) and the Forestry Laws Amendment Act (35 of 2005). Both of these acts focus strongly on sustainable forest management and give guidance on how forests should be managed without destroying them.

The National Forests Act (84 of 1998) was signed into government on 20 October 1998. The purpose of this act includes the following:

- promote the sustainable management and development of forests for the benefit of all;
- create the conditions necessary to restructure forestry in State forests;
- provide special measures for the protection of certain forests and trees;
- promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- promote community forestry; and

- promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.

The purpose of the Forestry Laws Amendment Act (35 of 2005) was to amend several sections of The National Forest Act (84 of 1998).

In the world of forestry there are two main certification bodies, the FSC and the Programme for Endorsement of Forest Certification (PEFC) (FAO, 2015b:25). The FSC was established by a group of businesses, environmentalists and community leaders in 1994 to create a voluntary market-based approach to improve forest practises worldwide (FSC, 2018). The mission of the FSC is to promote environmental, economic and socially beneficial management of the world's forests, and their vision is to meet the current demand for forest related products without compromising the health of the world's forests for future generations (FSC, 2019).

The PEFC is considered to be the world's largest certification body. They were established in 1999 to promote sustainable forest management, especially among small forest managers (PEFC, 2019b). Their mission is to unlock and build on the full contribution of forests for a sustainable world and their vision is of a world which values the full contributions of sustainable forests (PEFC, 2019a).

Both these systems are aimed at promoting sustainable forest management around the world and have very similar objectives. The only main difference is how they achieve them and their target markets (FSC, 2018; PEFC, 2019b). PEFC standards are set according to International Organisation for Standardisation (ISO), whereas FSC is responsible for their own standard setting (Forestry & Development, 2015). The PEFC also caters for small forest owners where the FSC doesn't (Llie, Apăfăian, Puicea and Enescu, 2018:179). As the big co-players in terms of forestry in South Africa such as Mondi, Sappi and SAFCOL are FSC certified, the focus of this study will be on the guidelines or principles that the FSC has set out for companies to become certified (FP&M SETA, 2014:3).

To achieve certification, the FSC has set aside 10 main principles with 57 criteria. For the purpose of this chapter the 10 principles are summarised in Table 2-2 below:

**Table 2-2: Summary FSC principles**

| Principles | Description |
|---|---|
| #1 Compliance with laws | The Organisation shall comply with all applicable laws, regulations and nationally-ratified international treaties, conventions and agreements. |
| #2 Workers' rights and employment conditions | The Organisation shall maintain or enhance the social and economic wellbeing of workers. |
| #3 Indigenous people's rights | The Organisation shall identify and uphold indigenous people's legal and customary rights of ownership, use and management of land, territories and resources affected by management activities. |
| #4 Community relations | The Organisation shall contribute to maintaining or enhancing the social and economic wellbeing of local communities. |
| #5 Benefits from the forest | The Organisation shall efficiently manage the range of multiple products and services of the Management Unit to maintain or enhance long-term economic viability and the range of social and environmental benefits. |
| #6 Environmental values and impact | The Organisation shall maintain, conserve and/or restore ecosystem services and environmental values of the Management Unit, and shall avoid, repair or mitigate negative environmental impacts. |
| #7 Management plan | The Organisation shall have a management plan consistent with its policies and objectives and proportionate to scale, intensity and risk of its management activities. The management plan shall be implemented and kept up to date based on monitoring information in order to promote adaptive management. The associated planning and procedural documentation shall be sufficient to guide staff, inform affected stakeholders, interested stakeholders and to justify management decisions. |

**Table 2-2: Summary FSC principles (continued0**

| Principles | Description |
|---|---|
| #8 Monitoring and assessment | The Organisation shall demonstrate that progress towards achieving the management objectives, the impacts of management activities and the condition of the Management Unit are monitored and evaluated proportionately to the scale, intensity and risk of management activities, in order to implement adaptive management. |
| #9 High conservation forests | The Organisation shall maintain and/or enhance the High Conservation Values in the Management Unit through applying the precautionary approach. |
| #10 Implementation of management activities | Management activities conducted by or for The Organisation for the Management Unit shall be selected and implemented consistent with the Organisation's economic, environmental and social policies and objectives and in compliance with the principles and criteria collectively. |

Source: Adopted from FSC (2017:10).

The ten main principles mentioned in Table 2-2 highlight the importance of sustainable forest management as they focus on employee rights and work conditions, environmental impact, community development, the importance of a management planning and the continuous monitoring, assessment and implementation of management activities. They serve as the benchmark of which companies are audited against for certification and it is important to understand these principles as they give a good indication on how companies should manage their plantations in South Africa. If one looks at the guiding document, principle number two specifically focuses on how safety should be managed in South African forestry. The following section will focus on what principle number two entails and why there is a need for a more participative approach for the management of safety in the industry.

### 2.4.8 The argument for participative management of safety

The management of safety in the forestry industry of South Africa is mainly guided through the Occupational Health and Safety Act (85 of 1996). In terms of safety management, companies that aim towards FSC certification or are already FSC certified need follow the criteria regarding safety as set out in The FSC National Forest Stewardship Standard of the Republic of South Africa (FSC, 2017:25). These criteria stem from the International Labour Office's (ILO) code of practise, combined with the necessary requirements from the Occupational Health and Safety Act (85 of 1996, ) and are tailored for the forestry industry. These criteria are written according to principle

number two (workers' rights and employee conditions) mentioned in Table 2-2 above. The criteria include the following in terms operational activities:

- hazards to the health and safety of workers from forestry activities need to be identified;
- there needs to be procedures for working safely;
- workers must be aware of hazards in the workplace, and trained on safe work procedures in compliance with the national legislation;
- workers must have personal protective equipment appropriate to their assigned tasks;
- workers shall be prohibited from working without PPE that has been provided;
- safe work procedures need to be carried out in the work place;
- incidences of non-conformance with procedures are investigated, recorded and reported; and
- past incidents are recorded, trends examined and safety practices adjusted to avoid recurrence.

From the above criteria it is clear to see that there is a definite lack of understanding on the way workers are managed in terms of communication, objectives towards safety, decision-making towards safety and the control measures used to monitor the progress of safety. It can therefore be argued that there is a need to gain the perception form the employees in the industry in order to obtain their view on how they are managed in the context of safety management. The following chapter will therefore focus on the aspects of participative management and how it can be used by senior management to improve the safety culture of employees.

# CHAPTER 3

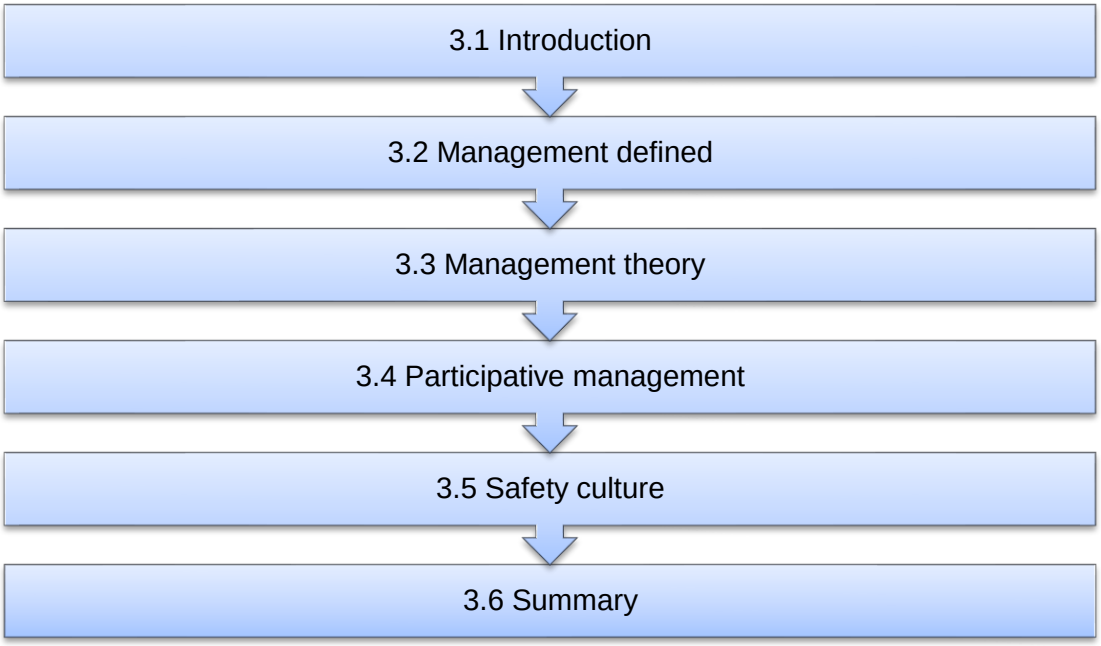
# THEORETICAL BACKGROUND ON MANAGEMENT THEORY, PARTICIPATIVE MANAGEMENT AND SAFETY CULTURE

## 3.1 INTRODUCTION

The purpose of this chapter is to provide a theoretical background to management theory, participative management, and safety culture. The Chapter starts with defining the concept of management, thereafter a brief history on the development of management theories is deliberated, an in-depth overview of participative management and how it can be used in safety management is provided, an explanation on safety culture is given as a tool to measure safety performance, and lastly the chapter is concluded with a summary on the main focus areas, namely participative management and safety culture.

Outlined in Figure 3-1 below is an abbreviated synopsis of the sections that will be discussed in this chapter:

**Figure 3-1: Chapter outline**




Source: Researcher's own compilation.

## 3.2 MANAGEMENT DEFINED

Many definitions of management by various sources are provided in the literature. The following are some definitions of management that will fit the context of this study. Management as defined by Taylor, one of the earliest theorist on management thought, is when the workers give their best initiative and in return receive some special incentive from their employers (Taylor, 1919:34). Management thought has evolved since 1919 and many definitions have developed over time; earlier definitions of management defines management as the formation of policy, its execution, the designing of the organisation, and its employment (La Dame, 1930:19). Taylor (1947:21) elaborates by defining management as knowing exactly what you want individuals to do, and then seeing that they do it in the best and cheapest way.

Brech (1953:8) refers to management as being concerned with seeing that the job gets done and tasks are centred on planning and guiding the operations of the enterprise. Farmer and Richman (1964:55) see management as the accomplishment of objectives by establishing an environment that is variable to the performance of people operating in organised groups. Hyman (1970:52) defines management as the process of initiating, organising, and controlling purposive group activity within society. Smit and Cronje (1992:6) maintain that management can be defined as a process of activities that gives the necessary direction to an enterprise's resources so that its objectives can be achieved as productively as possible in the environment in which it functions.

Lindfors (2001:251) refers to management as the act, art or manner of managing, controlling, directing or handling. Botha *et al.* (2011:10) define management as the process of using an organisations human and other resources in such a way that the organisational objectives are achieved. Another more modern definition defines management as the process of accomplishing organisational mission, strategies, goals and objectives through the use of several resources including human, financial, physical and informational (Civelek, 2019:3). A fairly recent definition of management defines management as the attainment of organisational goals in an effective and efficient manner through, planning, organising, leading and controlling organisational resources (Daft *et al.*, 2020:5).

**For the purpose of this study** management will be defined as: *The attainment of organisational missions, goals, strategies and objectives in an effective, efficient and cooperative manner through planning, organising, leading and controlling organisational resources.*

## 3.3 MANAGEMENT THEORY

As this study, amongst other things, will focus on participative management, it is firstly important to have insight in the different theories of management to establish where participative management fits in the development of management theory. It is furthermore important to reflect on these theories, as our current management is largely a result of how management was done in the past (Witzel, 2017:3). Participative management is an outflow of management and therefor the different management theories will form the platform where participative management originated. The management theories will give the background on a lot of aspects that will be discussed later. According to Benedict (2015:22), management theories that have developed over time can be distributed into four main approaches namely classical approaches behavioural approaches, quantitative approaches and contemporary approaches. Each of these approaches will be discussed in the sections to follow.

### 3.3.1 Classical approaches

Classical management approaches were primarily focused on the activities and structures of formal organisations; in short their main concern was on how efficiently work can be done (Efthymiou & Yacoub, 2016:3). There are three main classical approaches defined in the literature which includes the scientific, bureaucratic and administrative approach (Efthymiou & Yacoub, 2016:3).

#### 3.3.1.1 Scientific management

The theory of scientific management was an approach used by Frederick Winslow Taylor (1856-1915). Taylor studied skilled workers in a scientific manner by monitoring their activities to eliminate any unnecessary processes, thereby producing the best method for doing the job; that method would then become the standard to be used for all jobs performed similarly (Parker & Jeacle, 2019:9). As such the effect on safety management would be eliminating unsafe work practises by identifying reckless workers and training them to perform their jobs in a safer manner (Swuste *et al.*, 2016:10).

#### 3.3.1.2 Bureaucratic management

One of the most important figures in terms of bureaucratic management is Max Weber (1864-1920) who was considered to be the father of the bureaucratic management theory. Weber's views were that organisations function more efficiently when structured in a formal hierarchy and when there are clearly set rational and legal decision-making rules; therefore impersonal modes of conduct and a common control system govern the way of work (Thompson & McHugh,

2009:34). Bureaucracy in safety is still evident in modern times where safety professionals have become administers of safety bureaucracies. Safety bureaucracy can influence the relationship between safety professionals and the rest of the organisation through control measures such as audits, investigations and non-compliances, and then disciplining workers who do not adhere to safety policies, which could arguably be a significant barrier towards building an effective safety culture (Provan *et al.*, 2017:101).

#### 3.3.1.3 Administrative theory

The Administrative theory was developed by Henri Fayol (1841-1925). His concerns were with the administrative aspects of managing the resources and activities of an organisation, by formulating functions of management – planning, organising, commanding, co-ordination and control (Thompson & McHugh, 2009:35). The bottom line of Fayol's approach was to rationalise management structures through centralisation and control, whilst focusing on the importance of the managerial role on the setting of goals; and planning on how resources can be used optimally (Hatchuel & Segrestin, 2018:1). The administrative theory lends itself well to the management of safety as it allows for flexibility in the management thereof, which moves away from the rigidness often associated with safety management. Furthermore, the idea of balance in management, advocated by Fayol, is also relevant to the nature of safety management (Fewster, 2018:30).

Whilst there is an argument for the effectiveness of classical approaches, one aspect that classical approaches do not account for is the "human factor" as there is a lack of focus on human behaviour (Parreira *et al.*, 2021:4). Although some of the above-mentioned theories touch on some of the elements of participative management such as goal setting and control, the overall focus remains on the role of the manager with little consideration for subordinates. This leads us to theories such as human relations and human resources, that take into account how human behaviour effects productivity (Khorasani & Almasifard, 2017:136).

### 3.3.2 Behavioural approaches

Behavioural approaches are concerned with the social and group interactions that occur in the workplace, the main theory associated with behavioural approaches is human relations, also referred to as human resources (Harney *et al.*, 2018:124). The following are discussions of people that formed certain opinions on behavioural approaches.

#### 3.3.2.1 Elton Mayo Human relations theory

Human relations theory is a management theory founded by Elton Mayo (1980 – 1949) in the 1920's after performing several studies on northern American companies, the most evident study

being the one he performed on the large Hawthorne plant of the Western Electric Company in the USA (Kure *et al.*, 2018:2). The findings from his study suggest that any organisation is a social system and that workers are the most important element in it. The study further found that employees are not only motivated by economic needs but also through social needs. In the human relations theory there is a strong focus on using human emotion as a management strategy to motivate employees, the argument being that enhancing human relationships will enhance overall productivity (Edo & David, 2019:46). The significant theorists to follow and contribute to the human relations theory include, Mary Parker Follett (The Giving of Orders), Abraham Harold Maslow (A Theory of Human Motivation), Dougless McGregor (The Human Side of Enterprise), and Irving Janis (Groupthink: The Desperate Drive for Consensus at Any Cost) (Őnday, 2016:102).

#### 3.3.2.2 Mary Parker Follett – The Giving of Orders

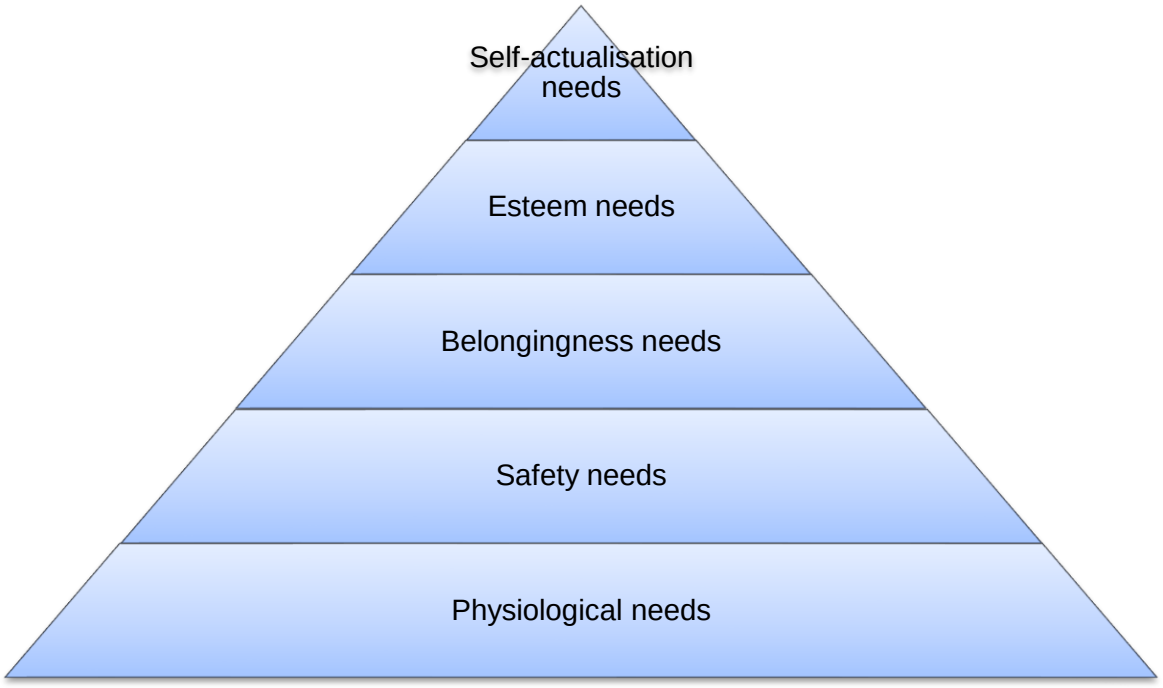
The work of Mary Parker Follett (1868-1933) focused on the social interaction between the employer and employee when so-called “orders” are given from the employer to the employee, and the effects thereof, also referred to in the literature as the “law of the situation” (Negruța & Ionescu, 2016:4). She argues that if orders are giving without any real consideration for the feelings of the person receiving the orders, by demanding someone to complete a certain task and expecting absolute obedience regarding that order, it cannot be expected that the task will necessarily be performed towards the desired expectation (Esmeray, 2015:17). Follett further argues that before orders are given, one should take into consideration the attitude of the employee, previous behaviour from the employee, the education and training of the employee, and the work environment and situation of the employee (Őnday, 2016:103). In addition, Follett links the above-mentioned to “the law of the situation”, which dictates that authority should not guide decision-making, and that decision-making should rather be guided by a shared process where the manager and subordinate has an equal input to a given situation and thereafter decide on a course of action. The study of the situation will then determine the “order” and an order is not just given as a result of one’s position in the organisation (Gibson *et al.*, 2013:448).

To summarise the main focus of Follett’s theory is to give attention to the situation by engaging with each other rather than just giving out orders and expecting it to be done (Stout & Love, 2017:18). Follett’s theory stresses the importance of labour participation in work development processes (Khorasani & Almasifard, 2017:135). The idea of involving workers in work processes links well to the idea of a more participative approach for the management of safety, as involving workers will assist in the implementation and establishment of safety management processes such as setting safety targets and evaluating outcomes (Sommani *et al.*, 2019:3).

#### 3.3.2.3 Abraham Harold Maslow – A Theory of Human Motivation

Arguably one of the most well-known theories of human motivation is Maslow's hierarchy of needs (Fallatah & Syed, 2018:19). Maslow (1903-1970) identified five levels of needs depicted in Figure 3-2 below. The first and most basic level of needs are physiological needs. Physiological needs include basic human needs for survival such as food, water and oxygen; In an organisational environment this would include an adequate safe working environment and a basic salary (Ryan *et al.*, 2020:4). The second level of needs are safety needs and include a secure physical and emotional environment free from any threats; In the workplace safety needs are considered to be needs such as job security, job safety and fringe benefits (Zheng *et al.*, 2016:2). The third level of needs are belonging needs, which represent the need for acceptance, to be part of a group, have friendships and to be loved (Wang, 2016:1596); Within a work context belonging needs would be the desire to have positive relationships with one's co-workers and participation and involvement with work group dynamics (De Vito *et al.*, 2018:21). At the fourth level esteem needs become apparent. Esteem needs relate to the aspiration towards a positive self-image through recognition, attention, and appreciation from others; In a working environment esteem needs will reflect motivation through recognition as well as an increase in responsibilities (Daft & Marcic, 2017:522). The last level, namely self-actualisation needs, are the final desired level of needs and involve the need for self-fulfilment by improving one's self as a person by increasing one's competence to reach your full potential (Hale *et al.*, 2019:113); These needs can be met in an organisation by providing employees with the opportunity to grow and the ability to build a career for themselves through training, challenging assignments and position advancements (Daft & Marcic, 2017:523).

**Figure 3-2: Maslow's Hierarchy of needs**




Source: Adopted from Hopper (2019).

Maslow's theory is based on the lower order needs being satisfied before higher order needs are realised (Uysal & Kayhan, 2018:10). Physiological needs will lead to safety needs, safety needs will lead to belongingness needs, belongingness needs will lead to esteem needs and esteem needs will lead to self-actualization needs. Once a certain level of need is satisfied, the desire to achieve the following need in the sequence is cultivated (Jonas, 2016:108). From a safety management perspective, Maslow's hierarchy of needs will always have an impact on safety; lower-level needs will only be met if employees feel safe in the environment in which they work, having adequate protection and equipment, as well as protection against the elements whilst in forest environments would arguably be enough to meet lower level-needs. However, to meet the higher level needs of employees in terms of a participative management perspective, employees will need to be engaged and feel part of the process to feel that sense of belongingness and self-development, to buy-in and take ownership towards safety (Mullins *et al.*, 2019:40).

#### 3.3.2.4 McGregor (The Human Side of Enterprise)

Dougless McGregor (1906 – 1964) identified two types of human theories that capture the view of human motivation, Theory X and Theory Y (Prottas & Nummelin, 2018:109). The details of the two theories were first published in an article in 1956 and later in the book called "The Human Side of Enterprise" in 1960 (McGregor, 1960). Theory X and Theory Y describe two opposing views of people at work and how they should be managed (Prottas & Nummelin, 2018:109).

Theory X is based on the notion that the average human being inherently dislikes work and will avoid work if possible. Because of this reluctance to work employees need to be monitored and controlled and constantly encouraged or threatened with punishment to put in meaningful effort to achieve organisational objectives. As such, the average human being prefers to be directed, tries to avoid responsibility, has very little motivation, and strives towards lower-level needs such as money and job security (Oluwakayode *et al.*, 2017:250). The implications of Theory X on safety management leans itself towards being more centralised in controlling and managing safety. Central determinations of what is the safest way to perform operational work will be established through prescribed roles, requirements and procedures, any deviations form prescribed work will then be remedied through increased pressure for compliance (Provan *et al.*, 2020:1).

Theory Y is based on the assumptions that the average human being does not inherently dislike work and that given the right circumstances, work can be satisfying or a source of fulfilment, controlling and using punishment are not the only methods of directing employees towards goal achievement and employees will display forms of self-direction and self-control towards goals they are committed to (Aithal & Kumar, 2016:803). Under the right conditions, employees will accept and actively seek responsibility. With Theory Y, McGregor argues the avoidance of responsibility and lack of ambition isn't an inherent characteristic as with Theory X, but rather as a result of past experiences and behaviour that is learned (Oluwakayode *et al.*, 2017:250). McGregor also suggested that in Theory Y employees start to desire higher order needs such as allowing to be creative, be accepted by others and greater independence in the completion of tasks when lower order needs are met (Daneshfard & Rad, 2019:45). From a management perspective, a Theory X-type manager will be required to closely supervise employees, give clearly specified tasks, and use the threat of punishment or pay incentives as motivating factors. McGregor argues that Theory X-type managers have a very autocratic management style, which can often lead to mistrust and resentment from those they manage (Odumegwu, 2019:133; Todorova & Vasilev, 2017:300). Theory Y-type managers on the other hand have a more modern style of management and encourage employees to be autonomous, creative and responsible (Hamelin *et al.*, 2018:4). In his book The Human side of Enterprise, McGregor recognises that the Theory Y approach to management is not the solution for all managerial problems however he believes that it is a much better approach to management than the Theory X approach (McGregor, 1960). Theory Y advances the idea that workers could be committed towards their safety objectives, if rewards address their higher order needs such as self-actualization and esteem needs. Furthermore, it will also encourage participation in safety management programmes and workers could be creative and self-directed towards meeting their safety objectives if they are committed to them – which blends in well with the context of this study (Adjekum, 2017:7).

#### 3.3.2.5 Irving Janis (Groupthink: The Desperate Drive for Consensus at Any Cost)

Irving Janis (1918 – 1990) introduced the theory of Groupthink in a study he did in 1971. The purpose of the study was to determine why groups consisting of intelligent and talented individuals made irrational decisions (Janis, 1971). The conclusion was that the groups often experienced groupthink, which can be seen as a form of thinking people find themselves in when they are involved in highly cohesive groups where maintaining an overall agreement by all people involved is considered more important than assessing alternative courses of action, it might affect overall group consensus and that this process of thinking (Groupthink) inevitably may lead to poor decision outcomes (Őnday, 2016:107). It is however important to notice that groupthink is not about a group making bad decisions, but rather the notion that the group is overlooking important considerations or alternatives in order to achieve concurrence (Al Harbi, 2018:25). To achieve conformity and harmony within the group is therefore more important than critically reflecting on alternatives to make the right choice (Størseth, 2017:14). The symptoms of groupthink identified by Janis are outlined in Table 3-1 below:

**Table 3-1: Janis's eight symptoms of Groupthink**

| The symptoms of groupthink | |
|---|---|
| Invulnerability | Group members experience a false sense of reassurance that leads to being overly optimistic and willing to take risks. |
| Rationale | Victims of groupthink justify decisions and overlook any warning signs. |
| Morality | Members of the group ignore the ethical impact of their decisions. |
| Stereotypes | Members who challenge decisions and ideas or hold opposing opinions are ignored. |

**Table 3 1: Janis's eight symptoms of Groupthink (continued)**

| The symptoms of groupthink | |
|---|---|
| Pressure | Pressure is placed on individuals who are doubtful and pose questions towards group decisions. |
| Self-censorship | Individuals of the group avoid deviating from group consensus and hide their opinions and doubts about decisions. |
| Unanimity | Members of the group are under the illusion that everyone in the group is in complete agreement. |
| Mindgaurds | Individuals hold back from sharing problematic information that could disrupt group satisfaction with previously made decisions. |

Source: Adopted from DiPierro *et al.* (2021:2).

Understanding these symptoms can assist managers and leaders in identifying when groupthink is present within a group or a team and enable them to act accordingly to adopt a process that identifies and evaluates all alternative courses of action before committing to final decisions (Al Harbi, 2018:25). In terms of safety management, the goal from management should be to prevent groupthink from occurring. To account for this, workers should be encouraged to speak up and provide feedback on matters relating to safety, through the engagement of people, coaching and leadership that inspires safety related empowerment and motivation, and allows workers to share their respective point of views (Geller & Geller, 2019:49).

It is reasonable to argue that many of the behavioural approaches are currently still being used in management and still have their place in modern safety management. Management has however evolved into a field that is more than just managing human behaviour; modern management as we know it involves many elements, and advances in technology has also led to a change in the way we see management. The following section will give a brief overview on the quantitative approaches to management.

### 3.3.3 Quantitative approaches

Quantitative management approaches focus on adapting mathematical models and processes to manage situations (Morgan, 2019:2). Quantitative approaches largely focus on the operational aspects of management, i.e., on how to express the processes and elements thereof into mathematical relations. Another important focus of quantitative approaches is the development of models for complex management processes (Dahlgaard-Park *et al.*, 2018:1111). It is viewed

that quantitative approaches to management should rather be seen as an aid to management and not a separate school of management theory, nevertheless it is still important to give an overview on the two most widely focused areas related to quantitative management approaches which include operations management and management information systems (Erasmus *et al.*, 2019). A brief overview of the two approaches follows.

#### 3.3.3.1 Operations management

Operations management is mostly concerned with the management of the transformation process within a business, where the transformation process is seen as the process of turning inputs from the environment into outputs to the environment (Hill & Hill, 2017:10). The main function of operations management is therefore to manage systems or processes that are directly involved in the provision of products or services to customers (Vybornova & Gala, 2018:61). The concept of operations management involves numerus processes, tasks and activities each associated with its own elements.

Expanding on the definition provided above, operations management firstly starts with a set of inputs from the environment. These inputs include raw materials, customer or client inputs and requirements, information gathering, human resources needed, as well as equipment and facilities used to produce products and services and technology (Hill & Hill, 2017:10). The next aspect of operations as per definition is the transformation process. The transformation process is the core element of operations management and involves the strategies and objectives used, such as reducing cost, improving quality, continuous innovation and insuring the implementation of these strategies and objectives through operations design, planning, controlling and improvement to eventually produce outputs, i.e., the final completed product or service delivered to the customer (Erasmus *et al.*, 2019).

From an operational perspective forestry involves turning trees into products such as paper and timber, and include a variety of mechanised and labour-intensive tasks and activities, where worker safety plays a big role throughout the whole operational process and needs to be monitored continuously (Machová & Horák, 2020:2). In any industry, operations management and safety management is often viewed to be in conflict with each other where the pursuit of continuous improvement and productivity will always be in conflict with workers' safety and the cost associated with the implementation thereof (Hasle *et al.*, 2019:5). To find a balance, Hasle *et al.* (2019:6) argues that there needs to be a rethink in the production set-up and the workers' roles. This can be done through co-operation between the two fields by not only supporting each other's objectives, but also through synergy between the two fields where the need for optimisation is addressed with the consideration of workers well-being in mind, as is it is worth

noting that better performance and commitment is associated with higher levels of well-being in workers.

A key aspect of operations management identified above is gathering information. Information gathering is a complex task that needs to be performed and within modern management, the most effective way to do this is through management information systems. The following section will further elaborate on how management information systems are used as a management tool.

#### 3.3.3.2 Management information systems

Management information systems are very thoroughly defined by Farhan and Susanto (2019:113) as a set of sub-systems that are interrelated and gathered together to form a unity. The authors further argue that management information systems interact and co-operate with each other to perform data processing functions by receiving inputs in the form of data and producing outputs in the form of information that supports management in decision-making to achieve objectives on an operational, managerial and strategic level. Information systems also form an important part of the systematic approach towards safety management and is used by safety professionals to improve safety performance and analyse safety-related data. Safety information systems produce, capture and process vast quantities of safety-related data as part of regular operations to aid management in safety-related decision making (Wang *et al.*, 2019:1596).

Quantitative approaches should rather be seen as an aid to management rather than a separate school of management theory. It is worthwhile looking at more modern approaches to management, therefore the following section will focus on contemporary approaches to management.

### 3.3.4 Contemporary approaches

Contemporary approaches to management came as a response to a rapid change in management during the second half of the 20$^{th}$ century (Erasmus *et al.*, 2019:200). During this time the environment in which businesses operated transformed at an alarming pace, which brought its own set of managerial challenges to the fore. Outlined below are the main approaches to emerge during this period which includes the systems approach, contingency approach, strategic management and total quality management (TQM) (Erasmus *et al.*, 2019:200).

#### 3.3.4.1 Systems approach

The systems approach was developed in response to the limitations to previous management approaches, as it is argued that previous approaches ignored the relations between an organisation and its external environment and they only focused on one particular aspect of an

organisation whilst ignoring the others (Erasmus *et al.*, 2019:200). Systems theory treats the organisation as a system, a system can be open or closed. When a system is viewed in the form of a business entity, it is considered to be an open system as any business is affected by its environment internally or externally (Tamunosiki-Amadi & Kuroakegha, 2017:199). The concept of systems theory views a business as a social system that is built from a set of interrelated parts that need to function in harmony in order for the business to be successful (Teece, 2018:361).

Another aspect the systems theory focuses on is the business and its environment (Schneider *et al.*, 2017:186). Systems theory also focuses on how businesses interact with their environment and adopt their systems according to environmental changes (Teece, 2018:361). Therefore, to summarise the above, within the systems theory managers cannot focus on managing a single part of a business independently and should rather focus on managing an organisation as an integrated whole, whilst also adapting to changes in its environment.

A systems approach to safety management means that the focus of management activities is on the process of identifying, understanding and managing all the interrelated processes in safety management in order for the safety management system to contribute to the effectiveness and efficiency of the organisation. One of the key factors that contributes to the success of a safety management system is the involvement and buy-in employees, which lends itself well towards the argument for participative safety management (Louw, 2015:1).

#### 3.3.4.2 Contingency approach

Contingency theory started around the second half of the 20th century when managerial studies started to challenge the beliefs of classical management approaches as well as what the best way would be to organise (Raju, 2018:128). This theory recognises the need for all managerial approaches and does not focus on one specific approach (Sridhar, 2017:13). The main focus of the contingency approach is to apply the most relevant management principles to a particular situation, confronting management at a specific point in time (Rana *et al.*, 2016:15). Effective contingency managers are able to identify important situational factors and determine what management technique would best suit a particular situation to obtain management goals (Joseph, 2020:56). The fundamental concept of contingency theory as per the above is therefore that there is no best way to lead or manage an organisation and therefore the effective structural design of the organisation is where the structure fits the contingencies.

The implications thereof on safety management will be that there is no single approach to safety management that is equally optimal for every company, and that the approach taken for each circumstance will rely on the specific situation the company is confronted with, such as the

industry or environment in which the company operates (Battaglia *et al.*, 2015:56). The argument for this study, is that in the forestry industry and environment, companies should focus on a more participative approach to managing safety.

#### 3.3.4.3 Strategic management

The discipline of strategic management evolved to meet the growing need of businesses to enhance their strategies in order to increase performance and stay competitive in the environment in which they operate (Abosede *et al.*, 2016:316). The need to think more strategically arose due to various demographic, political and social changes between the 1960s and 1970s, which forced businesses to align their goals and objectives with changes and trends emerging in their business environment (Myrick, 2017:15). The overall purpose of strategic management for businesses is to focus on external opportunities and threats and evaluate their internal strengths and weaknesses, so that they can overcome potential threats and take advantage of opportunities in order to gain a competitive advantage in their business environment in (Alencar Santos Laakia, 2019:5). Strategic management is still a very popular managerial school of thought of modern management and is still being used by businesses and universities to this day.

As per above, one of the key aspects of strategic management is to gain a competitive advantage. From a safety management perspective, businesses should focus on creating and implementing Safety Management Systems (SMS) that distinguishes them from their competition. An effective SMS is a set of policies, practises, roles, and functions associated with safety; it can raise a company's competitiveness as a positive effect on the image, reputation, productivity and innovation capabilities (Battaglia *et al.*, 2015:56).

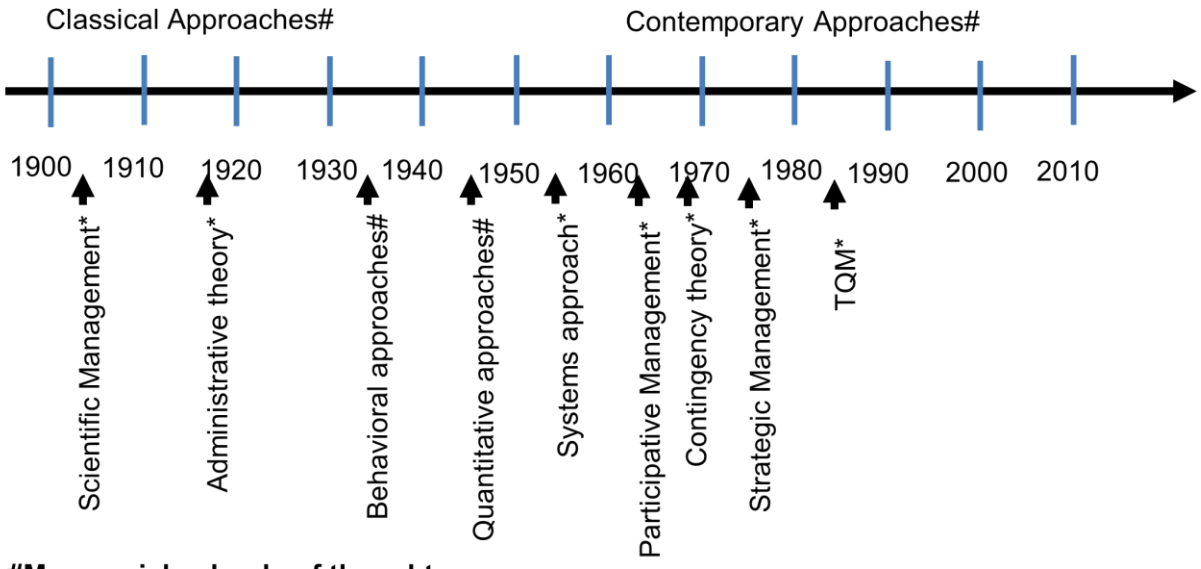
#### 3.3.4.4 Total Quality Management (TQM)

Total Quality Management (TQM) is a managerial approach that evolved around the 1980s and 1990s, and is used by enterprises to enhance their management capabilities, improve performance and accomplish excellence in quality (Dahlgaard-Park *et al.*, 2018:1117). To do so TQM focuses on continuous organisational improvement through the commitment and participation of all its employees, and ensures that the resources of an organisation are strategically utilised to meet the needs of external and internal customers through the use of statistical techniques that measure results and aid performance (Chen *et al.*, 2016:66).

TQM is closely related to safety management. A holistic approach to quality management also applies to safety management, and the ideas and values of TQM can also be used for continuous improvement in safety management. Safety management has a big impact on the quality of a product or a service and is a crucial aspect of the TQM process (Van Loggerenberg, 2015a:120).

From the above it can be argued that contemporary management approaches, also referred to as modern management theories, all share a similar trademark in that all of these theories aim at providing a holistic approach and view of management and focus on different elements of management rather than one single element. It does not however mean that other managerial schools of thought should not be further explored and ignored. Most of the management theories described in this chapter are still very much applicable in this modern management area and still provide space for further exploration. The managerial focus point of this study draws on the work of Rensis Likert (1903-1981) and his theory of participative management (Likert, 1967). Provided in Figure 3-3 below is a timeline showing the development of different managerial theories over time to give a perspective on how and where participative management fits in to general management theory.

**Figure 3-3: The development of management theory**




Source: Adopted from Erasmus et al. (2019:201).

Participative management and its evolution in terms of management theory further expand on the knowledge base of behavioural approaches and human resources. The purpose of Figure 3-3 is to indicate the emergence of the different schools of thought, namely classical, behavioural, quantitative, and contemporary management approaches, and when different theories within these schools of thought emerged. This section aimed to provide a general background of management theory. Therefore, having established the background on the body of knowledge relating to management theory and where participative management fits into this body of knowledge, including the implications on safety management thereof, one can now continue on

the theory of participative management and the argument for using it as an approach to improve safety culture. The following section further elaborates on participative management.

## 3.4 PARTICIPATIVE MANAGEMENT

Participative management is a management philosophy that acts to involve workers not only in the decision-making process of an organisation, but also for managing human resources in an environment where employees are respected and their contribution valued and utilised to increase work practises and improve performance standards (La Cock, 2017:7). Participative management is sometimes used interchangeably with different other terms in the literature which include employee involvement, employee empowerment, participative decision-making, power sharing, decentralisation, and participative leadership (Amosa *et al.*, 2019:4).

**For the purpose of this study,** the term participative management and employee involvement will be used. It is viewed that involving employees in the management system is one of the most effective approaches management can adopt to promote an effective safety culture (Van Loggerenberg, 2015b:107). One of the most effective tools to measure the level of employee involvement in any managerial context is the theory of participative management.

### 3.4.1 Participative management defined

Early assumptions of participative management theory were that employees prefer to have active participation in decision-making matters that directly impact their work (Hines, 1974:334). As participative management theory developed, it was later viewed as a management system where employees are involved and participate in decision-making, solving problems, setting goals and change processes within the organisation (Sashkin, 1984:5). Mudacumura (2000:2051) defines participative management as the techniques and practises which increase employee involvement in improving work practises, decision-making and organisational performance. Raquib *et al.* (2010:127) defines participative management as the process of empowering employees to assume greater control of the workplace. A fairly modern definition refers to participative management as employers using workers to enhance the effectiveness of operations in an organisation, which includes participative decision-making where employees promote the enhancement of their participation (Turner, 2017:52).

**For the purpose of this study,** participative management will be defined as the process of empowering employees through a management system where employees are actively involved and participate in the decision-making, problem-solving, goal setting, and change processes of the organisation to enhance the effectiveness of operations within that organisation.

Rensis Likert (1903-1981) is considered to be the first person to actively measure the level of participative management, and made a big contribution to the theory of participative management with his research (Amosa *et al.*, 2019:5). Arguably the best method to measure employee involvement in terms of participative management is by using Likert's management systems as proposed in his book "*The human organisation*" (Likert, 1967). Likert's management systems are for different management styles, where each style represents a certain managerial approach towards handling employees (Yeh & Hsieh, 2017:189). The following section further elaborates on Likert's management systems.

### 3.4.2 Likert's management systems

To measure the level of participative management within a business Likert distinguishes between four managerial systems which each represent a certain level of employee involvement, level one being the lowest level of employee involvement and level four being the highest level of employee involvement. The four management systems include System 1: Exploitative authoritative; System 2: Benevolent authoritative; System 3: Consultative and System 4: Participative management. Each will be further discussed below (Hashim *et al.*, 2016).

#### 3.4.2.1 System 1: Exploitative authoritative

This a system where managers do not pay attention to employees and impose their policies through coercing and sanctioning employees. Employees have no other choice but to adhere to decisions made by managers with a higher status than them in the organisation (Ionela, 2019:252). In this system there is no involvement from employees in decision-making and also very little team work (Albarout & Salem, 2017:242). Communication is almost not-existent, leadership is very autocratic and employees are motivated through fear, punishment and threats. In this type of system responsibility lies with higher positions of management and there is no trust in subordinates (Mitrovic *et al.*, 2019:86).

#### 3.4.2.2 System 2: Benevolent authoritative

Managers pay little attention to employees' ideas and suggestions; employees are sometimes motivated through rewards. Very little consultation exists between managers and their employees with regards to decision-making, and important decisions are still made by higher level managers. Very little information is shared between managers and their subordinates (Common, 2018:7).

#### 3.4.2.3 System 3: Consultative

This system involves situations where managers have trust and confidence in their employees to a considerable extent, but major decisions on policies are still made at higher management levels.

There is however mutual communication between employees and managers, and a sense of shared responsibility to achieve organisational goals through all levels of the organisation (Albarout & Salem, 2017:242).

#### 3.4.2.4 System 4: Participative management

With System 4, authority is delegated and new ideas are valued by the organisation, employees are motivated through monetary rewards and by participating in goal setting. Decisions are collectively made with all levels of the organisation in the decision-making process and there is a free flowing level of communication that occurs, which means communication happens from top to bottom and bottom to top (Waddell *et al.*, 2019:20). In this system, participative management is the system that will be used as the argument for the best system to manage safety in the forestry industry.

To determine which systems a business uses as an approach, Likert differentiates between different organisational variables (Likert, 1967). The independent variables that will be used in this study is adopted from Likert's organisational variables as defined in his book "*The human organisation"* (Likert, 1967:196). A discussion of these variables follows.

### 3.4.3 Participative management's independent variables

Likert identified several variables to measure management systems in organisations. The independent variables that has the most relevance to Likert's theory from a safety management perspective include leadership, motivation, communication, decision-making, control and goal setting (Kim *et al.*, 2019; Tappura *et al.*, 2017; Wang *et al.*, 2017; Wu *et al.*, 2017).

#### 3.4.3.1 Leadership

The attitude and behaviour of leaders play an important part in generating the conditions that determine how well employees perform their jobs, and thus leaders play an important part in the success of the organisation. In short leadership is defined as the ability to influence others in the obtainment of organisational goals (Daft & Marcic, 2017:470). For the **purpose of this study** the focus will only be on a leadership approach that supports or encourages employee involvement. The most significant leadership approach in the literature that facilitates employee involvement is transformational leadership and democratic leadership (Al Khajeh, 2018; Bodenhausen & Curtis, 2016; Hussain *et al.*, 2018; Vasilaki *et al.*, 2016).

In order to provide perspective and context it is also worthwhile to elaborate on the extreme opposite of transformational leadership and democratic leadership that discourages employee involvement for comparison. The most prominent leadership style on the opposite side of the

spectrum, is identified as autocratic leadership and bureaucratic leadership (Al Khajeh, 2018; Dyczkowska & Dyczkowski, 2018). A discussion of these four paradigms follows below.

#### 3.4.3.1.1 Autocratic leadership

Autocratic leadership also referred to as authoritarian leadership, provide no space for consultation and communication and want their subordinates to work according to their views; the rights to decision-making is retained by the leader and subordinates do not have any inputs in the decision-making process (Dyczkowska & Dyczkowski, 2018:195). Autocratic leaders create an environment where there is little room for creativity and restricts socialisation and communication in the workplace. It can be argued that this has a negative effect on organisational effectiveness and performance in the long-term (Pei, 2017:370). Autocratic leaders can however be effective in the short term where projects need to completed within very strict deadlines (Mohiuddin, 2017:20).

Safety management however is a continuous long-term process. However, it can be argued that an autocratic leadership approach would therefore be less effective in long term processes where a more participative leadership style will get better results (Adha *et al.*, 2020:118). It is also viewed that autocratic leaders do not have much faith or trust from their followers, where faith and trust is important from a participative management perspective (Esterhuyzen, 2015b:10).

#### 3.4.3.1.2 Bureaucratic leadership

Bureaucratic leaders are very task-oriented leaders, they are highly focused on the policies and procedures and expect their subordinates to follow them (Krause & O'Connell, 2019:531). Bureaucratic leaders are more focused on tasks being completed in a systematic manner and are committed to processes and procedures, and less committed to the needs of people they lead. (Nwokolo *et al.*, 2017:20). Bureaucratic leadership can be effective in situations where routine tasks need to be performed but provide little room for flexibility, creativity or innovation (Veliu *et al.*, 2017:61).

From the above it can be argued that bureaucratic leadership can be effective in a predictable environment in terms of safety management. However, as the forestry industry is an environment that is very unpredictable and where the need suddenly arises for innovative creative solutions to unique safety management problems, this approach could be ineffective (Dekker, 2014:350).

#### 3.4.3.1.3 Transformational leadership

Transformational leadership is defined as behaviour that transforms and inspires followers to perform beyond expectations whilst transcending self-interest to achieve the overall vision of the organisation (Veliu *et al.*, 2017:61). Transformational leaders are focused on the needs of their

followers, specifically acknowledging their higher order needs. Transformational leadership also includes a high level of employee involvement and the formation of mutual trust between the leader and their followers (Eliophotou-Menon & Ioannou, 2016:13). A manager that focuses on transformational leadership focuses on developing the overall value system of employees, their moralities and skills, whilst increasing their motivational levels (Al Khajeh, 2018:3). It is also considered that a transformational leadership approach has a positive effect on organisational performance (Al Khajeh, 2018).

Based on the above, a transformational leadership approach can be considered a useful approach for the management of safety, as it allows higher levels of employee involvement builds trust and allows for the overall acceptance of the organisational vision for safety management.

##### 3.4.3.1.4 Democratic leadership

Democratic leadership is also sometimes referred to as participatory leadership and is characterised by cooperation and collaboration (Aunga & Masare, 2017:44). The democratic leadership style seeks the opinions of subordinates before decisions are made, and aims to decentralise power and authority (Drouin *et al.*, 2018:988). This approach has a high level of involvement in decision-making processes and creates a feeling of shared responsibility amongst all members of the group (Fiaz *et al.*, 2017:146). Employee input make members amongst the group typically feel more motivated and valued (Okoye & Ukwuoma, 2020:92).

From a participative safety management perspective, democratic leadership can lead to better safety performance as subordinates are typically more dedicated, loyal and trustworthy towards managers as they feel valued and that they are worthy contributors of organisational success.

##### 3.4.3.1.5 Safety management and leadership

Based on the above, it can be reasonable to argue that in support of a participative approach towards the management of safety, a transformational and democratic leadership style will lead to better safety management performance in the long term. The argument in the context of this study would then support an environment where safety in forestry includes leadership practises from management that builds a feeling of shared responsibility, which contributes towards the overall success of the organisation. To do this, management needs to focus on including employees in decision-making processes and matters of safety and encourage involvement and participation towards establishing a vision and goals for safety.

Empirical findings strongly support the connection between safety management and leadership styles and arguably transformational leadership has been the most widely studied leadership style

in relation to safety performance (Martínez-Córcoles & Stephanou, 2017). There is also strong evidence to suggest that leadership, and more specifically participative leadership styles such as transformational and democratic leadership, have a significant effect on a positive safety culture or climate (Smith *et al.*, 2016; Zohar, 2002; Zohar, 2003; Zohar & Luria, 2004; Zohar & Tenne-Gazit, 2008).

#### 3.4.3.2 Motivation

Motivation is a key role that needs to be performed by managers in order to promote employee performance, and it is a difficult task to perform by managers as employees can easily lose their drive to perform if not motivated correctly (Daft *et al.*, 2020:456). In the context of this study, effective motivation in terms of safety management needs to be approached from an inclusive and participative perspective, which will have an effect on how employees should be motivated. Several perspectives that support this type of approach to safety management are, worth considering in terms of motivation, and include: individual needs of employees, how positive behaviour is reinforced, how employees are empowered through motivation, intrinsic and extrinsic motivation, goal setting theory, and expectancy theory (Bouzenita & Boulanouar, 2016:62; Jonaria & Ardi, 2020; Panuwatwanich *et al.*, 2017). A discussion for each of these viewpoints follows from a participative safety management perspective:

##### 3.4.3.2.1 Employee needs

Arguably the most recognised theory focusing on needs for motivation is Maslow's theory on the hierarchy of needs (Fallatah & Syed, 2018:19). This theory was discussed earlier in Chapter 3 (see Section 3.3.2.3). The focus of this section is to point out which level of needs will promote employee involvement. If one looks at the different level of needs it is reasonable to argue that levels 3 (belongingness needs), 4 (esteem needs) and 5 (self-actualisation needs) are the most supportive towards employee involvement. To meet the levels of needs using Maslow's levels three, four and five as guidelines, the implications for safety management will be as follows: In terms of *belongingness needs,* management should focus on insuring that employees are involved, that they are included and participate in safety activities as a team and are appreciated by each other; in terms of *esteem needs,* management should also insure that all employees are recognised and appreciated by one another, are credited for their contributions and increase their responsibility in all matters involving safety; and lastly in to realise *self-actualization needs,* management should focus on providing employees with opportunities to grow through training and, challenge employees to obtain a high level of safety standards (Mullins *et al.*, 2019:40).

#### 3.4.3.2.2 Reinforcement perspectives on motivation

The concept of reinforcement focuses on the relationship between behaviour and its consequences. Reinforcement tools motivate certain behaviours through reward or punishment. Common reinforcement strategies include positive reinforcement, avoidance learning, punishment and extinction. *Positive reinforcement* involves applying a rewarding or pleasing consequence following a desired behaviour (Sahito & Vaisanen, 2017:212). An example of positive reinforcement is giving immediate praise or monetary compensation after an employee displays positive working behaviour or performance (Collins & Barcelona, 2018:10). It is often perceived that most employees prefer monetary compensation for motivation, however according to Daft *et al.* (2020:465) the most valued form of reward as perceived by employees include praise, manager support and involvement. *Avoidance learning,* also referred to as negative reinforcement, is the opposite of positive reinforcement. Negative reinforcement involves applying unpleasant outcomes towards undesired behaviour such as criticizing or reprimanding an employee until incorrect behaviour stops. Employees therefore learn to do the right thing by avoiding unpleasant situations (Sahito & Vaisanen, 2017:212). *Punishment* typically occurs following undesired behaviour from an employee. Employees would therefore be disciplined for displaying the incorrect behaviour (Panuwatwanich *et al.*, 2017:64). The last form of reinforcement is *extinction* and involves deliberately withholding positive outcomes such as praise, bonuses or pay raises until the desired behaviour is achieved (Kotob & Noueiry, 2020:575).

Based on the above and within the context of this study the ideal form of reinforcement that supports employee involvement would be a scenario where the desired safety behaviour is reinforced through a rewards system where managers not only focus on monetary compensation but also on giving employees positive feedback, praise, as well as management support and involvement for achieving desired outcomes (Jianhua & Xiaoyan, 2014:147). As such, employees should be rewarded for safe working behaviour and empowered to make their own decisions towards safe working behaviour (Osman *et al.*, 2015:80). Furthermore, mangers observing safety behaviour should provide positive reinforcement for safe work behaviour and be able to provide coaching to correct unsafe working behaviour (Jasiulewicz-Kaczmarek *et al.*, 2015:4879).

#### 3.4.3.2.3 Employee empowerment

Employee empowerment involves sharing power with subordinates. By sharing authority to employee's, managers enable employees to better achieve their goals (Potnuru *et al.*, 2019:42). Increasing employee empowerment enhances the motivational level for task accomplishment and improves employee effectiveness (Min *et al.*, 2016:384). Daft and Marcic (2017:542) identify four

elements that help employees feel empowered within the organisation, which include the following:

- *Employees should receive information about company performance*. Employees have access to all financial and operational information.

- *Employees have knowledge and skills to contribute to employee goals.* Managers should have training programmes that allow people to acquire knowledge that assists with company performance.

- *Employees have the power to make important decisions.* Employees have the authority to influence work procedures.

- *Employees are rewarded based on company performance.* Organisations often reward workers based on the company's bottom line.

**For the purpose of this study** the ideal scenario from a safety management perspective that will also facilitate employee involvement would be where employees are informed and updated with information that relates to matters of safety, receive regular training and opportunities to build their knowledge on safety, have the authority to make important decisions that influence their safe work procedures, and be rewarded for outstanding safety performance statistics (Bian *et al.*, 2019:6).

3.4.3.2.4 Goal setting theory

Goal setting theory for motivation implies setting specific challenging goals that are accepted as being fair by employees, and then helping employees track their progress towards goal-achievement by providing continuous feedback (Daft & Marcic, 2014:267). In order for goals to lead to higher motivation they need to be clear and specific. It must allow employees to focus on what needs to be achieved, be challenging enough to think creatively and encourage maximum effort, allow for commitment from employees through participation in goal setting and provide support to employees through feedback and recognition (Swann *et al.*, 2021:38).

The implications of goal setting theory on safety management would be to set achievable and realistic safety goals with the participation of the workforce. It is, also important that these goals are discussed and agreed upon by workers (Guo *et al.*, 2018:205).

#### 3.4.3.2.5 Expectancy theory

Expectancy theory suggests that an individual's motivation is guided by their belief or expectation that they have the ability to perform a desired task and receive the desired reward. Therefore, a low level in belief in the expectation to achieve the desired outcomes or a low level in belief in the value of the reward will lead to low motivation (Swain *et al.*, 2020:120).

Expectancy theory can be used to manage safety for the purpose of enhancing the overall safety level of the organisation by establishing relevant safety-related tasks for employees accompanied with desired rewards (Guo *et al.*, 2021:2).

#### 3.4.3.2.6 Intrinsic and extrinsic motivation

Intrinsic motivation is the satisfaction that one receives in the process of performing a particular task, and extrinsic motivation is a reward given to an employee for performance, such as a bonus, praise from a manager or pay increase (Daft & Marcic, 2017:521). In a study conducted by Panuwatwanich *et al.* (2017:72), it was found that both intrinsic and extrinsic motivation plays an important role in safety management when a work environment is created where the employees notice the importance of workplace safety, which is valued and collectively shared amongst fellow employees and top management. It can be argued that the perception of collectiveness further highlights participative management with regards to intrinsic and extrinsic motivation in terms of safety management.

#### 3.4.3.2.7 Safety management and motivation

Bunner *et al.* (2018:3) indicate that employee motivation and participative work behaviour have a significant effect on the safety climate of an organisation. Based on this relationship and the above mentioned within the context this study, it can be argued that the ideal scenario from a safety management perspective which will also facilitate employee involvement would be where employees are informed and updated with information relating to matters of safety, receive regular training and opportunities to build their knowledge on safety, have the authority to make important decisions that influence their safe work procedures and be rewarded for outstanding safety performance statistics. In terms of *reinforcement perspectives on motivation* it is advocated that positive reinforcement should be used.

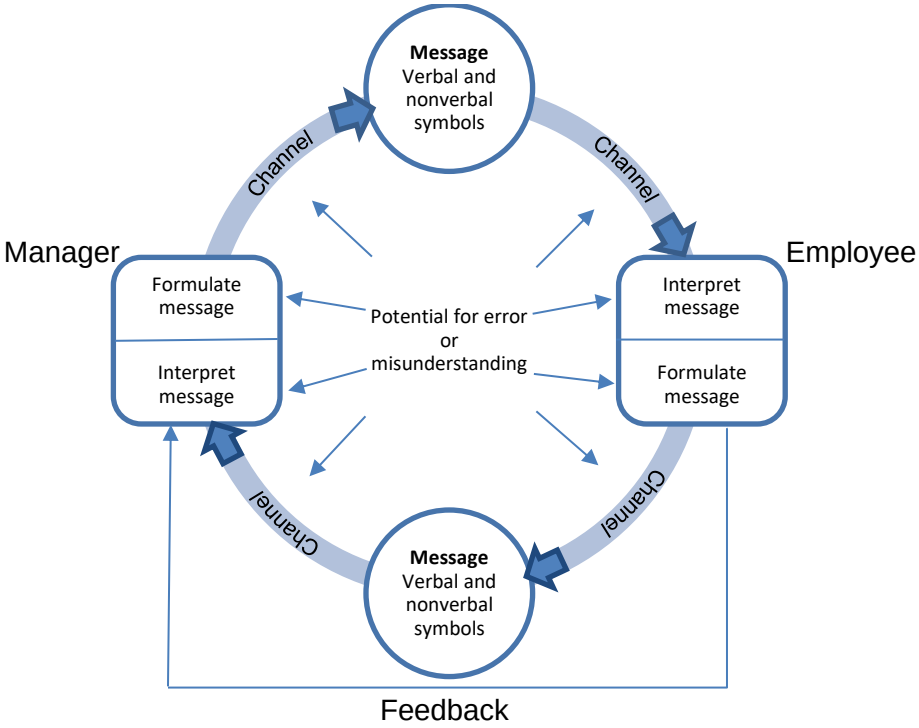
### 3.4.3.3 Communication

Communication is the exchange of knowledge, thoughts and opinions between communicator and recipient (Van Loggerenberg, 2015b:112). From a managerial perspective, communication is defined as the downward, horizontal, or upward exchange of information and transmission of

meaning through informal or formal channels that enable managers to achieve their goals (Motoi, 2017:48). Effective communication in health and safety plays an integral part in the relationships between employers and employees, and guides the attitude and behaviours of all stakeholders in an organisation on all matters concerned with safety (Van Loggerenberg, 2015b:113).

Before one can argue how safety should be managed in the context of this study, one first has to look at the way communication takes place within the business environment. One of the most effective ways to illustrates this is through the model of communication provided in Figure 3-4 below:

**Figure 3-4: Interpersonal communication process**




Source: Adopted from Daft *et al.* (2020).

The communication model illustrates the process that takes place when a manager communicates with an employee. From this model, if managers want to convey a thought or an idea to an employee, it has to be encoded by selecting verbal or non-verbal symbols to compose the message. This message is then sent via a channel, such as an email, telephone call, face to face conversation, etc. The employee interprets the meaning of the message and provides feedback to the manager using the same process as described earlier, which allows the manager to determine if the message was understood, whereby the process repeats itself until a mutual understanding has been reached. It is also important to take note that in this whole process there is a potential for misunderstanding caused by various factors; the most important factors in terms of this study being an open communication climate and how information flows within the

organisation. How an organisation uses and manages these factors will reduce or increase the potential for errors or misunderstandings occurring when communication takes place. How the communication process typically takes place from a health and safety perspective, is explained by Van Loggerenberg (2015b:117) as follows:

Firstly, the message must by conveyed in such a manner that is understood as intended. In health and safety this involves conveying a lot of information on health and safety, as well as instructions on training and supervision. All these factors will lead to a greater understanding to improve health and safety in the work environment. Information conveyed to employees should provide factual data about matters pertaining to safety training, that would help staff to acquire the skills to perform their task safely, and supervision help to control the process by providing advice and guidance to support employees in topics relating to safety.

To understand the view of how communication takes place within the framework of this study, the following section further elaborates on the elements of communication.

#### 3.4.3.3.1 Open communication climate

An open communication climate involves the sharing of information across hierarchal boundaries and functional areas. It allows employees to see the bigger picture of the organisation and understand the decisions managers make on how their work activities contribute to the overall success of the organisation (Heffels, 2018:27). An open and participative communication climate allows employees to identify with the organisation, fosters a positive attitude amongst employees, and builds a sense of trust amongst them (Neill *et al.*, 2019:291).

#### 3.4.3.3.2 Formal communication channels

Communication channels are formed within the chain of commands or task responsibility as defined by the organisation. There are three communication channels: upwards communication, downwards communication and horizontal communication. *Upwards communication* involves the flow of information from the lower to the higher levels of the organisation: information shared from lower levels generally involves suggestions for improvements, grievances and disputes, performance reports, financial information and when employees experience difficulties and problems (Rogala & Bialowas, 2016:50). *Downwards communication* involves the flow of information from senior levels of the organisation to lower levels of the organisation and is the most familiar formal form of communication (Andrejić *et al.*, 2020:314). Downward communication includes information such as goals and strategies, job instructions, procedures and practises, performance and feedback (Daft *et al.*, 2020:501). *Horizontal communication* involves the flow of information amongst co-workers and between departments and is a more decentralised flow of

information (Lee & Lin, 2017:1912). Horizontal communication often involves information related to problem solving, co-ordination between departments and new initiatives and improvements to the organisation (changes to the organisation) (Daft *et al.*, 2020:502).

##### 3.4.3.3.3 Safety management and communication

Based on the above, the ideal communications scenario from a participative safety management perspective would be a situation where an open and participative climate is present that encourages all levels of the organisation to have a shared sense of responsibility and trust between managers and their subordinate. It should also be apparent that all formal communication lines are effectively used and not only through downwards communication, but also upwards and horizontal communication lines. This view is also supported and advocated by (Louw, 2015:10).

#### 3.4.3.4 Decision-making

Managerial decision-making can be defined as a mindful selection from a set of alternatives to obtain a desired goal or result (Maisah, 2020:240). It often involves routine decisions or non-routine decisions that depend on the degree of certainty, risk or uncertainty involved given the scenario confronted with at a particular point in time (Daniel & Daniel, 2018:190). This study focuses on the degree of control or authority exercised by a manager, and the extent of participation of subordinates in the decision-making process when it comes to matters involving safety. To determine this, one needs to focus on various decision-making styles provided in the literature as each style describes a different level of employee involvement when it comes to decision-making. A study done by Siddique and Siddique (2019:821) used six decision-making styles to determine the level of employee participation when it comes to decision-making. The six styles were initially identified by Ali (1993:61) and can be summarised as follows:

- *Autocratic:* Managers make decisions based on the information without any consultation with their subordinates.

- *Pseudo-consultative:* There is sometimes consultation with subordinates but managers do not really take their suggestions or ideas into account.

- *Consultative:* Prior to making decisions, managers sometimes consult with subordinates, but still decide whether they should consider inputs from subordinates which may or may not reflect in the final decisions made.

- *Pseudo-participative:* Managers discuss and review problems with subordinates as a group but may not actually use their inputs in the decisions they make.

- *Participative:* Problems are shared and analysed with subordinates, and managers evaluate alternatives with the group to come up with a majority decision.

- *Delegative:* Authority is shared with subordinates and managers can rely on subordinates to make decisions on their own.

In addition to the decision-making styles above, Daft and Marcic (2017:247) also describe four personal decision making styles worth mentioning, which include the following:

- *Directive style:* This is a style used by managers who like simple solutions to problems. Managers only evaluate one or two alternatives to make a decision and do not like to deal with plenty of information. They therefore do not widely consult with other individuals.

- *Analytical style:* Managers like to consider a broad amount of information and evaluate many alternatives through various sources such as management control systems and try to come up with the best possible decision based on the information available.

- *Conceptual style:* Much like the analytical style, conceptual style managers like to source plenty of information and evaluate various alternatives before making decisions. In addition, conceptual style managers are more socially orientated and consult with others on problems and alternatives before making a decision.

- *Behavioural style:* This style is used by managers who have a great concern for individuals. Managers like to talk to people one-on-one before making decisions and take into account the concerns of each individual. Managers are focused on developing individuals and make decisions that help individuals to obtain their goals.

##### 3.4.3.4.1 Safety management and decision-making

As within the framework of this study, the ideal decision-making process from a safety management perspective would be a scenario where employees are involved, included and consulted before decisions are made by management, and where their inputs are valued and considered as participation in decision-making as an important aspect of a good safety culture (Dirik & Intepeler, 2017:257). From the above it can be seen that the participative, delegative, conceptual and behavioural decision-making styles would fit this criterion best and will be theoretically used to determine the level of involvement of employees when it comes to decisions that need to be made in matters relating to safety.

#### 3.4.3.5 Control

Organisational control is referred to as the process of influencing the behaviour of the employees of the organisation with the purpose of increasing the probability that the goals of the organisation will be achieved (Mohammed & Charles, 2018:226). Another definition defines organisational control as the strategies used by an organisation to align employee behaviour with the objectives of the organisation (Askay, 2017:1727). Daft and Marcic (2017:640) define organisational control as the process of regulating the activities of the organisation and aligning them with the established plans, targets and standards of performance with the organisation.

In the framework of this study the focus is on the level of employee participation and involvement in the approach adopted by management when applying control in safety management. Two opposing modern perspectives are provided by Daft and Marcic (2017:646) that correspond to Likert's (1967:208) theory on control, which include hierarchal control and decentralised control, also referred to in the literature as formal or informal control.

##### 3.4.3.5.1 Hierarchical control

With hierarchical control employee behaviour is monitored and influenced through the wide use of policies, hierarchy, authority, rules, written documentation, reward systems and other types of formal mechanisms. Control measures rely on a centralised authority through a formal hierarchy by closely supervising employees on a regular basis, where the responsibility for control measures lies with supervisors rather than employees (Rosin *et al.*, 2019:995). There is little participation from employees in the control process, if any, and any form of participation happens through formal producers such as grievance procedures (Neirotti, 2020:1978).

##### 3.4.3.5.2 Decentralised control

With decentralised control, procedures and rules are only used when necessary and managers rely on shared goals and values to guide and control employee behaviour. Managers focus on the socialisation of employees to encourage the appropriate employee behaviour that is aligned with achieving the company's goals (Rosin *et al.*, 2019:995). Self-discipline and self-control ensure employees perform their work up to standard and is achieved through employee empowerment, effective socialisation and training (Daft *et al.*, 2020:620). Furthermore, everyone is involved in the control process and employees participate in determining standards of performance, governing quality, setting goals, and aid in establishing control systems (San Ong *et al.*, 2019:1295).

3.4.3.5.3 Safety management and control

As in the context of this study, the ideal control system from a safety management perspective is a decentralised system, as it will enable employees to participate in controlling safety performance by involving them in setting the standards for safety, and encourage them to share the same goals and values when it comes to their behaviour towards safety. Employees should also have a level of autonomy that allows them to apply self-discipline and self-control without being actively supervised on a continuous basis which is reinforced through safety training programmes (Jang *et al.*, 2017:454).

### 3.4.3.6 Goal setting

Goal setting can be defined as the process of identifying what needs to be achieved and developing plans to do so (Wariso, 2017:14). From this definition, it is clear that planning plays an integral part of goal setting and goals cannot be accomplished without an effective plan. One important aspect of goal setting is that goals and plans are established at different managerial levels. Figure 3-5 below illustrates the different levels of goals and plans:

**Figure 3-5: Levels of goals and plans**

Source: Adopted from Mezentseva *et al.* (2020:72).

Figure 3-5 above indicate the formal mission statement as the basic purpose of the organisation and forms the basis from which strategic, tactical and operational goals/plans are established. Strategic goals and plans are established by top managers, defining the goals and plans for the

organisation as a whole. Tactical goals/plans are established by middle management and include the goals/plans for major organisational divisions and management functions. Operational goals/plans are performed by the lower management of the organisation and are established for different departments and individuals. In accordance with this study, the focus is on the operational level of safety management; consequently the rest of this section will focus on the different aspects of operational planning and goal setting.

Managers incorporate operational goals to direct employees and resources towards achieving the outcomes that allow the organisation to perform efficiently and effectively. When it comes to setting operational goals, Daft *et al.* (2020:216) identify two important aspects: establishing effective goals and using management by objectives (MBO) to implement these goals. A discussion of these two theories follows.

#### 3.4.3.6.1 Establishing effective goals

In order for operational goals to be effective, they need to be Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) (Daft *et al.*, 2020:323). When goals are *specific* they provide distinctive information pertaining to the goal, indicating exactly what needs to be achieved without leaving any room for interpretations (Luzhnica, 2017:17). *Measurable* goals are expressed in quantitative terms that can be determined through known units of measurement. They should also be qualitative, need to be precisely defined and allow for measurable progress (Ogaji, 2019:63). *Achievable* goals need to be achievable and demanding, therefore they should be challenging enough to keep employees motivated as setting goals that are too easy to achieve demotivates employees (Iyer & Stone, 2018:200). *Relevant* goals need to be linked to the desired results that needs to be achieved to ensure the accurate measurement of performance reviews (OLT & SZASZ, 2019:110). Lastly, effective operational goals need to be *time-bound,* where goals have a definite time period that stipulates the date at which goal achievement will be measured (Ogbeiwi, 2017:328). To implement operational goals, one needs to develop a system that can monitor the process towards goal achievement. One such system as referred to earlier is MBO.

#### 3.4.3.6.2 Management by objectives (MBO)

Management by objectives (MBO) is a system where managers and employees are involved in defining different goals for each department, project and person and use the different goals to monitor and measure performance (Islami *et al.*, 2018:95). MBO specifically focuses on the contribution of individuals towards the broader organisational goals (Francis, 2018:118). The MBO starts with setting goals by using the SMART process as a guide and forms part of the planning phase. Thereafter plans are implemented in the monitoring phase, and lastly the

outcomes towards goals are reviewed and evaluated in the evaluation phase (Islami *et al.*, 2018:98). The key aspect of MBO to be successful is the continuous involvement and participation of employees in each phase and from a goal setting perspective employees feel more committed towards goal-achievement if they are goals that they helped to establish and form, which in turn will lead to better performance (Daft *et al.*, 2020:217).

#### 3.4.3.6.3 Safety management and goal setting

Taking into account the above, from a safety management perspective at an operational level, employees should work with management to develop and establish goals by following the SMART criteria as a guideline. This will lead employees to be more motivated to achieve their individual safety goals and give them a sense of independence and ownership in the process of achieving them, and arguably lead to better safety standards and performance (Van Loggerenberg, 2015a:122).

With the argument for using participative management as a tool to better safety management, the question arises on how it can be determined whether it is an effective approach towards safety management. To answer this, one needs to look of the state of safety in an organisation at any given time. One of the most effective tools to determine the state of safety in an organisation provided in the literature is to look at the Safety Management System (SMS) of an organisation, and more specifically the safety culture amongst the employees of that organisation (Ahmad & Gibb, 2003; Janicak, 2009; Trinh *et al.*, 2019). Before one can discuss the concepts of an SMS and safety culture, one needs to look at safety management as an overarching term for safety. Hence the following section elaborates by starting with a definition of safety management before moving on to SMS and safety culture.

## 3.5 SAFETY MANAGEMENT

Safety management is defined by Winge *et al.* (2019:140) as the process to realise certain safety functions. To further add to the definition of safety management, Choe and Leite (2017:335) state that safety is a systematic and comprehensive process for managing safety risk. Darveau and Hannon (2017:94) add by defining safety management as the implementation of a framework, including an outline of the principles and processes, to prevent accidents and incidents in high-risk industries. Another definition provided by Karanikas (2017:38) further elaborates on safety management as the application of policies, processes and measures with the scope to prevent adverse safety-related events during operations.

Considering the above definitions, **for the purpose of this study** safety management can be defined as "*A systematic and comprehensive process that realises the importance of safety functions through the implementation of a framework, with the scope to prevent accidents and incidents that happen as part of daily operations*".

To implement the policies, procedures, and frameworks, as most of the definitions mentioned above imply, a SMS must be used (Tong *et al.*, 2018:1558). The following section will further elaborate on SMS and the structure thereof.

### 3.5.1 Safety Management Systems (SMS)

A SMS can be defined as the management procedures, elements and activities that aim to improve the safety performance of and within an organisation (Winge *et al.*, 2019:140). The practise of a safety management system not only reflects the organisation's commitment to safety, but is also recognised as an important component of employees' perceptions of the status of safety in their company (Tong *et al.*, 2018:1558). According to Van Loggerenberg (2015a:105), a SMS is structured through the following aspects:

- **The vision and commitment of management:** The involvement and vision of the management team towards health and safety will influence the perceptions and views of workplace safety amongst the workers of the organisation, and ultimately form the starting point from which the safety culture in that organisation is created (Tsao *et al.*, 2017:54).

- **The safety and health policy:** The formulations of a health and safety policy affirms the values of all employees and stakeholders as well as the commitment from management to health and safety issues (Yiu *et al.*, 2019:24).

- **The safety goals and objectives:** Setting clear goals and objectives will help to provide focus to the SMS and define targets for health and safety in the organisation, rather than just reacting to immediate health and safety issues (Van Loggerenberg, 2015a:105).

- **The safety culture of the organisation:** The overall mission of the SMS should be to foster an effective, positive safety culture that will make health and safety a way of life in the workplace (Gao *et al.*, 2019:224).

**For the purpose of this study** the focus will be on the safety culture created in the SMS of the organisation. Consequently, the following section will focus on what a safety culture entails and how it can be used to determine the state of safety in an organisation.

## 3.6 SAFETY CULTURE

To provide more context to the notion of a safety culture it is worth looking at how culture is defined and more specifically how organisational culture is defined. Hence a discussion follows of what a culture and organisational culture entails.

### 3.6.1 Culture

Culture can be defined as acquired knowledge, functional in a specific environment and shared by a specific group of people to successfully cope with the environment and with each other (Hermida *et al.*, 2019:2133). According to Aydin (2018:269), culture determines what is unacceptable or acceptable, unimportant and important, wrong or right, and what is workable and unworkable. The author further argues that ultimately the culture of the organisation creates the framework for the work behaviour and attitudes that are adopted from employees and managers within the organisation. Considering the importance of culture in shaping the behaviour and attitudes of employees in the workplace, the heading to follow will further elaborate on organisational culture and what it entails.

### 3.6.2 Organisational culture

Organisational culture can be described as a repeated sequence of events of shared assumptions that was cultured by a group as it solved its problems of external adaptation and internal integration within the workplace, in such a manner considered to be valid and, as such, to be taught to new employees as the correct way to perceive, think, and feel when confronted with similar scenarios (Aasi *et al.*, 2018:22). There are four types of organisational cultures identified by Samson *et al.* (2017:115) namely, adaptability culture, achievement culture, consistency culture, and involvement culture. A brief discussion of each of the types of organisational cultures follows below:

- **Adaptability culture:** An adaptability culture is a culture adopted by employees that are functioning in an environment that requires fast and high-risk decision-making, that is motivated by change through creativity, experimentation and risk taking (Daft & Marcic, 2017:85).

- **Achievement culture:** An achievement culture is adopted by employees who are focused on achieving results by setting ambitious goals, where employees value competitiveness and personal initiative (Daft, 2018:447).

- **Consistency culture:** Consistency culture values and rewards a methodical rational, ordinal way of doing things and is a culture with an internal focus on consistency within the workplace in a stable environment, where success is determined through integration and efficiency (Daft *et al.*, 2020).

- **Involvement culture:** Involvement culture emphasises the importance of the participation of employees to rapidly adapt to changing needs of the environment. This culture has a high regard for meeting the needs of employees and is characterised by a caring atmosphere. As a result, management places a high value on cooperation and equality (Samson *et al.*, 2017:117).

Within the **context of this study** an involvement culture would most likely be formed as the result of a participative management approach (Somwaru, 2018:24). A safety culture within an organisation is an extension of the organisation's corporate culture, and in essence both organisational and safety culture focus on specific practices that are created and learned by employees (Van Loggerenberg, 2015c:3). Consequently, the following section will start off with providing several definitions of safety culture, provide the characteristics of a safety culture, give context on how a safety culture is established, discuss the impact of changing a safety culture, and lastly give an explanation on how safety culture is measured.

### 3.6.3 Safety culture defined

The following are definitions set to formulate a more specific definition for safety culture for the use in this study:

- As a set of norms, roles, beliefs, attitudes, social and technical practises within an organisation which are concerned with minimising the exposure of individuals to conditions considered to be dangerous (Toft & Reynolds, 1999:25).

- The shared values, beliefs, assumptions, and norms that govern organisational decision-making, as well as individual and group attitudes about danger, safety, and proper conduct of hazardous operations (Wong *et al.*, 2005:59).

- The combination of values, attitudes and perceptions of competencies, as well as individual and group behaviour which determine the commitment, methods and ability of an institution to manage safety (Occelli *et al.*, 2011:42).

- The attitudes, beliefs, perceptions, and values of the individuals in the workplace, all the way from upper management to lower management (Fan *et al.*, 2016:122).

- How exposed employees behave when they are not being supervised (Peightal & Singerhouse, 2020:10).

**For the purpose of this study** safety culture will be defined as: *"The shared attitudes, beliefs and values amongst all levels of management and employees, that determines how individuals and members of a group view safety within the workplace, which is ultimately reflected through their behaviour towards safety when they are not supervised".*

With a set definition of safety culture as one of the primary constructs of this study, it will be worth looking at what characteristics will be included in creating a sufficient safety culture for an organisation.

### 3.6.4 The characteristics of a safety culture

When looking at any organisation it should be apparent that there is a safety culture in place. Smit and Masebe (2019:39) suggest that a safety culture should display the following characteristics:

- positive attitudes and practises towards safety are monitored and evaluated;
- safety forms part of the organisation's team-building activities;
- new employees are given mentors in order to guide them towards positive attitudes and practises towards safety;
- the safety aspects of the organisational culture are periodically assessed, and corrective action is taken where and when necessary;
- all employees in positions of authority show positive attitudes and practises regarding safety and act as role models in this regard;
- employees at all levels are committed to safety;
- employees at all levels expect positive attitudes and practises regarding safety measures that are practised;
- new employees are provided with a comprehensive orientation in safety measures, including positive attitudes and practises towards safety; and
- ongoing and comprehensive safety training is provided to all personnel at all levels.

The characteristics mentioned above provide the foundation in the establishment of an organisation's safety culture (Smit & Masebe, 2019:39). Therefore, the following section focuses on the elements to consider when establishing a safety culture.

### 3.6.5 Establishing a safety culture

To establish a successful safety culture it is proposed by Esterhuyzen (2015a:18) that the following elements should be taken into account:

- safety should be meaningful to all employees and management;
- a safety culture can be changed or established through the negotiation of different groups within the organisation;
- safety culture campaigns should be tailored according to the dynamics of different groups and is not a one-size-fits-all approach;
- participation from all employees is essential in the negotiation process of safety culture establishment; and
- safety culture campaigns should take into account the different views from all employees as each individual thinks differently about safety.

To establish an effective safety culture, a culture change in terms of safety recognition is required from both management and the employees of the organisation (Smit & Masebe, 2019:53). The following section will therefore further expand on the notion of cultural transformation in terms of a better focus on safety and the implementation thereof.

### 3.6.6 Cultural transformation

Cultural transformation involves a major shift in the norms, values and mind-set of the employees of the entire organisation (Daft & Marcic, 2017). Transforming a safety culture involves changing the organisational values regarding safety in order to improve safety performance (Van Loggerenberg, 2015c:3). According to Smit and Masebe (2019:54), organisational learning should play an important part in promoting the change towards a positive safety culture, as it allows employees to change their method of acting and thinking. As a result, management and employees will start to adopt a better safety mind-set and begin to develop a positive safety culture. The most important factors to consider when implementing change to an organisation's safety culture, especially within the context of this study, is the commitment from leadership and

management towards the change and the involvement and support of the employees in the change management process, thus participative management (Nævestad *et al.*, 2018:44).

With the background for culture, organisational culture, the notion of cultural transformation and more specifically safety culture established, the following section will aim to provide further context on how a safety culture can be measured within an organisation.

### 3.6.7 Measuring safety culture

The temporal state measure of safety culture is safety climate, which will give an indication of the current perceived state of safety at a particular time or place (Zhang *et al.*, 2002:1407). Safety climate can therefore be seen as a temporal phenomenon which gives a "snapshot" of the perception of an organisation's safety culture at a specific point in time (Wiegmann *et al.*, 2004:124).

Van Loggerenberg (2015c:8) argues that the safety climate within an organisation is usually determined by means of surveys or questionnaires, which measures the attitudes, behaviours and perceptions of employees regarding safety. Furthermore, by measuring an organisation's safety climate, the state of the organisation's safety culture can therefore be determined.

Building on measuring safety culture, the following section will explain the factors involved when measuring safety climate.

#### 3.6.7.1 Factors influencing safety climate

The first person considered to actively measure safety climate was Zohar (1980). Zohar (1980) developed a questionnaire that had eight factors determining safety climate. These factors included workers' perceptions on the importance of safety training, managements attitudes towards safety, the effects of safe work conduct on promotions, the level of risk at the workplace, the effects of work pace on safety, status of the safety officer, effects of safe conducts on social status, and the status of the safety committee. Since then, various other researchers have added their voices towards determining safety climate; each with their own take on the factors determining safety climate. These factors differ from one study to another, which makes it difficult to choose one researcher's view on what a safety climate should entail above another. Studies reviewed in the literature include but are not limited to the following: Bian *et al.* (2019); Brown and Holmes (1986); Cox and Cheyne (2000); Coyle *et al.* (1995); Hale (2000).

Choosing the correct questionnaire will therefore rely on the context of this study, and in relation to a study with similar respondents, in this case mostly lower level workers, it was decided to focus on a study done by Vinodkumar and Bhasi (2009). After a review of their study and the

results, the following factors were considered to be of significant value for the **purpose of this study**: management commitment and actions towards safety, workers' knowledge and compliance to safety, workers' attitude towards safety, and workers' participation and commitment towards safety. A discussion of each of these factors follows.

#### 3.6.7.1.1 Management commitment and actions towards safety

Management commitment is a process of interaction between management and employees through the extension of management's concern of employee welfare to achieve organisational safety goals (Gao *et al.*, 2019:224). According to Ismail *et al.* (2017:94), management can show their commitment through the following actions towards safety: participation, support, visibility, demonstrating leadership, by having a positive attitude towards safety, the manner in which they control safety activities, through their values and beliefs regarding safety, and lastly their acknowledgement of the significance of safety programmes.

#### 3.6.7.1.2 Workers' knowledge and compliance to safety

Workers safety knowledge refers to the extent to which a worker knows how to perform their job and tasks in a safe manner (Kao *et al.*, 2019:206). Worker's compliance towards safety refers to the participation in safety-related activities, including the completion of work in a safe manner. Furthermore, safety compliance can be seen as the knowledge, skills and motivation of workers to comply with safety policies and processes (Haas *et al.*, 2019:10). In terms of workers' safety, knowledge and compliance, workers need to know how to complete their job in a safe manner, need to use the necessary safety equipment to complete their job in a safe manner, maintain or improve health and safety within their workplace, reduce risks and accidents within the workplace, and identify the hazards associated with their job and what precautions they need to take to avoid them (Vinodkumar & Bhasi, 2009:662). Jaafar *et al.* (2018:502) argue that to improve the safety culture through knowledge and compliance training for employees, it is an important element that should be focused on. The authors further argue that continuous training and education will enhance workers' knowledge and understanding through behavioural changes. It is therefore important for managers to provide employees with enough information and training to reduce accidents and improve their safety awareness.

#### 3.6.7.1.3 Workers' attitude towards safety

Safety attitudes can be described as the state of mind towards issues relating to safety which is reflected through the procedures and behaviour of employees (Van Loggerenberg, 2015c:6). Ultimately, a workers safety attitude will determine their behaviour towards safety, and workers with a positive safety attitude are more likely to pay attention to safety in the workplace and as

such will be involved in less accidents (Gharibi *et al.*, 2016:146). According to Vinodkumar and Bhasi (2009:662), workers with a good safety attitude feel that it is important to maintain safety at all times, carry out work in a safe manner, put in the necessary effort to reduce accidents and incidents in the workplace, encourage others to work safely, and promote safety training programmes. To improve the attitude of workers towards safety it is argued by Mohammadi *et al.* (2018:389) that employee involvement in terms of communication, adequate managerial support, and allowing employees to have greater influence on how safety management systems and practises are implemented, are the most important factors to consider in this regard.

3.6.7.1.4 Workers' participation and commitment towards safety

Safety participation can be described as the behaviour of employees to actively report safety issues, effectively communicate matters of safety, making suggestions on increasing safety performance, and engaging in self-directed learning towards safety. Safety participation also promotes independent safety behaviour by allowing workers to participate in decision-making (Zhang *et al.*, 2020:87). Gaining commitment from employees means they understand the need and importance of a good safety culture (Esterhuyzen, 2015a:21). By participating and being committed towards safety workers will follow the correct safety rules and procedures, put in extra effort to improve safety, and willingly carry out tasks that improve workplace safety (Vinodkumar & Bhasi, 2009:662). To conclude, it is argued by Curcuruto and Griffin (2018:31) that a supportive and participative style of safety management can possibly lead to better commitment and participation of workers towards safety.

## 3.7 SUMMARY

The aim of this chapter was to provide a theoretical background to management theory, participative management, and safety culture.

Firstly, the four main management theories, i.e., classical, behavioural, quantitative, and contemporary, and their relationship with safety management was discussed. In terms of participative management (PM), the six constructs that measure PM included leadership, motivation, communication, decision-making, control and goal setting. From a leadership perspective it was argued that transformational leadership and democratic leadership was most likely to encourage employee participation in safety management. From a motivational perspective it was maintained that most motivational theories will have a positive outcome on participative safety management. In terms of communication, it was determined that all communication channels should be used to encourage safety participation. From a decision-making standpoint it was advocated that participative, delegative, conceptual and behavioural

decision-making was more likely to promote safety participation. The implication of control on promoting safety participation was to use a decentralised control system that inspires more self-direction from employees, and lastly in relation to goal setting it was suggested that using the SMART criteria for goal setting will lead to higher safety participation.

The chapter then concludes with safety culture as a tool to measure the performance of safety within a company at a given time. After a review of various studies done on safety culture, it was decided that the focus should be on management commitment and actions towards safety, workers' knowledge and compliance towards safety, workers' attitude towards safety, and workers' participation and commitment towards safety.

The following chapter discusses the research methodology utilised in order to achieve the primary and secondary objectives as set out in Section 1.5.

# CHAPTER 4

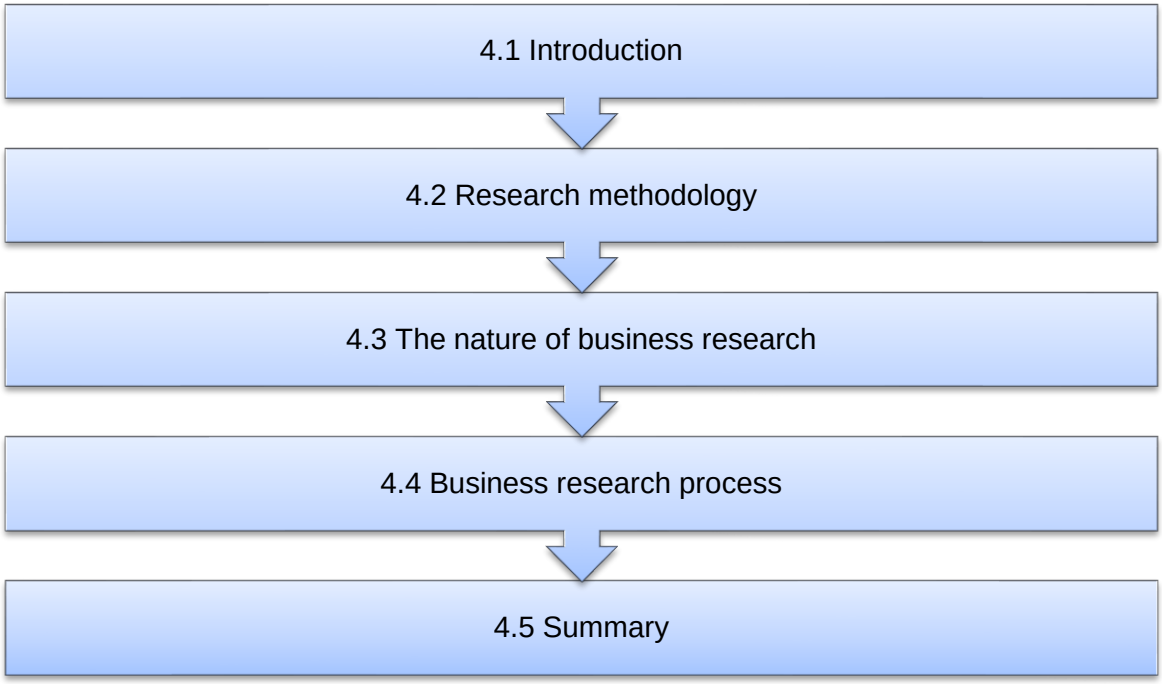
# RESEARCH METHODOLOGY

## 4.1 INTRODUCTION

The purpose of this chapter is to provide context on the research methodology process that was used for this study. Thus, this chapter will start off with explaining what research methodology entails by examining the different research philosophies and approaches to theory development. Thereafter the nature of business research will be deliberated through definition and its importance, after this the business research process adopted for this study will be broadly discussed, and lastly the chapter will be concluded with a summary of the main conclusions that can be taken from the chapter.

Outlined in Figure 4-1 below is an abbreviated synopsis of the sections that will be discussed in this chapter:

**Figure 4-1: Chapter 4 outline**




Source: Researcher's own compilation.

## 4.2 RESEARCH METHODOLOGY

The research methodology contains all the detail on how the research is conducted (Saunders *et al.*, 2019:4). Before continuing with the detail on how research was conducted within in the context of this study, it is worthwhile to first reflect on the research philosophy and the approach to theory development that was adopted for the purpose of this study. This will serve as the foundation for the rest of the research process to follow.

### 4.2.1 Research philosophy

According to Saunders *et al.* (2019:130) a research philosophy refers to a system of beliefs and assumptions about the development of knowledge. The authors further state that there are five types of management philosophies which include the following:

- **Positivism:** Relates to the philosophical stance of the natural scientist and entails working with an observable social reality to produce law-like generalisations (Mathotaarachchi & Thilakarathna, 2021:947).

- **Critical realism:** Focuses on analysing the social world by concentrating on what causes something to happen or change that leads to an observable phenomenon (Williams *et al.*, 2017:13).

- **Interpretivism:** Emphasising constructing explanations of development and understanding of the particular landscapes of meaning shaping the motivations of individuals and the institutionally prescribed mechanisms available to individuals who act on those motivations (Voyer, 2019:454).

- **Postmodernism:** Emphasises the role of language and of power relations, seeking to question accepted ways of thinking and give ways to alternative marginalised views (Saunders *et al.*, 2019:149).

- **Pragmatism:** Asserts that there is a difference between claims and theories only if they produce a difference through their practical application (Shapira, 2020:288).

The beliefs and assumptions followed for **this study** draws on the epistemological approach of **positivism**, more specifically, quantitative data was collected and measured to test the theories of participative management and safety culture (Malhotra *et al.*, 2017).

With the research philosophy established, the next section explains the approach to theory development adopted for this study.

### 4.2.2 Approach to theory development

The nature of the relationship between theory and research determines the approach to research; if theory is an outcome of research it is known as an inductive approach, if theory guides research it is known as a deductive approach (Malhotra *et al.*, 2017:162-163). Since the objectives were developed and guided through the literature and tested through quantitative results, **this study** followed a deductive approach.

As the research philosophy and approach to theory development that was adopted **for the purpose of this study** has now been established, it is appropriate to focus on the field in which the research was conducted. As the research for this study was done in the field of business and management, it is considered to be business research (Saunders *et al.*, 2019:6). The following sections will therefore focus on the nature of business research, and the research process that was followed in the context of business research.

## 4.3 THE NATURE OF BUSINESS RESEARCH

According to Cooper (2018:9), business research is the process of gathering information methodically and impartially, effectively to support management with decision-making and problem solving through the collection, examination, and evaluation of data. One important aspect according to Hair *et al.* (2020:5) is that business research is generally partially social sciences as most business-related problems ultimately involve people. Thus, social sciences has a great impact on the research methodology of business research. Based on this and in order to further understand the nature of business research, it is meaningful to look at how business research is defined throughout the literature. Thus, the following section will focus on defining business research.

### 4.3.1 Defining business research

Table 4-1 below shows various recognised definitions of business research that can be found in the literature. It provides a discussion of the various business research definitions and is followed by an interpretation of their commonalities.

**Table 4-1: Business research defined**

| Source | Definition |
|---|---|
| Hair *et al.* (2020:5) | Business research is a truth-seeking, fact-finding function that gathers, analyses, interprets, and reports information so that business decision-makers become more effective. |
| Cooper and Schindler (2014:5) | Business research is a process of planning, acquiring, analysing, and disseminating relevant data, information, and insights to decision-makers in ways that mobilise the organisation to take appropriate actions that, in turn, maximise performance. |
| Saunders *et al.* (2012:6) | Business research can be defined as a process of undertaking systematic research to find out things about business and management. |
| Zikmund *et al.* (2013:5) | The application of the scientific method in searching for the truth about business phenomena. These activities include defining business opportunities and problems, generating and evaluating ideas, monitoring performance, and understanding the business process. |
| Collis and Hussey (2014:6) | A systematic and methodical process of inquiry and investigation with a view to increasing knowledge. |
| Sekeran and Bougie (2016:2) | Business research can be described as a systematic and organised effort to investigate a specific problem encountered in the work setting, which needs a solution. |

Source: Author's own depiction.

The following key elements can be gathered from the definitions of business research as seen in Table 4-1 above:

- business research is a systematic scientific process or effort;
- business research involves the identification, investigation, defining and solving of problems within the field of business and management;
- business research is done to increase the performance of the business; and
- business research helps improve management's decision-making.

Based on the key elements identified above and **for the purpose of this study,** business research can therefore be defined as follows: *Business research is the systematic and scientific research process or effort, that involves the identification, investigation, defining and solving of problems within the field of business and management, with the purpose of increasing the performance of the business and improving the decision-making of management.*

With a definition for business research established, the following section focuses on how to ensure the quality of business research.

### 4.3.2 The importance of business research within the context of this study

Business research can be used to solve various operational and planning problems that might be evident within a business (Martelli & Greener, 2018:12). It also provides managers with knowledge regarding the organisation, the market, the economy, or any other area of ambiguity. Ultimately the goal of business research is to provide managers with accurate information to improve decision-making (Hair *et al.*, 2020:5). Therefore, based on the **context of this study** whilst keeping the above mentioned in mind, the importance of the research conducted in this study will aim to provide the following contribution as indicated in Chapter 1 (see Section 1.8):

**This study** will aim to provide a better perspective on how participative management can lead to better safety management in the forestry industry. This can also lead to fewer incidents and fatalities in the forestry industry and can reduce the risk involved in activities performed in such operations. **This study** will also contribute to existing literature with regard to safety management in the forestry industry, as there is little information on how safety is managed in this specific industry, if any. It will also give clarity on the roles that leadership, motivation, communication, decision-making and goal setting play in the management of safety in this specific industry.

With the nature of business research established, the following section will focus on the research process that was followed to reach the objectives of this study.

## 4.4 BUSINESS RESEARCH PROCESS

As business research is essentially an extension of social sciences, it mostly follows the same research process (Bell *et al.*, 2019:3). There are various views and opinions from various authors on what type of research process should be adopted for any type of study (Bell *et al.*, 2019; Bryman & Bell, 2015; Cooper & Schindler, 2014; Hair *et al.*, 2020; Saunders *et al.*, 2019; Schindler, 2019; Sekeran & Bougie, 2016; Zikmund *et al.*, 2013). As such it is fairly evident when reviewing the literature on business research, that there is no “one size fits all approach”, and the type of process adopted largely depends on the researcher’s research philosophy and the type of study that is being done. Therefore, it was decided to follow a process which supports the appropriate research philosophy adopted for this study, at the same time keeping in mind the various views from authors in the field of business research. Consequently the following research process was used **for the purpose of this study** which is illustrated in Figure 4-2 below:

**Figure 4-2: The business research process used for this study**

Source: Adopted from Bell *et al.* (2019); Bryman and Bell (2015); Cooper and Schindler (2014); Hair *et al.* (2020); Saunders *et al.* (2019); Schindler (2019); Sekeran and Bougie (2016); and Zikmund *et al.* (2013).

With the argument for the research process that was used in this study concluded, the following sections will focus on explaining each step of the process that was used for **this study**.

### 4.4.1 Define the research problem

According to Ritter (2019:615), the formulation of a research problem is a complex process of making sense of applying various theories to determine what to look for in the real world and how to unscramble empirical material into a recognisable and meaningful research problem. As a result, the research problem for this study was broadly formulated in Chapter 1 (see Section 1.2) and can be summarised as follows:

The safety of employees and the implementation thereof are reasons for concern in some sectors of South Africa. Safety statistics in the forestry industry are concerning, and more research needs to be done on how safety is managed, especially amongst contractors within the forestry industry. There is a considerable lack of employee involvement in the management of safety in some industries in South Africa, and this might arguably also be the case in the forestry industry. As a result, there is a definite need to investigate whether a more participative approach to the management of safety in the South African forestry industries will lead to better safety management. There is also no clarity on the current use of this approach and its effect on safety management and this study will be the first of its kind in South Africa, particularly in the forestry industry.

### 4.4.2 Set the research objectives

The research objectives, sometimes referred to as questions, are considered to be evidence of the researcher's clear sense of the research and provides direction towards the concerns that the researcher wants to address (Saunders *et al.*, 2019:45). The research objectives were formulated for this study in Chapter 1 (Section 1.5) in was indicated as follows:

- Primary objective

The primary aim of this study will be to determine the effect that participative management has on the creation of a safety culture in the forestry industry of South Africa.

- Secondary objectives

The secondary objectives derived from the primary objectives as well as the research problem are:

1. to measure respondents' perception of participative management;
2. to measure respondents' safety culture;
3. to determine whether leadership has an effect on the establishment of a safety culture;
4. to assess whether motivation has an influence on the creation of a safety culture;
5. to determine whether communication has an impact on the construction of a safety culture;
6. to investigate the consequences of decision-making on the design of a safety culture;
7. to explore the value of goal setting on safety culture;

8. to examine the importance of control on safety culture; and

9. to determine the influence of the dimensions that participative management has on safety culture.

### 4.4.3 Select the research strategy

The research strategy refers to the overall approach you take in your research project (Bell *et al.*, 2019:17). There are three research strategies, namely a) qualitative, b) quantitative, and c) mixed methods (Leavy, 2017:8). **Qualitative research** is a research strategy that usually put emphasis on words rather than numbers in the collection and analysis of data, and as a strategy it follows an inductive generation of theory from data, and takes on the epistemological orientation of interpretivism and the ontological orientation of constructionism (Bell *et al.*, 2019:356). **Quantitative research** on the other hand is a research strategy which attempts to measure and/or count a social phenomenon, such as a certain behaviour, knowledge or attitude (Schindler, 2019:586). It entails the collection of numerical data, regards the relationship between theory and research as deductive, prefers a natural science approach to research (positivism in particular), and adopts the objectivist stance to social reality (Leavy, 2017:8). **Mixed method research** is used to describe research that combines both quantitative and qualitative research strategies within a single research project, where data is used in a mutually beneficial manner for example quantitative data is used to strengthen weaknesses in qualitative data or qualitative data is used to strengthen weakness in quantitative data (Cuervo-Cazurra *et al.*, 2020:152). Mixed method researchers usually take on the philosophical position of pragmatism and critical realism, which means they value both quantitative and qualitative research strategies (Saunders *et al.*, 2019:181).

For the **purpose of this study** a **quantitative research strategy** was adopted which will guide the progression of the remaining steps in the research process to follow. The assumptions of the quantitative research strategy are summarised in Figure 4-3 below:

**Figure 4-3: Assumptions of quantitative research**

| Assumptions | Quantitative research strategy |
|---|---|
| Principal orientation to the role of theory in relation to research | Deductive empirical testing of theory |
| Epistemological orientation | Natural science model, in particular positivism |
| Ontological orientation | Objectivism |

Source: Researchers own compilation.

Having established the research strategy that was followed in this study, the sections to follow will focus on further elaborating on the remaining steps of the business research process, namely research design, data collection, and data analysis from a **quantitative research perspective**.

### 4.4.4 Select the research design

A research design is an outline for conducting a research project. It identifies the procedures needed for gaining the information to structure or research problems (Malhotra *et al.*, 2017:61). According to Bell *et al.* (2019:46), the decision of the type of research design followed reflects the choices of the priority given to certain dimensions of the research process, which involves the importance attached to the following:

- Expressing connections between variables.
- Generalising to larger groups of individuals than those actually forming part of the investigation.
- Understanding behaviour and the meaning of that behaviour in a specific social context.
- Having a time-based appreciation of social phenomena and interconnections.

As such, there are two aspects to take into consideration when choosing a research design: the criteria for ensuring quality in business research and the differences between the types of research designs in terms of providing quality in research. Generally there are three types of research designs which a business researcher can follow, which will reflect where the priority was given in terms of certain dimensions in the research process, namely exploratory, causal and descriptive research (Hair *et al.*, 2020:162). Each of the research designs are subsequently discussed in the sections to follow.

#### 4.4.4.1 Exploratory research design

Exploratory research is conducted to mainly gain a better understanding of a certain phenomenon, that has not been extensively researched and of which the cause is uncertain, in order to look for patterns and come up with new ideas (Collis & Hussey, 2021). Exploratory research helps in the understanding and assessment of the critical issues related to problems. It is particularly useful when the researcher lacks a clear idea of the problems they will face during the study. By using exploratory research, researchers are able to develop concepts more clearly, establish priorities, develop operational definitions, and improve the final research design (Schindler, 2019:581).

#### 4.4.4.2 Causal research design

Causal research is used to enlighten the relationship between two or more variables. As such it provides a deeper understanding on how variables are related, with the main purpose being to determine causality, causality being the link between cause and effect (Mooi *et al.*, 2017:18). The main purpose of the researchers in terms of causality is to point out the factors that are causing a specific outcome, often referred to in statistical terms as the effect of the independent variables on dependent variables (Sekeran & Bougie, 2016:44).

#### 4.4.4.3 Descriptive research design

Descriptive research can be defined as a research method used to describe an existing phenomena as accurately as possible, by collecting available data through the use of research instruments such as tests, questionnaires, interviews or observation (Atmowardoyo, 2018:198). Descriptive research can further be divided into cross-sectional and longitudinal research.

##### 4.4.4.3.1 Longitudinal research

Longitudinal research involves the study of a particular observable fact or event over a prolonged period of time. It allows the researcher to study the changes and development of a specific phenomenon and allows for a measure of control over some of the variables being studied (Saunders *et al.*, 2019:212, 809).

##### 4.4.4.3.2 Cross-sectional research

A cross-sectional research design involves the collection of data on more than one respondent and at a single point in time and is mostly done to collect quantitative data in relation to two or more variables. These variables are then measured to detect patterns of association and relationships between variables (Bell *et al.*, 2019:58).

**For the purpose** of this study a combination of an exploratory and descriptive research design was adopted. Firstly, exploratory research was used to gain a better understanding on how safety is managed in the forestry industry and to aid in defining and developing the problem statement as formulated in Chapter 1 (Section 1.2). Secondly, descriptive research was used by following a cross-sectional research design to gain insight into the nature of how participative management can be used to improve safety culture in the forestry industry at a specific point in time, and also to provide certain demographic characteristics that could reveal specific differences between managerial positions. The following section will further elaborate on the two main sources used for data collection in this study.

### 4.4.5 Design the data collection method

In order for research to provide information that helps solve problems, researchers must identify the types and sources of information they will use (Collis & Hussey, 2021:90). There are two types of data that can be used towards the collection of data, namely: secondary data and primary data (Schindler, 2019:33).

#### 4.4.5.1 Secondary data

A secondary data source is something that has been written from a primary data source. It is developed from primary data and interprets and analyses the historical data from primary sources. According to Ghauri *et al.* (2020:154), secondary data can help the researcher in several ways:

- by answering research questions and solving research problems;
- to help with the formulation of a problem statement;
- deciding on different research methods; and
- to compare other findings with the results of the study.

According to Hair (2017:50) there are two types of secondary data: internal and external. **Internal secondary data** are data that companies compiled for reporting and analysis purposes, such as company records, sales reports and existing research studies (Mooi *et al.*, 2017:50). **External secondary data** are collected by sources outside the organisation, such published materials, online databases, and information made available by syndicated services (Malhotra *et al.*, 2017:100).

**In this study** a combination of **internal and external secondary data** were used. Firstly, as part of the introduction and background of the study to (Chapter 1), and to explore the nature of the forestry industry (Chapter 2). Then a literature review on participative management and safety culture was further explored (Chapter 3) to gain an in-depth understanding of the constructs under investigation, and lastly this chapter (Chapter 4) explains the research methodology used for the study. The abovementioned literature was obtained from a variety of sources, which include websites, academic books, journals, theses, departmental reports, and company reports. The researcher also consulted a variety of electronic databases, including Google Scholar, ProQuest, EBSCOhost, Social Sciences Citation Index (SSCI), Sabinet, and the National ETD Portal to get extensive literature that served as the basis for this study.

#### 4.4.5.2 Primary data

Primary data in business research are gathered by the researcher for the specific purpose of addressing the problem at hand and can be qualitative or quantitative in nature (Ghauri *et al.*, 2020:153). Quantitative data are data to which numbers are assigned to represent specific characteristics that can be measured from a numerical scale (Mooi *et al.*, 2017:266; Mundung *et al.*, 2020). Qualitative data are audio, pictorial, or textual information that the researcher uses to answer research questions. In business research primary data can be collected from first-hand sources quantitatively through surveys, observation and experiments and qualitatively through interviews, focus groups and case studies (Schindler, 2019:121 - 221).

**For the purpose** of this study primary data was collected through surveys. The following section will further elaborate on the different survey methods used in business research as well as the survey method that was adopted for this study.

#### 4.4.5.3 Survey method

In surveys, research data are collected through the use of a structured questionnaire administered to a sample of the target population (Malhotra *et al.*, 2017:269). A decision needs to be made weather to administer the questionnaire face-to-face or to rely on the self-completion of the questionnaire (Bell *et al.*, 2019:207). In business research there are mainly three survey methods used for the collection of quantitative data via questionnaires, namely: Self-administered surveys, telephone surveys and surveys administered via a personal interview, also referred to as a structured interview (Schindler, 2019:200). A summary of each one of these methods is provided in Table 4-2 below:

**Table 4-2: Comparison of different survey methods**

| Self-administered surveys | Telephone surveys | Structured interview | Mixed mode surveys |
|---|---|---|---|
| Respondents answer questions by completing the questionnaire themselves. | Respondents are interviewed on telephone by a trained interviewer. | The researcher or a research assistant physically meets respondents and asks the questions face-to-face. | A combination of the best characteristic between two or more survey methods. |

Source: Adopted from Bell *et al.* (2019:232); and Schindler (2019:199).

According to Saunders *et al.* (2019:506-509), the choice on the survey method used will be affected by the following:

- the time available for data collection;
- the profile and availability of respondents;
- the cost of data collection;
- the availability of field workers and assistants; and
- the software used for data analysis.

The biggest advantages of self-administered surveys and telephone surveys in relation to structured interviews are that they are generally more cost effective and allow for faster completion times (Burns *et al.*, 2017:178-184). Structured interviews on the other hand promotes the standardization of both the asking and the recording of answers and gives the researcher the opportunity to eliminate any confusion that might occur before a question is answered (Bell *et al.*, 2019:208).

Therefore, considering the above and in the context of this study, it was decided to administer the questionnaire through a combination of the **self-administered survey method** and **structured interview method**, thus incorporating the **mixed mode survey method**. The reasons for this were: firstly, the respondents work in remote areas and are difficult to reach, and secondly, to overcome the language barrier, an interviewer who could assist with translation, had to be incorporated to explain the questions of the questionnaire to respondents who are not fluent in English. As a result, **for the purpose** of **this study,** data were collected by giving respondents who were fluent in English the questionnaire to fill in by themselves, whilst those who could not understand English fluently were assisted by a trained field worker who acted as an interviewer and interpreter to help respondents less fluent in English fill in the questionnaire.

#### 4.4.5.4 The research instruments

In the process of structured data collection, before data can be collected, a formal structured questionnaire is prepared, and the questions are asked in a prearranged order (Malhotra *et al.*, 2017:269). In order to prepare the questionnaire, one needs to take into account the units of measurement and the questionnaire design. The following sections further elaborate on these two aspects (Burns *et al.*, 2017:232).

##### 4.4.5.4.1 Levels of measurement

According to Schindler (2019:227), measurements in research consist of assigning numbers to empirical events, objects or properties, or activities in compliance with a set of rules.

Measurement can be characterised by four levels which are compromised out of classification, order, distance and zero origin. The combination of these four levels of measurement produces four types of measurements, namely nominal, ordinal, internal and ratio (Dalati, 2018:82). Each of the four different types of measurement are briefly discussed below in order to provide more insight on how the questionnaire used for this study was developed:

#### 4.4.5.4.2 Nominal level of measurement

Represents the most elementary level of measurement in which values are assigned to an object for classification and identification purposes only (Brown *et al.*, 2017:337).

#### 4.4.5.4.3 Ordinal level of measurement

Ranking scales allow things to be arranged based on how much of a certain concept they represent, therefore an ordinal scale is a ranking scale (Burns *et al.*, 2017:207).

#### 4.4.5.4.4 Interval level measurement

Interval scales have both ordinal and nominal properties, but also capture information about the differences in quantities of a concept from one observation to the next (Malhotra *et al.*, 2017:340).

#### 4.4.5.4.5 Ratio scale

Represents the highest form of measurement, as they have all of the characteristics of interval scales with the additional attribute of reflecting absolute quantities, whilst also having the property of a meaningful absolute zero (Ghauri *et al.*, 2020:83).

**For the purpose** of this study nominal and ordinal levels of measurement were used to obtain a demographic profile of respondents, and interval levels of measurement were used to measure the constructs associated with participative management and safety culture. Where and how these scale measurements were employed within the measurement instrument will be further discussed in the questionnaire design section in this chapter (see Section 4.4.5.4.7).

With the types of measurement scales used, this study established the following section which focuses on the criteria used for accurate and good measurement.

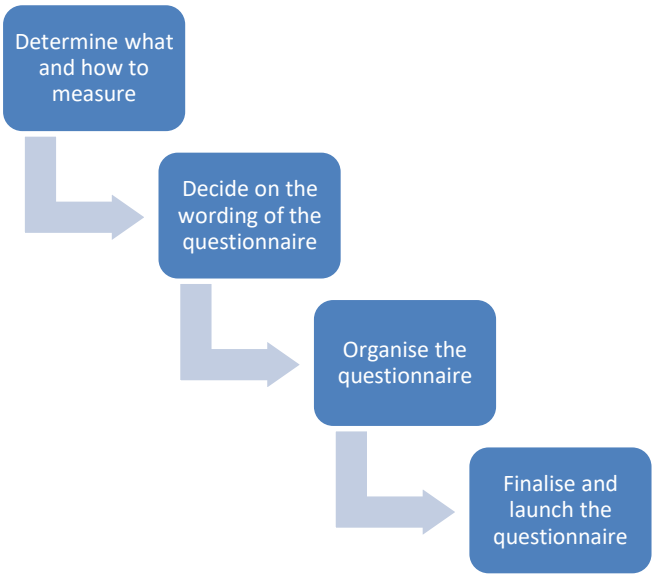
#### 4.4.5.4.6 Designing the questionnaire

Arguably the questionnaire is one of the most used measurement instruments in the field of business and management research. The questionnaire design is one of the most important steps in business research, and is a tool used to ask a set of specific research questions through face-

to-face interviews, telephone interviews or by self-administration. Ultimately, questionnaires provide the data that are used to produce the analysis of responses. The questionnaire is therefore not a stand-alone tool used in research, but an aid to the collection and analysis of data (Hair *et al.*, 2020:273).

According to Burns *et al.* (2017:216), designing the questionnaire is a systematic process where the researcher need to consider various factors which include the format in which questions are presented, the number of factors characterising the survey at hand, the wording of the questionnaire, as well as the layout of the questionnaire. The questionnaire development and design process are summarised in Figure 4-4 below:

**Figure 4-4: Questionnaire development and design process**




Source: Adopted from Burns *et al.* (2017:216).

4.4.5.4.7 Determine what and how to measure

Beginning with research objectives, the researcher needs to identify the properties of the construct under measurement and what types of measures are going to be used in each one of them (Burns *et al.*, 2017:214).

The primary aim of this study was to determine the effect that participative management has on the safety culture of workers in the forestry industry of South Africa. Consequently, the two main concepts that were measured in this study included the level of participative management experienced by workers in terms of safety operations, and secondly to determine the safety culture of workers. For the **purpose of this study,** the **Likert-scale** was used to measure the constructs of participative management and safety culture and is often associated with the interval

level of scale measurement (Schindler, 2019:33). By using a Likert-scale the respondents is presented with a series of statements and asked to indicate their level of agreement with those statements, the level of agreement ranging from strongly disagree to strongly agree (Hair *et al.*, 2020:245). A breakdown of how the Likert scale was used to measure the constructs of this study is summarised as follows:

To measure participative management, six constructs were identified, starting with leadership, motivation, communication, decision-making, control and goal setting. Each item from each construct included a statement where respondents had to indicate their level of agreement, starting from 1 (strongly disagree) and ending with 5 (strongly agree). To measure the constructs of safety culture, four constructs were identified, namely management commitment and actions towards safety, workers' knowledge and compliance to safety, workers' attitude towards safety, and workers' participation and commitment towards safety. Similarly, each item from each construct included a statement where respondents had to indicate their level of agreement, starting from 1 (strongly disagree) and ending with 5 (strongly agree).

#### 4.4.5.4.8 Decide on the wording of the questionnaire

One of the key aspects regarding the wording of a questionnaire is to consider the level of understanding and the interpretations of respondents (Ekinci, 2015:88). Ultimately the choice of words regarding the questionnaire will depend on the respondents' educational level, frame of reference, as well as use of special terms and idioms within their culture (Sekeran & Bougie, 2016:146). To avoid any errors in judgement regarding the wording of the questionnaire, Malhotra *et al.* (2017:389) propose the following guidelines:

- Define the issue.
- Use ordinary words.
- Avoid ambiguity in the wording of questions.
- Avoid questions that are leading or bias.
- Avoid implicit alternatives.
- Avoid implicit assumptions.
- Avoid generalisations.
- Use positive and negative statements.

**For the purpose** of this study the wording of the questionnaire was particularly challenging due to the language barrier between the respondents and the researcher. As such, careful consideration was put into the wording of this questionnaire to adhere to the above-mentioned guidelines and achieve the objectives of the study.

4.4.5.4.9 Organise the questionnaire

Questionnaire organisation is the sequence and flow of statements and questions that make up the questionnaire (Burns *et al.*, 2017:223). The authors further indicate that the flow and organisation of the questionnaire is critical, as this will ultimately determine the ease with which the questionnaire is completed by respondents and can potentially have an effect on the quality of the information that is gathered. A summary of the flow of the questionnaire used in this study is provided in Table 4-3 below:

**Table 4-3: Summary of questionnaire**

| Question | Subject & construct | Level of measurement |
|---|---|---|
| Section A | Participative management | |
| Question 1 - 4 | Leadership | Interval (Likert-scale) |
| Question 5 - 8 | Motivation | Interval (Likert-scale) |
| Question 9 -12 | Communication | Interval (Likert-scale) |
| Question 13 - 16 | Decision-making | Interval (Likert-scale) |
| Question 17 - 20 | Goal setting | Interval (Likert-scale) |
| Question 21 - 24 | Control | Interval (Likert-scale) |
| Section B | Safety culture | |
| Question 25 - 27 | Management commitment and actions towards safety | Interval (Likert-scale) |
| Question 28 - 30 | Workers' knowledge and compliance to safety | Interval (Likert-scale) |
| Question 31 - 33 | Workers' attitude towards safety | Interval (Likert-scale) |
| Question 34 - 36 | Workers' participation and commitment towards safety | Interval (Likert-scale) |

Source: Researcher's own compilation.

A part of the questionnaire also included a preface that provided respondents with information on the background of the study, their rights, as well as information on how the questionnaire needs to be completed. From Table 4-3 above, the questionnaire therefore included the following sections:

- Section A: This section captured the level of participative management experienced from respondents. Section B used an adopted version of Likert's management system questionnaire. This section implemented a five-point Likert-type scale (1 = strongly disagree and 5 = strongly agree) that was used in 15 questions, starting with question 5, which measured leadership and ending with question 17, which measured goal setting (Likert, 1967:8).

- Section B: This section measured the safety culture of respondents. This section implemented a five-point Likert-type scale (1 = strongly disagree and 5 = strongly agree) that was used in 12 questions, starting with question 18 that measured management commitment and actions towards safety and ending with question 29 that measured workers' participation and commitment towards safety.

4.4.5.4.9.1 Pre/pilot testing

According to Brown *et al.* (2017:199), the value of a questionnaire can only be determined under actual conditions of data collection. Therefore, a pilot test needs to be conducted to ensure that the researcher is familiar with the questionnaire and to eliminate any uncertainty regarding the questionnaire.

**For this study** a pilot test was conducted for the questionnaire with a small sample of the population through self-administered questionnaires. The final version of the questionnaire was consequently prepared and administered to respondents and the data prepared for analysing. The respondents used for the pilot test were not included as part of the data used for data analyses.

4.4.5.4.9.2 Finalise and launch the questionnaire

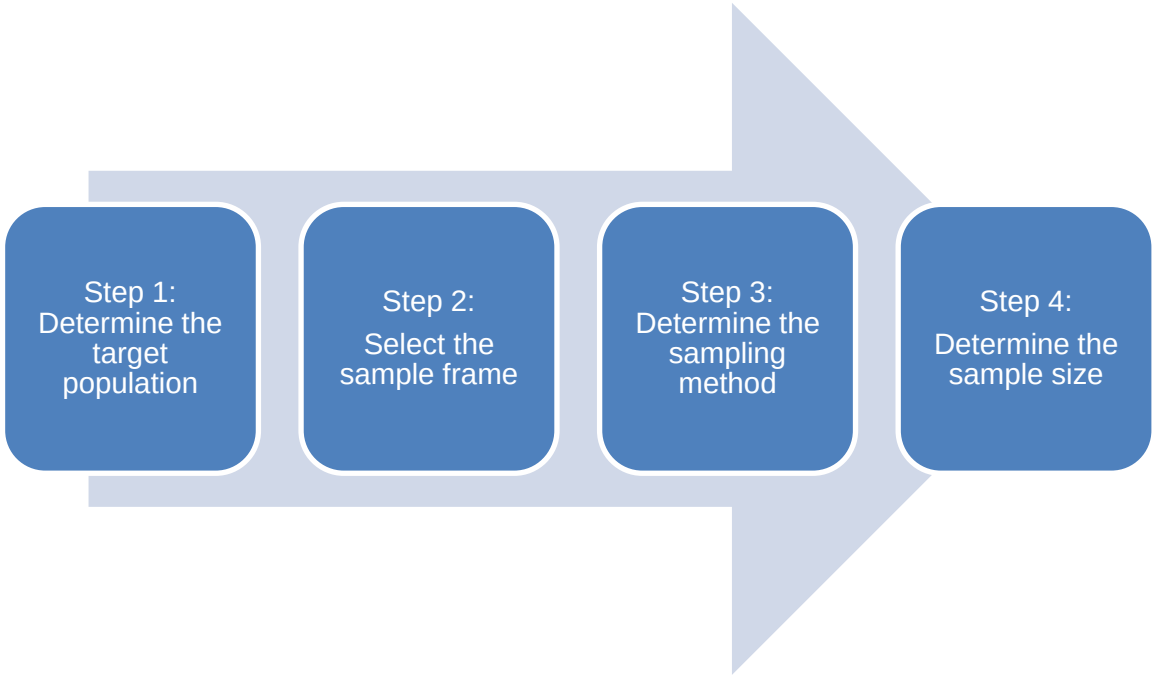
With the data collection process used for this study now established the following section focuses on how an adequate sample was selected and data were collected.

### 4.4.6 Develop the sampling plan design and collect the data

During the process of conducted primary research, attention must be given to the sampling design (Schindler, 2019:36). The process of sampling is to establish a sample that is representative of a wider population (Negassa, 2019:120). Aspects to take into consideration when going through the sampling process include the target population, selecting the sample, sampling method and sample size (Malhotra *et al.*, 2017:414).

The steps in designing the sampling plan for this study are shown in Figure 4-5.

**Figure 4-5: Steps in the sampling plan design**




Source: Researcher's own compilation.

#### 4.4.6.1 Step 1: Determine the target population

The target population can be defined as the population of interest, as specified by the objectives of the research project (Burns *et al.*, 2017:238; Lazar *et al.*, 2017:108). From a business research perspective, a target population will either include firms, employees or workers, groups or elements that will be represented by the study (Ghauri *et al.*, 2020:106). **The target population** for this study included all workers from the forestry industry in South Africa.

#### 4.4.6.2 Step 2: Selecting the sample frame

According Burns *et al.* (2017:239), a sample is a subset of the population that suitably represents the entire group. A sample is usually drawn from a sampling frame, which is a list of all the respondents representing the target population. However, in theory it is very difficult to obtain such a list in most business research studies (Brown *et al.*, 2017:206). The researcher was able to obtain and identify a representative sample of the target population as defined in Section 4.4.6.1. The sample for this study was workers in the Mpumalanga province, male and female, who participate in operational activities (OHS in particular) relating to in the forestry industry. The motive for choosing this sample is mostly due to the high extent of forestry operations in this area, the labour intensiveness of silviculture operations, and the importance of safety management in this field.

Once a representative sample has been established, the researcher needs to determine the sampling method.

#### 4.4.6.3 Step 3: Determining the sampling method

The process of selecting a subgroup or sample of the population is called the sampling method. This should be as rigorous as possible to avoid sampling error or bias, and the sampling method should enhance the representation of the sample (Berndt, 2020:224). There are mainly two types of sampling methods identified in the literature, namely probability sampling and non-probability sampling.

##### 4.4.6.3.1 Probability sampling

Probability sampling is based on the process of random selection where each respondent of the population has a known chance of being selected for the sample (Schindler, 2019:96). With probability sampling it is possible to determine a sample of any size from a specific population and specify the probability of selecting each sample if the target population is clearly defined and the researcher has access to a sample frame of the target population (Malhotra *et al.*, 2017:419). The random component on how respondents are selected in probability sampling insure that they are selected objectively and not on the determination of the researcher (Brown *et al.*, 2017:209). The different techniques used in probability sampling include: a simple random sample, systematic sample, stratified random sampling, cluster sampling, and multiphase sampling, and is discussed in Table 4-4 below:

**Table 4-4: Probability sampling techniques**

| **Probability sampling** | |
|---|---|
| Simple random sample | Each population element has an equal chance of being selected into the sample. |
| Systematic sampling | Only the first population element is selected randomly, thereafter every population element is selected systematically through a procedure determined by the researcher. |
| Stratified random sampling | The population is divided into different sub-groups and then simple random sampling is used for each sub-group. |
| Cluster sampling | The population is divided into different sub-groups and then a random sample is selected from one or more sub-groups and not every sub-group. |
| Multiphase sampling | Multistage sampling has to do with a variation of the different techniques of probability sampling in the most effective and efficient way. |

Source: Adopted from (Burns *et al.*, 2017:242).

A discussion of non-probability sampling and an argument for why it was the method used for **this study** follows.

#### 4.4.6.3.2 Non-probability sampling

In non-probability sampling the probability of each unit of being selected for a sample of the target population is not known, and therefore a sample cannot be randomly drawn (Saunders *et al.*, 2019:296). Non-probability relies on the personal judgement of the researcher when it comes to the selection process, and therefore the probability of any unit of the population being selected for a sample cannot be accurately determined (Brown *et al.*, 2017:207). It is therefore important that the researcher recognises that the result obtained from non-probability sampling cannot be generalised to the larger population and only represents the sample (Burns *et al.*, 2017:253). It must however be noted that it does not mean a study is insufficient when following a non-probability sampling method, as it is a common method used in most business research studies (Bell *et al.*, 2019:198). Only when the researcher considers all the factors that have a significant bearing on the conclusion of the study, will the choice between either of these methods lead to a representative sample (Mooi *et al.*, 2017:43). The reasons for choosing a non-probability sampling method largely depends on the nature of the study, the objectives of the study, the availability of a sampling frame, and the cost and time benefits it provides (Schindler, 2019:106). Non-probability sampling techniques include convenience sampling, judgemental sampling, quota sampling, and snowball sampling, and is discussed in Table 4-5 below:

**Table 4-5: Non-probability sampling techniques**

| Non-probability sampling | |
|---|---|
| Convenience sampling | Sample drawn from groups to which the researcher has easy access. |
| Judgemental sampling | The researcher uses his or her own judgement or another knowledgeable person to determine who will be in the sample. |
| Quota sampling | A sample is selected based on the relative properties of people in different categories or characteristics. |
| Snowball sampling | Respondents are asked to refer the researcher to other respondents with properties similar to themselves. |

Source: Adopted from Brown *et al.* (2017:207).

**For the purpose of** this study, **non-probability, judgemental, and convenience sampling** were used, as the researcher used his own experience and knowledge of the forestry industry, the knowledge of qualified persons in the field of forestry, together with the relationships formed with professionals in the field to determine and select the most representative sample.

#### 4.4.6.4 Step 4: Determining the sample size

After determining the sample method, one needs to determine the sampling size. In general terms, the larger the sample size, the more accurate the results of the study will be. However, this is not always possible and practical. It is argued by Mooi *et al.* (2017:43) that the strength of a sample comes from selecting the sample accurately and not from the size of the sample. As such, it is worth keeping it in mind when determining the size of the sample. It is difficult to statistically determine the sample size when using non-probability sampling techniques if there is no sample frame from which the researcher can determine the size of the population, and therefore the size of the sample will largely depend on the type of statistical analysis that are being applied, the general rule of thumb and budget considerations (Rahi, 2017:3).

In terms of statistical analysis, a sample of 384 is suggested to be a good representation for a population of 1 000 000 units (Rahi, 2017:3). A general rule of thumb is that a sample size of between 30 and 500 is appropriate for most research (Sekaran & Bougie, 2016:264). An indication of the population size (*N*) and a representative sample (*S*) for such a population is presented in Table 4-6 below:

**Table 4-6: Sample size for a given population**

| *N* | *S* | *N* | *S* |
|---|---|---|---|
| 100 | 80 | 1 200 | 291 |
| 200 | 132 | 1 300 | 297 |
| 300 | 169 | 1 400 | 302 |
| 400 | 196 | 1 500 | 306 |
| 500 | 217 | 1 600 | 310 |
| 600 | 234 | 1 700 | 313 |
| 700 | 248 | 1 800 | 317 |
| 800 | 260 | 1 900 | 320 |
| 900 | 269 | 2 000 | 322 |
| 1000 | 278 | 2 200 | 327 |
| 1100 | 285 | 1 000 000 | 384 |

Source: Adopted from Sekaran and Bougie (2016:264).

From Table 4-6 above it is clear that the increase in the required sample size for a given population decreases as the population increases. Therefore, keeping all the factors mentioned above in mind as well as the relationship between sample and population size, for the purpose of this study it was determined that a sample size of **300 respondents** will be sufficient.

To conclude, Table 4-7 below provides a summary of the sample design used for this study:

**Table 4-7: Summary of sample design**

| | |
|---|---|
| **Target population** | All workers from the forestry industry in South Africa. |
| **Sample** | Workers from the Mpumalanga Province, male and female, who participate in operational activities (OHS in particular) in the forestry industry. |
| **Sampling method** | Non-probability convenience and judgemental sampling. |
| **Sample size** | 300 respondents. |

Source: Researcher's own compilation.

#### 4.4.6.5 Data collection

After an appropriate sample has been identified the data can be collected. Before data could be collected, an arrangement had to be made with the health and safety risk manager of the company to develop a schedule for the questionnaires to be administered. Through this process a combination of seven teams were visited and handed questionnaires by the researcher to fill out during the course of a week. For each team a trained field worker was available for respondents who were not fluent in English so that they can answer the questions correctly and to make sure they understood the questions being asked.

### 4.4.7 Data analysis

Bell *et al.* (2019:58) state that data analysis involves the application of statistical techniques to data for interpretation. It is a process of editing and reducing accumulated data to a manageable size to look for patterns and develop summaries (Schindler, 2019:579). According to O'Gorman and MacIntosh (2015:174), real-life data generally cannot be used for data analysis, as it is unorganised and filled with different types of errors. To use data for statistical analysis, information from surveys or other data sources need to be converted through a process called data preparation (Hair, 2017:248). Therefore, the following section describes the data preparation process used for the data analysis in this study.

#### 4.4.7.1 Data preparation

After data have been collected and before it is analysed, the researcher must examine it to ensure its completeness and validity (Hair *et al.*, 2020:327). According to Hair (2017:248), data preparation plays an important part in assessing and controlling data integrity and ensuring data

quality. The author further argues that data preparation processes typically involve the following four steps:

- **Step 1: Data validation**

Data validation refers to the process of checking the accuracy and quality of the data, and is a form of data cleaning (Jiro *et al.*, 2021:56). According to Hague *et al.* (2016), it is important to have a quality control process during data analysis that ensures any errors regarding the processing of data are spotted early-on and corrected (Hague *et al.*, 2016:215). In addition Hair (2017:249) argues that data validation is also important during data collection, and that doing so correctly, free of fraud and bias, is central to the quality of the data as well. **For the purpose** of this study, data were validated by checking questionnaires for completeness, consistency and accuracy.

- **Step 2: Data editing and coding**

According to Hair *et al.* (2020:327), before survey data can be used it must be edited by inspecting the data for completeness and consistency. The authors further point out that this involves checking whether respondents understood and answered questions correctly, and if not it may result in the questionnaire being entirely removed from the database. Coding data involves assigning a code to represent a specific response to a specific question along with the data record and column position that the code will occupy (Malhotra *et al.*, 2017:910). Pre-coding questions for statistical analysis as part of the questionnaire design makes data entry easier and less prone to error (Collis & Hussey, 2021:204). **For the purpose of this study,** the questionnaires were manually coded and entered into Excel by the researcher, before submitting the data sheet for statistical analysis by the statistical services of the North-West University (NWU).

- **Step 3: Data entry**

On order to start analysing quantitative data, after the data have been coded one can start entering the data into a matrix (Martelli & Greener, 2018:82). The author further consents that this can be done by entering data into a statistical package. **For the purpose of this study,** IBM's SPSS Predictive Analytics was used to enter and analyse the data.

- **Step 4: Data tabulation**

Tabulations can be helpful in promoting systematic comparisons, such as listing incidents that represent a construct across cases (Ghauri *et al.*, 2020:139). Cross-tabulation shows the

interrelationships between two or more variables so that any specific amount can be read easily (Saunders *et al.*, 2019:584).

**For the purpose of this study** the researcher manually checked and performed the validation of the data, data editing and coding, and was assisted by the statistical services of the North-West University (NWU) regarding the entry and tabulation of data.

After the data has been prepared, the reliability and validity of the measures need, to be determined. Therefore, the section to follow will focus on the criteria used to determine the quality of measurement.

#### 4.4.7.2 Criteria for good measurement

The most widely used criteria to determine quality in business research is reliability, replicability and validity (Bell *et al.*, 2019:46). A discussion of each one of these criteria follows.

##### 4.4.7.2.1 Reliability

Reliability is focused on the question if or whether the results of the study can be repeated, more specifically it is concerned with the measures applied to certain concepts of business management. In the case for this study the measures for participative management and safety culture needed to reflect internal consistency in order to be considered reliable (Saunders *et al.*, 2019:518). Reliability is a popular criterion used for quantitative research and the research will be particularly concerned with whether or not a measure is stable (Sekeran & Bougie, 2016:223). One of the most effective tools for testing reliability in scales measurements is through the use of Cronbach's alpha. Cronbach's alpha tests the internal consistency of scale items and measures reliability by providing a coefficient α value of between 0 and 1. A value between 0,8 and 0,95 is considered to have very good reliability a value of between 0,70 and 0,80 is considered to have good reliability and a value of between 0,60 and 0,70 is considered to have fair reliability (Babin & Zikmund, 2016:281).

**For the purpose** of this study the Cronbach's alpha values were calculated in order to determine the internal consistency and reliability of the scales used in this study.

##### 4.4.7.2.2 Replicability

Replicability is closely related to reliability and is concerned with whether a study is capable of replication; therefore others must be able to reproduce the findings of the study (Bell *et al.*, 2019:395). Consequently, it is very important that a researcher explains the procedures followed in the study in great detail so that the procedures can be replicated by someone else.

#### 4.4.7.2.3 Validity

Validity is concerned with the accuracy of the conclusions drawn from a research study and the extent to which the measurement tools actually measures what the researcher intended it to measure, and that the difference in measurement accurately reflects the difference in participants drawn from a population (Schindler, 2019:590). The most widely used forms of validity include content validity, criterion validity, and construct validity. A summary of each of these forms of validity is provided below:

- Content validity

  Yusoff (2019:49) defines content validity as the degree to which elements of an assessment instrument are relevant to and representative of the targeted construct for a particular assessment purpose. Additionally, content validity establishes the representative sampling of a whole set of items that measure a concept, and reflects how well the dimensions and elements thereof are outlined (Sekeran & Bougie, 2016:390).

- Criterion validity

  Criterion validity involves the comparison of survey responses to other measures of the construct, preferably to a gold standard in the field of interest (Li *et al.*, 2021:66). If a scale is designed to measure a certain variable, criterion validity can then be determined by comparing the results from one variable to another (Malhotra *et al.*, 2017:362).

- Construct validity

  Van Zyl and Pellissier (2017a:150) define construct validity as the degree to which implications can be legitimately made from the measurement instruments of the study. The authors further state that construct validity is associated with generalising, and involves generalising from your measures to the concept of your measures. There are two types of construct validity. *Convergent validity* involves the comparisons of measures of the same concept developed through other methods (Bell *et al.*, 2019:175). *Discriminant validity* is the degree to which scores on a scale do not correlate with scores on scales designed to measure different constructs (Schindler, 2019:239).

In **this study** validity was established by compiling the constructs from existing research and previously tested questionnaires. The data was also viewed and analysed by experts in the field of statistics. To measure participative management, the constructs were drawn and adopted within a safety context from Likert's questionnaire of management systems, based on a recent

study done by Amzat *et al.* (2020), with successful results. The Safety Culture survey was used as a popular instrument to measure safety culture where the scales validity has been established by numerous other studies. Furthermore, validity was also determined through factor analysis by determining the Kaiser-Meyer-Olkin measure of sample adequacy (KMO), Bartlett's test of sphericity, checking the internal consistency of the questions loading onto the same factors, and by examining the amount of variance in the original variables accounted for by each component through principal component analysis (PCA).

#### 4.4.7.3 Descriptive and correlation statistical techniques

When dealing with quantitative data and questionnaires, there is a variety of statistical techniques that can be used. This section will further elaborate on the different statistical techniques used **for the purpose of this study.**

##### 4.4.7.3.1 Descriptive statistics

Descriptive research uses descriptive statistics, which is useful for answering question related to who, what, when, where, how much and how often (Martelli & Greener, 2018:82). Descriptive statistical analysis is any statistical or mathematical procedure that reduces or summarises numerical and/or categorical data into a form that is more easily understood and is the type of statistics used to describe data (Aldrich & Cunningham, 2016:110). For the purpose of this study the following descriptive statistics were used:

- **Frequency distributions**

Frequency is the number of observations for a particular data value in a variable (Collis & Hussey, 2021:217). **For the purpose of this study** a frequency distribution was presented with a summary of the frequencies for all the data values in a particular variable.

- **Percentages**

Percentages summarises frequencies as a proportion of 100 (Collis & Hussey, 2021:218). **For the purpose of this study** a frequency distribution was presented with a summary of the percentage of the frequencies for all the data values in a particular variable as a proportion of 100.

- **Mean and standard deviation**

The mean is the arithmetic average and is one of the most commonly used measures of central tendency. It is most often used with interval or ratio data (Hair *et al.*, 2020:344). The standard

deviation is the average amount of variation around the mean, which is calculated by taking the difference between each value and the mean, totalling the differences and dividing the total by the number of values (Martelli & Greener, 2018). **For the purpose of this study** the scale question was calculated using standard deviation and mean scores.

#### 4.4.7.3.2 Correlational statistics

According to Martelli and Greener (2018:89), correlational statistics are used to provide a measure of association between two or more variables and indicates the degree of strength between variables. The author further argues that, if the value in one value increases in a positive relationship, the value in the other value increases and vice versa. **For the purpose of this study** the Pearson's product moment correlation coefficient was used to look for relationships between the individual dimensions of participative management and safety culture.

#### 4.4.7.3.3 Standard multiple regression

According to Hair *et al.* (2020:395), regression is a method used for measuring predictive linear relationships between two or more variables. With regards to multiple regressions, the authors argue that the predictive linear relationship is between a single metric dependent variable and several metric independent variables. Multiple regression allows for a more realistic interpretation of the results, as it takes into account what the effect of a combination of multiple factors has on a single dependent variable rather than just looking at individual correlations between variables (Hair *et al.*, 2020:401). **For the purpose of this study** standard multiple regression was used to test the relationship between participative management and safety culture, with the dimensions of participative management as independent variables and each of the individual dimensions of safety culture as the dependent variables.

### 4.4.8 Present the research findings and formulate conclusions

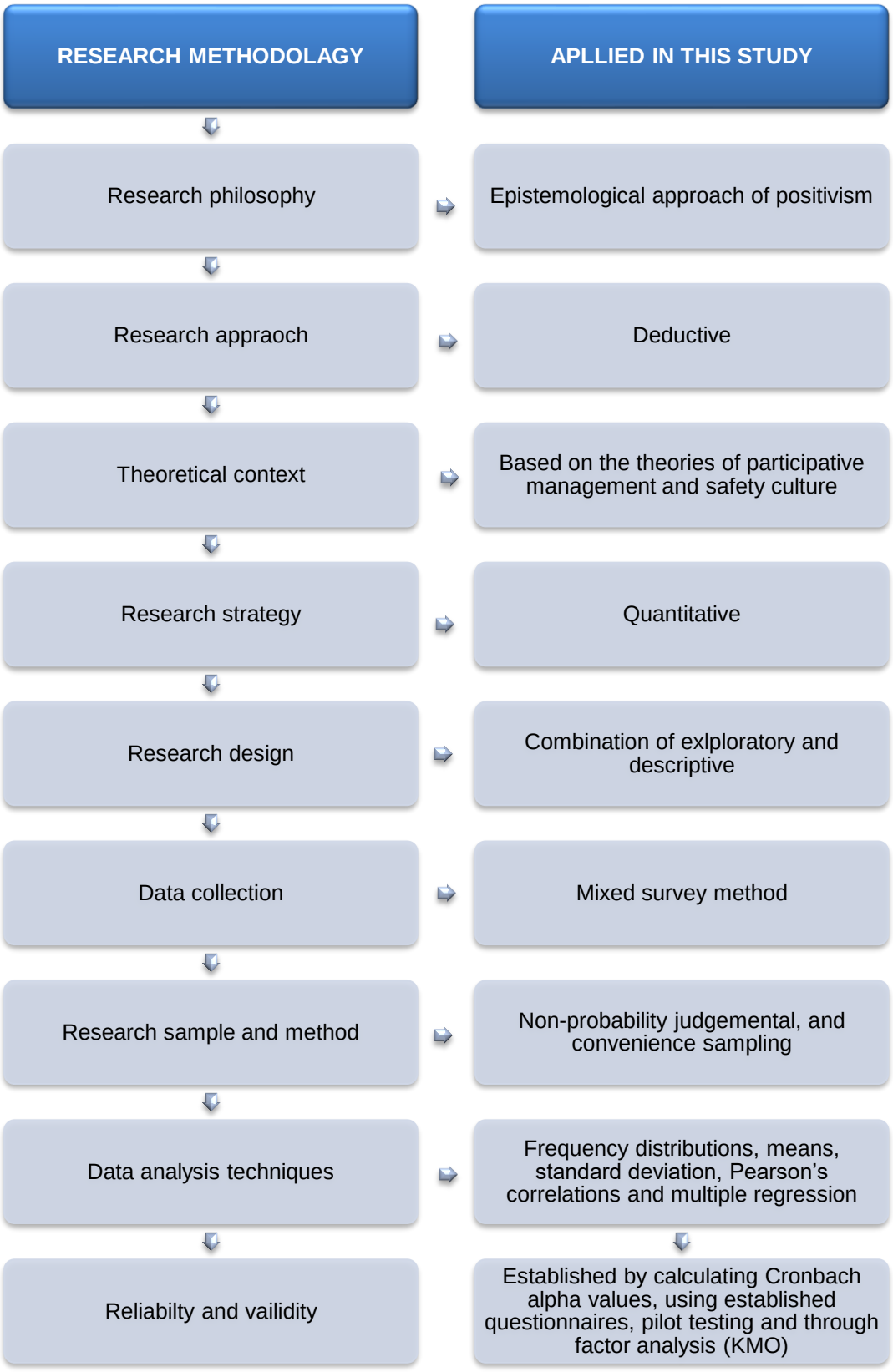
The final step in the business research process is to present the main findings and results from the research study and formulate the conclusions, implications, and recommendations regarding the objectives of the study (Martelli & Greener, 2018:157). Good research is made useful by effectively communicating its, purpose, results and implication. Therefore, it is important that the results of the study are adequately presented and effectively address the research objective to enable better decision-making (Hair *et al.*, 2020:475).

For this study, the results and findings are put forward in Chapter 5, whereas the conclusions, implications and recommendations regarding the secondary research objectives (pertaining to the results and findings) are provided in Chapter 6.

## 4.5 SUMMARY

The purpose of this chapter was to provide context on the research methodology that was adopted to address the research problem and achieve the secondary objectives set for the empirical study. The research philosophy and approach to theory development was deliberated in Section 4.2, thereafter Section 4.3 focused on defining business research and explaining its importance, and lastly the business research process adopted for this study was explained in detail in Section 4.4. To conclude this chapter, Figure 4-6 provides a summary of the research methodology that was applied in this study.

**Figure 4-6: Summary of research methodology**




Source: Researchers own compilation.

# CHAPTER 5

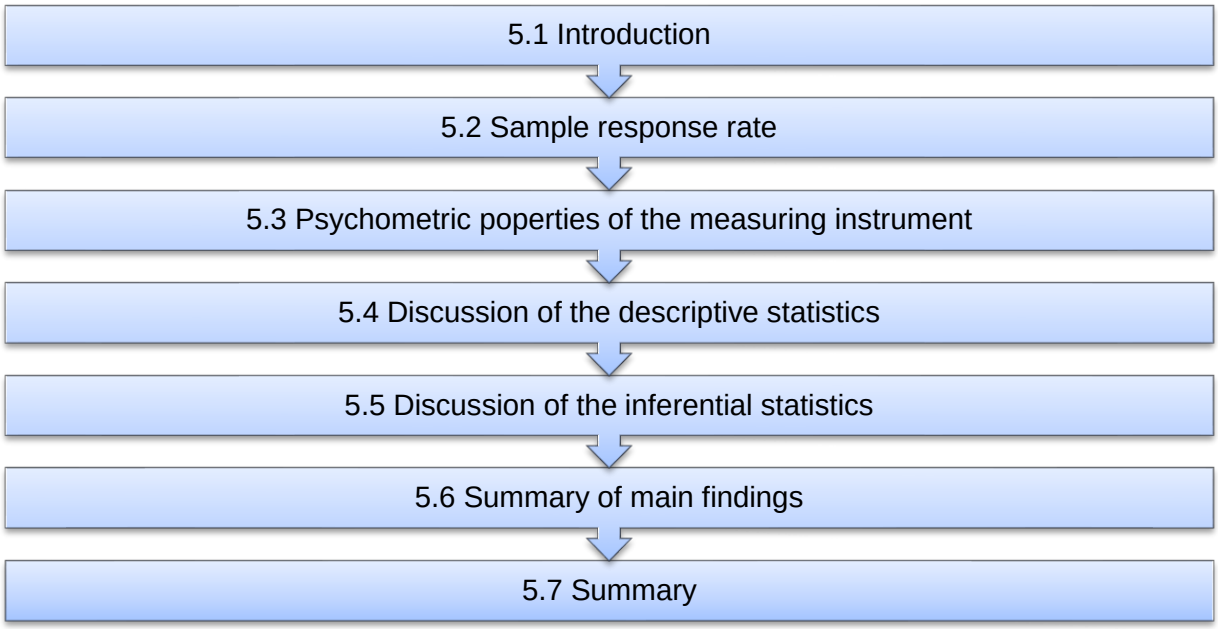
# EMPIRICAL RESULTS AND FINDINGS

## 5.1 INTRODUCTION

The previous chapter gave an overview of the research methodology that was used to reach the objectives of this study. One of the stages were the presentation of the research findings obtained from the empirical data analysis.

This chapter begins with a brief overview of the sample response rate. The psychometric properties of the measuring instruments are then deliberated by specifically focusing on reliability and validity. Thereafter, the descriptive statistics are reported in relation to the constructs of participative management and safety culture. The inferential results are then conveyed to determine whether the primary and secondary objectives of this study have been achieved. The chapter concludes with a summary of the main findings as determined through the empirical investigation. Outlined in Figure 5-1 below is a summary of the sections that will be discussed in this chapter:

**Figure 5-1: Chapter 5 outline**




Source: Researcher's own compilation.

## 5.2 SAMPLE RESPONSE RATE

According to Burns and Veeck (2020:293) there are various errors that can occur on the part of respondents during the data collection process, arguably the most common problem being Nonresponse Error. The authors further argue that this can be as a result of respondents refusing to answer a questionnaire, respondents stopping halfway through the questionnaire, or respondents answering some questions but not others. The sample realisation rate for this study is summarised in Table 5-1 below:

**Table 5-1: Response realisation rate**

| Proposed sample size | 300 |
|---|---|
| Number of completed questionnaires | 280 |
| Number of discarded questionnaires | 15 |
| Number of final useable questionnaires (completed minus discarded) | 265 |
| Realisation rate (final divided by proposed) | 88 % |

Source: Researcher's own compilation.

As indicated in Chapter 4 (see Section 4.4.6.4), the prosed sample size for this study was 300 respondents. 280 questionnaires were collected in total. Questionnaires where Sections A and B were not fully answered were discarded as these sections measured the constructs associated with this study. As a result, 15 questionnaires had some form of Nonresponse Error and were not used for data analysis. The final response realisation rate for **this study** was therefore 88%.

With an overview of the response realisation rate of this study established, the following section will focus on the psychometric properties of the study.

## 5.3 PSYCHOMETRIC PROPERTIES OF THE MEASURING INSTRUMENT

The accuracy of the measuring instrument can be determined through its psychometric properties, in this instance reliability and validity.

### 5.3.1 Reliability

Sarstedt and Mooi (2019:280) assert that the Cronbach's alpha coefficient is arguably the most popular measure of internal consistency. They further argue that the lower level of the coefficient is 0,70. However in exploratory studies, a value of 0,60 is also considered to be acceptable. The authors further state that a value of 0,80 and higher is satisfactory for more advanced research

studies. In addition to the Cronbach's alpha coefficient, it is also recommended to calculate the mean inter-item correlations for a variable with less than seven items, with a value between 0,20 and 0,40 indicating good internal reliability (Parveen *et al.*, 2020:1137). Table 5-2 provides the Cronbach's alpha values (α-values) and mean inter-item correlations for the scales used in this study, and indicates whether the scale is reliable or not.

**Table 5-2 Reliability of this study's measurement instrument**

| Variable | Number of items | α-value | Mean inter-item correlations | Reliable / Not reliable |
|---|---|---|---|---|
| Participative management | | | | |
| Leadership | 4 | 0,640 | 0,307 | Reliable |
| Motivation | 3 | 0,468 | 0,322 | Not reliable |
| Communication | 4 | 0,613 | 0,287 | Reliable |
| Decision-making | 4 | 0,684 | 0,366 | Reliable |
| Goal setting | 4 | 0,578 | 0,274 | Reliable |
| Control | 4 | 0,638 | 0,322 | Reliable |
| Safety culture | | | | |
| Management commitment and action towards safety | 3 | 0,611 | 0,343 | Reliable |
| Workers' knowledge and compliance towards safety | 3 | 0,720 | 0,463 | Reliable |
| Workers' attitude towards safety | 3 | 0,735 | 0,481 | Reliable |
| Workers' participation and commitment towards safety | 3 | 0,676 | 0,421 | Reliable |

Source: Researcher's own compilation.

It is evident from Table 5-2 above that the Cronbach's alpha values for most of the scales used in this study are above 0,60 and the mean inter-item correlations are between 0,2 and 0,5, which correspondents well with an internal consistency that can be considered to be acceptable within the context of this study. Therefore, the internal consistency reliability of the scales used in this study are confirmed, except for the motivation variable. The four items of motivation will therefore be used as individual items.

The following main finding can be drawn regarding the reliability of this study:

**Main finding 1**: All the measurement scales used to measure the participative management and safety culture constructs were deemed reliable except for the measurement scales regarding the motivation construct.

With the reliability of the scale measurements established, the following section will focus on the validity of the scales used to measure the constructs of the study.

### 5.3.2 Validity

The content validity of the measurement scales was already discussed in Chapter 4 (Section 4.4.8.2). To assess the construct validity of the measurement scales, a measure of sample adequacy (MSA) was determined. To calculate the MSA, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were determined by conducting a principal component analysis (PCA).

The purpose of KMO is to assess the strength and factorability of the variables (Shamsudin *et al.*, 2019:528). The general cut-off point for a significant factor loading between 0 and 1 is considered to be 0,50 and higher (Mooi *et al.*, 2017:272). Bartlett's test of sphericity is to test whether a variable perfectly correlates with itself but has no correlation with the other variables, and expresses these correlations as a p-value (Malhotra *et al.*, 2017:711).

According to Hair *et al.* (2020:468), a factor analysis examines the underlying correlations among variables and finds those that are similar. Based on the factor analysis conducted on the measuring instrument for participative management and safety culture, it can be concluded that the measuring instruments contain acceptable elements of validity. Table 5-3 and Table 5-4 indicate the KMO and p-values of the scales used to measure the constructs of this study. Furthermore Table 5-3 and Table 5-4 also show the percentage of the variance that can be explained when reduced to a single factor, as well as the loadings for the different factors.

**Table 5-3: Construct validity participative management**

| Variable | Factors extracted | KMO | p-value (Bartlett) | % variance explained | Loadings |
|---|---|---|---|---|---|
| Participative management | | | | | |
| Leadership | 1 | 0,689 | 0,000 | 48,284 | 0,596 – 0,774 |
| Motivation | 1 | 0,610 | 0,000 | 39,837 | 0,415 – 0,748 |
| Communication | 1 | 0,671 | 0,000 | 46,860 | 0,566 – 0,770 |
| Decision-making | 1 | 0,721 | 0,000 | 52,534 | 0,674 – 0,775 |
| Goal setting | 1 | 0,665 | 0,000 | 45,803 | 0,595 – 0,775 |
| Control | 1 | 0,718 | 0,000 | 49,283 | 0,638 – 0,761 |

Source: Researcher's own compilation.

Based on Table 5-3 with regards to participative management, the following is evident:

- With regards to the *leadership* dimension, the KMO value of 0,689 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *leadership* dimension can be reduced to one factor, with 48,284% of the variance explained and factor loadings between 0,596 and 0,774.

- With regards to the *motivation* dimension, the KMO value of 0,610 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *motivation* dimension can be reduced to one factor with 39,837% of the variance explained and factor loadings between 0,415 and 0,748.

- With regards to the *communication* dimension, the KMO value of 0,671 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *communication* dimension can be reduced to one factor with 46,860% of the variance explained and factor loadings between 0,566 and 0,770.

- With regards to the *decision-making* dimension, the KMO value of 0,721 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *decision-making* dimension can be reduced to one factor with 52,534% of the variance explained and factor loadings between 0,674 and 0,775.

- With regards to the *goal setting* dimension, the KMO value of 0,665 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well suited for factor analysis. In addition, the

*goal setting* dimension can be reduced to one factor with 45,803% of the variance explained and factor loadings between 0,595 and 0,775.

- With regards to the *control* dimension, the KMO value of 0,718 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well suited for factor analysis. In addition, the *control* dimension can be reduced to one factor with 49,283% of the variance explained and factor loadings between 0,638 and 0,761.

**Table 5-4: Construct validity safety culture**

| Variable | Factors extracted | KMO | p-value (Bartlett) | % variance explained | Loadings |
|---|---|---|---|---|---|
| Safety culture | | | | | |
| Management commitment and action towards safety | 1 | 0,630 | 0,000 | 56,286 | 0,693 – 0,781 |
| Workers' knowledge and compliance towards safety | 1 | 0,672 | 0,000 | 64,315 | 0,768 – 0,831 |
| Workers 'attitude towards safety | 1 | 0,686 | 0,000 | 65,395 | 0,797 – 0,818 |
| Workers' participation and commitment towards safety | 1 | 0,611 | 0,000 | 61,913 | 0,651 – 0,852 |

Source: Researcher's own compilation.

Based on Table 5-4 with regards to safety culture the following is evident:

- With regards to the *management commitment and action towards safety* dimension, the KMO value of 0,630 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *management commitment and action towards safety* dimension can be reduced to one factor with 56,286% of the variance explained and factor loadings between 0,693 and 0,781.

- With regards to the *workers' knowledge and compliance towards safety* dimension, the KMO value of 0,672 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *workers' knowledge and compliance towards safety* dimension can be reduced to one factor with 64,315% of the variance explained and factor loadings between 0,768 and 0,831.

- With regards to the *workers' attitude towards safety* variable, the KMO value of 0,686 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis.

Furthermore, the *workers' attitude towards safety* dimension can be reduced to one factor with 65,395% of the variance explained and factor loadings between 0,797 and 0,818.

- With regards to the *workers' participation and commitment towards safety* dimension, the KMO value of 0,611 and Bartlett's test of sphericity ($p < 0,000$) indicate that the data are well-suited for factor analysis. In addition, the *workers' participation and commitment towards safety* dimension can be reduced to one factor with 61,913% of the variance explained and factor loadings between 0,651 and 0,852.

The following main finding can be deduced regarding the validity of this study:

**Main finding 2:** The scales used to measure the constructs of participative management and safety culture can be deemed valid.

With the context of the validity regarding the scale measurements used in this study discussed, the following section will further elaborate on the descriptive statistics of this study.

## 5.4 DISCUSSION OF THE DESCRIPTIVE STATISTICS

On the grounds of the reliability and validity discussed in the previous section, descriptive statistics were consequently used to summarise the data and provide an adequate representation of the respondents' perceptions regarding participative management and the safety culture of respondents. In this regard, two descriptive statistical techniques were used, namely the mean scores ($\bar{x}$) and standard deviation (SD).

### 5.4.1 Respondents' insights regarding participative management

The mean scores reflect the average of the scale descriptions of the five-point Likert-scale used in each item to measure the level of participative management experienced form employees in terms of safety (see Appendix A). The scale ranged from "1 = strongly disagree" to "5 = strongly agree". Table 5-5 reports the descriptive statistics with the mean scores ($\bar{x}$) and standard deviations (SD) regarding the different aspects of participative management, followed by a discussion of the results and main findings.

**Table 5-5: Descriptive statistics for participative management**

| Dimensions of participative management | $\bar{x}$ | SD |
|---|---|---|
| **Leadership** | **4,21** | **0,680** |
| Management trusts me to act in a safe manner. | 4,29 | 0,947 |
| I have complete trust in management regarding safety. | 4,25 | 0,979 |
| Management supports me when I raise any safety concerns. | 3,99 | 1,140 |
| I feel free to discuss things related to safety to my manager/supervisor. | 4,31 | 0,798 |
| **Motivation** | **4,34** | **0,592** |
| Good safety behaviour is rewarded. | 4,05 | 1,278 |
| Safety goals are established as a group. | 4,41 | 0,933 |
| I have a negative attitude towards safety goals. | 4,54 | 0,645 |
| I take responsibility for the safety goals established. | 4,37 | 0,933 |
| **Communication** | **4,18** | **0,700** |
| I communicate with my fellow employees on how to achieve safety objectives. | 4,46 | 0,657 |
| I can openly communicate any issues regarding safety to all levels of management. | 3,94 | 1,233 |
| My managers are willing to share any information with regards to safety that I request. | 4,16 | 1,061 |
| I am willing to share any information requested from my managers regarding safety. | 4,15 | 1,080 |
| **Decision-making** | **4,07** | **0,810** |
| Most of the decisions involving safety are made by management. | 3,93 | 1,172 |
| I am consulted when decisions need to be made regarding safety. | 3,87 | 1,288 |
| I inform my manager/supervisor regarding any matters regarding safety. | 4,08 | 1,192 |
| Enough information is available when I need to make decisions regarding safety. | 4,40 | 0,811 |

**Table 5-5: Descriptive statistics for participative management (continued)**

| Dimensions of participative management | x̄ | SD |
|---|---|---|
| **Goal setting** | **4,35** | **0,560** |
| Safety goals are established by means of group participation. | 4,18 | 1,066 |
| Safety goals are forced from management. | 4,41 | 0,597 |
| Safety goals are accepted by me without any disagreement. | 4,42 | 0,775 |
| The goals to achieve good safety performance in my workplace is clear to me. | 4,36 | 0,856 |
| **Control** | **4,07** | **0,780** |
| There is a shared feeling of responsibility between me and my managers regarding safety performance. | 4,20 | 1,057 |
| The information available to measure my safety performance is clear to me. | 4,28 | 0,891 |
| There is a considerable amount of effort from the company to achieve safety goals. | 3,90 | 1,227 |
| Review of my safety performance is done by all levels of management and myself. | 3,99 | 1,286 |

Source: Researcher's own compilation.

As is shown in Table 5-5 in relation to the *leadership* dimension, the overall mean score was (x̄ = 4,21; SD = 0,680), indicating that respondents mostly view their managers as participative leaders in terms of safety. Furthermore, the item "I feel free to discuss things related to safety to my manager/supervisor" scored the highest (x̄ = 4,31; SD = 0.,98), and the item "Management supports me when I raise any safety concerns" scored the lowest (x̄ = 3,99; SD = 1,1140).

With regards to the *motivation* dimension of participative management, the overall mean scores were (x̄ = 4,34; SD= 0,592), which proposes that respondents mostly feel motivated regarding safety. More specifically, the item "I have a negative attitude towards safety goals" scored the highest (x̄ = 4,54; SD = 0,645), whilst the item "Good safety behaviour is rewarded" had the lowest mean score (x̄ = 4,05; SD = 1,278).

In terms of the *communication* dimension, the overall mean score was, (x̄ = 4,18; SD= 0,700), which suggests that respondents feel mostly involved when it comes to communicating safety-related matters. In addition, the item "I communicate with my fellow employees on how to achieve safety objectives" had the highest mean score (x̄ = 4,46; SD = 0,657), and the item "I can openly communicate any issues regarding safety to all levels of management" had the lowest mean score (x̄ = 3,94; SD = 1,233).

With regards to the *decision-making* dimension of participative management, the overall mean scores were (x̄ = 4,07; SD= 0,810), which proposes that respondents mostly feel involved in the

decision-making processes regarding safety. More specifically, the item “Enough information is available when I need to make decisions regarding safety” scored the highest ($\bar{x}$ = 4,40; SD = 0,811), whilst the item “I am consulted when decisions need to be made regarding safety” had the lowest mean score ($\bar{x}$ = 3,87; SD = 1,288).

Dealing with the *goal setting* dimension the mean score was $\bar{x}$ = 4,35 with a standard deviation of SD = 0,560. This implies that respondents mostly feel that they are involved in the goal setting process when it comes to establishing safety goals. Moreover, the item “Safety goals are accepted by me without any disagreement” had the highest mean score ($\bar{x}$ = 4,42; SD = 0,775) with the item “Safety goals are established by means of group participation” representing the lowest score ($\bar{x}$ = 4,18; SD = 1,066).

Lastly pertaining to the *control* dimension, the mean score was ($\bar{x}$ = 4,07; SD = 0,780), suggesting that in terms of managing their performance regarding safety, respondents mostly feel involved during this process. What is more, the item “The information available to measure my safety performance is clear to me” had the highest average score ($\bar{x}$ = 4,28; SD = 0,891) and the item “There is a considerable amount of effort from the company to achieve safety goals” had the lowest score ($\bar{x}$ = 3,90; SD = 1,227).

Based on the above, the following main findings were noticed regarding the participative management of safety:

**Main finding 3:** With regards to the *leadership* dimension, respondents mostly indicated that they felt free to discuss issues related to safety to their manager or supervisor.

**Main finding 4:** In relation to the *motivation* dimension, respondents mostly indicated that they have a positive attitude towards safety goals.

**Main finding 5:** In reference to the *communication* dimension, respondents mostly indicated that they communicate with their fellow employees on how to achieve their safety objectives.

**Main finding 6:** In relation to the *decision-making* dimension, respondents mostly indicated that there is enough information available when they need to make decisions regarding safety.

**Main finding 7:** Pertaining the *goal setting* dimension, respondents mostly indicated that the safety goals are accepted by them without any disagreement.

**Main finding 8:** In terms of the *control* dimension, respondents mostly indicated that the information available to measure their safety performance is clear to them.

**Main finding 9:** Concerning the *participative management* of safety, respondents seemed to feel the most involved when it comes to setting goals for safety.

**Main finding 10:** With regards to the *participative management* of safety, respondents appeared to feel the least involved when it comes to the decision-making and control of safety-related matters.

With the descriptive statistics for participative management established, the following section will focus on the descriptive statistics of the safety culture of respondents.

### 5.4.2 Safety culture of respondents

This section reports on the mean score and standard deviations for the scale descriptions of the five-point Likert-scale used in each item to measure the safety culture of employees (see Appendix A). The scale ranged from “1 = strongly disagree” to “5 = strongly agree”. Table 5-6 reports the descriptive statistics with the mean scores ($\bar{x}$) and standard deviations (SD) regarding safety culture, followed by a discussion of the results and main findings.

**Table 5-6: Descriptive statistics for safety culture**

| Dimensions of safety culture | $\bar{x}$ | $\sigma$ |
|---|---|---|
| **Management commitment and actions towards safety** | **4,17** | **0,790** |
| Safety is given a high priority by management. | 4,26 | 1,081 |
| My company gives comprehensive training to the employees in the workplace regarding health and safety issues. | 4,18 | 1,061 |
| Management promotes employee involvement in safety-related matters. | 4,06 | 1,021 |
| **Workers' knowledge and compliance to safety** | **4,56** | **0,490** |
| I know how to perform my job in a safe manner. | 4,55 | 0,650 |
| I use all necessary safety equipment to perform my job. | 4,57 | 0,624 |
| I know all the dangers associated with my job. | 4,55 | 0,569 |
| **Workers' attitude towards safety** | **4,53** | **0,530** |
| I feel that it is important to always maintain a safe working environment. | 4,50 | 0,640 |
| I feel that it is important to encourage others to perform their job in a safe manner. | 4,55 | 0,662 |
| I feel that it is important to promote safety in the workplace. | 4,53 | 0,663 |
| **Workers' participation and commitment towards safety** | **4,36** | **0,680** |
| I encourage my co-workers to work safely. | 4,46 | 0,696 |
| I voluntarily carry out tasks or activities that help to improve workplace safety. | 4,09 | 1,105 |
| I follow correct safety rules and procedures while carrying out my job. | 4,54 | 0,759 |

Source: Researcher's own compilation.

From Table 5-6 in relation to the *Management commitment and actions towards safety* dimension the mean score was ($\bar{x}$ = 4,17; SD = 0,790), which suggests that respondents felt mostly positive towards the commitment and actions from their management team towards safety. The item "Safety is given a high priority by management" had the highest score ($\bar{x}$ = 4,26; SD = 1,081), and the item "Management promotes employee involvement in safety related matters" had the lowest mean score ($\bar{x}$ = 4,06; SD = 1,021).

Pertaining to the dimension *Workers' knowledge and compliance to safety* the overall mean score was ($\bar{x}$ = 4,56; SD = 0,490), which gives the indication that respondents felt largely positive towards their knowledge and compliance towards safety in the workplace. The item "I use all necessary safety equipment to perform my job." showed the highest mean score ($\bar{x}$ = 4,57; SD = 0,624), whilst the items "I know how to perform my job in a safe manner" ($\bar{x}$ = 4,55; SD = 0,650)

and “I know all the dangers associated with my job” ($\bar{x}$ = 4,55; SD = 0,569) shared the lowest mean score.

With regards to the *Workers’ attitude towards safety* dimension the overall mean score was ($\bar{x}$ = 4,53; SD= 0,530), which proposes that respondents largely have a positive attitude towards safety. More specifically, the item “I feel that it is important to encourage others to perform their job in a safe manner” scored the highest ($\bar{x}$ = 4,55; SD = 0,662), whilst the item “I feel that it is important to always maintain a safe working environment” had the lowest mean score ($\bar{x}$ = 4,50; SD = 0,640).

Lastly with regards to the *Workers’ participation and commitment towards safety* dimension, the mean score was ($\bar{x}$ = 4,36; SD = 0,680), suggesting that respondents mostly feel positive towards their commitment and participation in the safety management process. What is more, the item “I follow correct safety rules and procedures while carrying out my job” had the highest average score ($\bar{x}$ = 4,54; SD = 0,759) and the item “I voluntarily carry out tasks or activities that help to improve workplace safety” had the lowest score ($\bar{x}$ = 4,09; SD = 1,105).

Considering the above, the following main finding are realised:

**Main finding 11:** With regards to the *Management commitment and actions towards safety* dimension, respondents mostly indicated that safety is given a high priority by management.

**Main finding 12:** In relation to the *Workers’ knowledge and compliance to safety* dimension, respondents largely indicated that they wear their safety equipment whilst doing their job.

**Main finding 13:** In terms of the *Workers’ attitude towards safety* dimension, respondents largely indicated that they feel it is important to encourage others to perform their job in a safe manner.

**Main finding 14:** Pertaining to the *Workers’ participation and commitment towards safety* dimension, respondents mostly indicated that they follow the correct safety rules and procedures while carrying out their jobs.

**Main finding 15:** Concerning the *safety culture* of respondents, respondents were the most positive in relation to their attitude towards safety.

**Main finding 16:** With regards to the *safety culture* of respondents, respondents were the least positive towards the commitment and actions towards safety from management.

## 5.5 DISCUSSION OF THE INFERENTIAL STATISTICS

In order to further address the objectives of this study as set in Chapter 1 (see Section 1.5), the Pearson's product moment correlation coefficient (PMCC) was used to assess the strength of the relationship between the individual independent variables of participative management and dependent variables of safety culture (Saunders *et al.*, 2019:616). To further unpack the results from data collection, a standard multiple regression and stepwise multiple regression were used to predict the value of a variable in the presence of one or more other variables (Van Zyl & Pellissier, 2017b:174). The accuracy of the prediction from the regression increases when the independent variables are individually correlated to the dependent variable, but relatively uncorrelated to each other (Martelli & Greener, 2018:145).

This section will therefore commence with a discussion on the correlation between the independent variables and dependent variables, thereafter the multi-collinearity between the independent variables of participative management will be deliberated. The multiple regression results will then be discussed, and lastly the findings regarding the relationship between participative management and safety culture will be deduced.

### 5.5.1 Correlational statistics

For the purpose of this study the correlations between the dimensions of participative management and safety culture were tested to determine the influence of participative management on safety culture. Consequently, Pearson's correlation was used to test the relationship between the dimensions of participative management and safety culture. According to Hair *et al.* (2020:190), the Pearson correlation coefficient is a sufficient method to use when two or more variables have been measured with interval scale measures, that have a scale of 5 points or more. Correlation values can vary between (-1,00) and (1,00) with (0,00) indicating no relationship between variables. In addition, correlation coefficients can also be negative or positive, which is reliant on the direction of the relationship between two variables (Bell *et al.*,

2019:323). For behavioural sciences, Cohen (1988:79-80) gives the following guidelines for the correlation and their effect sizes, r = 0,10 (small effect), r = 0,30 (medium effect) and r = 0,50 (large effect). The correlation between the dimensions of participative management and safety culture are indicated in Table 5-7 below:

**Table 5-7: Pearson's correlation between the dimensions of participative management and safety culture**

| Pearson's *r* | | Management commitment and actions towards safety | Workers' knowledge and compliance to safety | Workers' attitude towards safety | Workers' participation and commitment towards safety |
|---|---|---|---|---|---|
| Leadership | Correlation | ,385** | ,227** | ,325** | ,462** |
| | Sig. (2-tailed) | 0,000 | 0.000 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |
| Motivation item (Good safety behaviour is rewarded) | Correlation | ,373** | 0,106 | ,188** | 0,049 |
| | Sig. (2-tailed) | 0,000 | 0,085 | 0,002 | 0,424 |
| | N | 265 | 265 | 265 | 265 |
| Motivation item (Safety goals are established as a group) | Correlation | ,343** | ,296** | ,402** | ,182** |
| | Sig. (2-tailed) | 0,000 | 0,000 | 0,000 | 0,003 |
| | N | 265 | 265 | 265 | 265 |
| Motivation item (I have a positive attitude towards safety goals) | Correlation | ,272** | ,191** | ,294** | ,146* |
| | Sig. (2-tailed) | 0,000 | 0,002 | 0,000 | 0.017 |
| | N | 265 | 265 | 265 | 265 |
| Motivation item (I take responsibility for the safety goals established) | Correlation | ,196** | ,205** | ,340** | ,587** |
| | Sig. (2-tailed) | 0,001 | 0,001 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |
| Communication | Correlation | ,459** | ,416** | ,507** | ,497** |
| | Sig. (2-tailed) | 0,000 | 0.000 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |
| Decision-making | Correlation | ,531** | ,418** | ,421** | ,413** |
| | Sig. (2-tailed) | 0,000 | 0.000 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |
| Goal setting | Correlation | ,420** | ,488** | ,498** | ,469** |
| | Sig. (2-tailed) | 0,000 | 0,000 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |
| Control | Correlation | ,625** | ,375** | ,409** | ,420** |
| | Sig. (2-tailed) | 0,000 | 0,000 | 0,000 | 0,000 |
| | N | 265 | 265 | 265 | 265 |

**Correlation is significant on a 1% level (2-tailed),
*Correlation is significant on a 5% level (2-tailed),
when r = 0,10 (small effect), r = 0,30 (medium effect) and r = 0,50 (large effect).

Source: Researcher's own compilation.

From Table 5-7 above, the following conclusions can be drawn:

The dimension *leadership* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive medium correlation (0,462) with the dimension "Workers' participation and commitment towards safety" had the strongest relationship, which suggests that higher levels of involvement from leadership leads to increased participation and commitment from workers towards safety.

In terms of the correlation between *motivation* and safety culture, the items measuring motivation were correlated individually with the dimensions of safety culture, as they did not meet the criteria for reliability. The item "*Good safety behaviour is rewarded*" showed a significant positive medium correlation (0,373) between "Management's commitment and actions towards safety" (p-value < 0,05), as well as a significant positive small correlation (0,188) with the "Workers' attitude towards safety" dimension (p-value < 0,05). This may indicate that being rewarded for good safety behaviour gives employees the sense that their management is committed towards safety, and also slightly improves their attitude toward safety.

The item *"Safety goals are established as a group"* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive medium correlation (0,402) with the dimension "Workers' attitude towards safety" had the strongest relationship, which implies that when workers establish safety goals as a group it intends to improve their attitude towards safety.

The item "*I have a positive attitude towards safety goals*" had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive small correlation (0,294) with the dimension "Workers' attitude towards safety" had the strongest relationship, which suggests that workers with a positive attitude towards safety goals tend to have a better attitude towards safety.

The item "*I take responsibility for the safety goals established*" had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive large correlation (0,587) with the dimension "Workers' participation and commitment towards safety" has the strongest relationship, which suggests that when workers take responsibility for their safety goals, they are likely to be more involved and committed towards safety.

The dimension *Communication* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive large correlation (0,507) with the dimension "Workers' attitude towards safety" had the strongest relationship, which proposes that higher

levels of involvement in the communication of safety-related matters with workers typically improves the attitude of workers towards safety.

The dimension *Decision-making* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive large correlation (0,531) with the dimension "Management commitment and actions towards safety" had the strongest relationship, which infers that involving workers in the decision-making process regarding safety tends to make workers view their management as more committed and involved in their actions towards safety.

The dimension *Goal setting* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive medium correlation (0,498) with the dimension "Workers' attitude towards safety" had the strongest relationship, which implies that involving workers in the establishment of safety goals generally improves their attitude towards safety.

Lastly, the dimension *Control* had a significant positive correlation with all the dimensions of safety culture (p-value < 0,05). A significant positive large correlation (0,625) with the dimension "Management commitment and actions towards safety" had the strongest relationship, which indicates that involving workers regarding their performance reviews in terms of safety, tends to make workers view their management as more committed and involved in their actions towards safety.

Based on the above results, the following main findings can be concluded:

**Main finding 17:** The *Leadership* dimension of participative management has a statistically significant positive effect on the safety culture of respondents.

**Main finding 18:** The item "*Good safety behaviour is rewarded"* of motivation does not have a statistically significant effect on the safety culture of respondents.

**Main finding 19:** The item "*Safety goals are established as a group"* of motivation has a statistically significant positive effect on the safety culture of respondents.

**Main finding 20:** The item "*I have a positive attitude towards safety goals"* of motivation has a statistically significant positive effect on the safety culture of respondents.

**Main finding 21:** The item "*I take responsibility for the safety goals established"* of motivation has a statistically significant positive effect on the safety culture of respondents.

**Main finding 22:** The *Communication* dimension of participative management has a statistically significant positive effect on the safety culture of respondents.

**Main finding 23:** The *Decision-making* dimension of participative management has a statistically significant positive effect on the safety culture of respondents.

**Main finding 24:** The *goal setting* dimension of participative management has a statistically significant positive effect on the safety culture of respondents.

**Main finding 25:** The *control* dimension of participative management has a statistically significant positive effect on the safety culture of respondents.

With the correlations between the dimensions of participative management and safety culture now established, the following section will further analyse and unpack the data through a regression analysis.

### 5.5.2 Regression analysis

According to Van Zyl and Pellissier (2017b:174), regression analysis, builds on the principles of correlation analysis and is used to predict an outcome variable based on a set of predictor variables. The authors further add that the results of the regression analysis can also indicate which predictor variables contribute more to explaining the variation in the outcome variable. For the purpose of **this study**, standard multiple regression was used to determine the total variance

explained from the dimensions of participative management on each of the individual dimensions of safety culture. In this regard, to improve the accuracy of the predictions made from the results of the analysis, only the dimensions of participative management that were correlated with the dimensions of safety culture were used (see Table 5-7), as well as testing for multi-colinearly between the independent variables (Hair *et al.*, 2020:210). Multi-collinearity can be determined by calculating the variation inflation factor of variables and should ideally be between 0,10 and 10,0 (Pallant, 2020:164). The Variance Inflation Factor (VIF) for the independent variables of participative management ranged from 1,156 – 2,071 it is therefore evident that multi-collinearity does not exist. With the suitability of the data for regression analysis established, the following section will firstly provide an overview on the interpretation of regression analysis, thereafter the results of the regression analysis on each of the dimensions of safety culture will be discussed.

#### 5.5.2.1 Interpretation of regression results

Before the findings for the regression analysis can be discussed, it is important to provide clarity on how to interpret the results from the regression analysis. The model significance is the first aspect that should be determined. The **F-test** determines the model significance, where the *F*-value is the result of a one-way ANOVA with a p-value below 0,05 indicating that the model is significant (Sarstedt & Mooi, 2019).

Secondly, one needs to take into consideration the coefficient of determination ($R^2$), which measures the goodness-of fit of the multiple regression model expressed as a value indicating the percentage of the variance of the dependent variable that can be explained by the independent variables, with $R^2$ being greater than 0 and smaller than 1 (Mooi *et al.*, 2017:233; Plonsky & Ghanbar, 2018:715). According Sarstedt and Mooi (2019:234), it is difficult to provide a general rule of thumb regarding the effect size of the $R^2$ value as this differs from one research area to another. However, a rough rule of thumb is provided by Steyn and Ellis (2003:53), with $R^2$ values larger than 0,25 indicating a large practically important effect, between 0,13 and 0,25 a significant medium effect, and values smaller than 0,13 indicating a small non-significant effect.

Lastly we need to look at the Standardised coefficient Beta-value, which is used to compare the different independent variables' effects on the dependent variable (Plonsky & Ghanbar, 2018:718). The standard Beta value helps us to determine which independent variables have the strongest effect on the dependent variable, and only coefficient Betas that are statistically significant ($p < 0,05$) are considered (Sarstedt & Mooi, 2019:230). The higher the Beta value, the stronger the relationship (Babin & Zikmund, 2016:435).

With the basis for the interpretation of the results for standard multiple regression established, the following sections will focus on the results of the multiple regression analysis for the dimensions of safety culture.

#### 5.5.2.2 Regression results for dependent variable "*Management commitment and actions towards safety"*

With regards to "*Management commitment and actions towards safety"* as dependent variable, Table 5-8 indicates the significance of the model with Motivation (Item 1), Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control as independent variables within the calculated ANOVA. From Table 5-8 it is evident that the p-value (p < 0,000) is smaller than 0,05, thus indicating that the model is statistically significant.

**Table 5-8: ANOVA for "Management commitment and actions towards safety"**

| Model | | Sum of squares | df | Mean square | F-value | p-value |
|---|---|---|---|---|---|---|
| 1 | Regression | 77,318 | 9 | 8,591 | 24,882 | <0,000*[b] |
| | Residual | 88,042 | 255 | 0,345 | | |
| | Total | 165,360 | 264 | | | |

a. Dependent Variable: Management commitment and actions towards safety
b. Predictors: (Constant), Motivation item 1, Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

From Table 5-9 an $R^2$ value of 0,468 was observed, which indicates that the dependent variables, Motivation (Item 1), Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control have a large practical important effect on explaining 46,80% of the variance observed in the dimension management commitment and actions towards safety.

**Table 5-9: Model Summary for "Management commitment and actions towards safety"**

| Model | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| 1 | 0,684[a] | 0,468 | 0,449 |

a. Predictors: (Constant), Motivation item 1, Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

Additionally, Table 5-10 indicates that according to the β-weights and corresponding p-values, the item (Item 1 of the motivation dimension) "Good safety behaviour is rewarded" (p = 0,000; β = 0,187), and the dimensions Decision-making (p = 0,008; β = 0,187), and control (p = 0,000; β = 0,425), all significantly contributed towards explaining the variance observed in the dependent variable. Furthermore, the control dimension was the most important dimension in terms of explaining the variance observed in the dimension "*Management commitment and action towards safety".*

**Table 5-10: Coefficients for "Management commitment and actions towards safety"**

| Model | Variable | Standardised coefficient Beta-value (β) | t | p-value |
|---|---|---|---|---|
| 1 | (Constant) | | | <0,001* |
| | Motivation Item 1 (See Appendix A) | 0,187 | 3,816 | 0,000* |
| | Motivation Item 2 (See Appendix A) | -0,047 | -0,826 | 0,410 |
| | Motivation Item 3 (See Appendix A) | 0,043 | 0,832 | 0,406 |
| | Motivation Item 4 (See Appendix A) | -0,006 | -0,120 | 0,905 |
| | Leadership | 0,048 | 0,838 | 0,403 |
| | Communication | 0,061 | 0,940 | 0,348 |
| | Decision-making | 0,187 | 2,686 | 0,008* |
| | Goal setting | -0,019 | -0,305 | 0,760 |
| | Control | 0,425 | 6,461 | 0,000* |

a. Dependent Variable: Management commitment and actions towards safety

Source: Researcher's own compilation.

With regards to the above results, the following main findings can be summarised:

**Main finding 26:** The item "*Good safety behaviour is rewarded"* and the dimensions decision-making and control are the most significant contributors towards the commitment and actions towards safety from management.

**Main finding 27:** The *Control* dimension is the most important contributor towards the commitment and action towards safety from management.

With the main findings regarding the regression analysis on the "*Management commitment and actions towards safety"* dimension established, the following section focuses on the findings on the regression analysis done on the dimension "*Workers' knowledge and compliance towards safety".*

#### 5.5.2.3 Regression results for dependent variable *"Workers' knowledge and compliance towards safety"*

With regards to "*Worker's knowledge and compliance towards safety"* as dependent variable, Table 5-11 indicates the significance of the model with Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control as independent variables within the calculated ANOVA. From Table 5-11 it is evident that the p-value ($p < 0,000$) is smaller than 0,05, thus indicating that the model is statistically significant.

**Table 5-11: ANOVA for *"Workers' knowledge and compliance towards safety"***

| Model | | Sum of squares | df | Mean square | F-value | p-value |
|---|---|---|---|---|---|---|
| 1 | Regression | 18,330 | 8 | 2,291 | 12,778 | <0,000*[b] |
| | Residual | 45,902 | 256 | 0,179 | | |
| | Total | 64,.232 | 264 | | | |

a. Dependent Variable: Workers' knowledge and compliance towards safety
b. Predictors: (Constant), Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control.

Source: Researcher's own compilation.

From Table 5-12 an $R^2$ value of 0,285 was observed, which indicates that the dependent variables, Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control have a large practical important effect on explaining 28,50% of the variance observed in the dimension "*Workers' knowledge and compliance towards safety".*

**Table 5-12: Model Summary for *"Workers' knowledge and compliance towards safety"***

| Model | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| 1 | 0,534[a] | 0,285 | 0,263 |

a. Predictors: (Constant), Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

Furthermore, Table 5-13 indicates that according to the β-weights and corresponding p-values, the dimensions Communication (p = 0,034; β = 0,160), and Goal setting (p = 0,000; β = 0,334), both significantly contributed towards explaining the variance observed in the dependent variable. Moreover, the Goal setting dimension was the most important dimension in terms of explaining the variance observed in the dimension "*Workers' knowledge and compliance towards safety".*

**Table 5-13: Coefficients for *"Workers' knowledge and compliance towards safety"***

| Model | Variable | Standardised coefficient Beta-value (β) | t | p-value |
|---|---|---|---|---|
| 1 | (Constant) | | | <0,001* |
| | Motivation Item 2 (See Appendix A) | 0,017 | 0,264 | 0,792 |
| | Motivation Item 3 (See Appendix A) | -0,039 | -0,669 | 0,504 |
| | Motivation Item 4 (See Appendix A) | 0,029 | 0,501 | 0,617 |
| | Leadership | -0,076 | -1,156 | 0,249 |
| | Communication | 0,160 | 2,126 | 0,034* |
| | Decision-making | 0,107 | 1,324 | 0,187 |
| | Goal setting | 0,334 | 4,540 | 0,000* |
| | Control | 0,066 | 0,876 | 0,382 |

a. Dependent Variable: Workers' knowledge and compliance to safety

Source: Researcher's own compilation.

With regards to the above results the following main findings can be deduced:

**Main finding 28:** The dimensions C*ommunication* and G*oal setting* are the most significant contributors towards workers' knowledge and compliance to safety.

**Main finding 29:** The G*oal setting* dimension is the most important contributor towards workers' knowledge and compliance towards safety.

With the main findings regarding the regression analysis on "*Workers' knowledge and compliance towards safety"* dimension established the following section focuses on the findings of the regression analysis done on the *"Workers' attitude towards safety dimension*".

#### 5.5.2.4 Regressions results for dependent variable "*Workers' attitude towards safety"*

With relation to "*Workers' attitude towards safety"* as dependent variable, Table 5-14 indicates the significance of the model with Motivation (item 1), Motivation (item 2), Motivation (item 3), Motivation (item 4), Leadership, Communication, Goal setting, Decision-making and Control as independent variables within the calculated ANOVA. From Table 5-14 it is evident that the p-value ($p < 0,000$) is smaller than 0,05, thus indicating that the model is statistically significant.

**Table 5-14: ANOVA for "*Workers' attitude towards safety"***

| Model | | Sum of squares | df | Mean square | F-value | p-value |
|---|---|---|---|---|---|---|
| 1 | Regression | 27,250 | 9 | 3,028 | 16,495 | <0,000*[b] |
| | Residual | 46,806 | 255 | 0,184 | | |
| | Total | 74,056 | 264 | | | |

a. Dependent Variable: Workers' attitude towards safety
b. Predictors: (Constant), Motivation item 1, Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

From Table 5-15 an $R^2$ value of 0,368 was observed, which indicates that the dependent variables, Motivation (Item 1), Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control have a large practical important effect on explaining 36,80% of the variance observed in the dimension "*Workers' attitude towards safety"*.

**Table 5-15: Model Summary for "*Workers' attitude towards safety"***

| Model | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| 1 | 0,607[a] | 0,368 | 0,346 |

a. Predictors: (Constant), Motivation item 1, Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

In addition, Table 5-16 indicates that according to the β-weights and corresponding p-values, the items (Item 2 and 4 of the motivation dimension) "*Safety goals are established as a group*" (p = 0,029; β = 0,136), and "I take responsibility for the safety goals that are established" (p = 0,007; β = 0,150), together with the dimensions Communication (p = 0,001; β = 0,250), and Goal setting (p = 0,001; β = 0,229), all significantly contributed towards explaining the variance observed in the dependent variable. Furthermore, the communication dimension was the most important dimension in terms of explaining the variance observed in the dimension "*Workers' attitude towards safety".*

**Table 5-16: Coefficients for "*Workers' attitude towards safety"***

| Model | Variable | Standardised coefficient Beta-value (β) | t | p-value |
|---|---|---|---|---|
| 1 | (Constant) | | | <0,001* |
| | Motivation Item 1 (See Appendix A) | 0,031 | 0,575 | 0,566 |
| | Motivation Item 2 (See Appendix A) | 0,136 | 2,197 | 0,029* |
| | Motivation Item 3 (See Appendix A) | 0,062 | 1,100 | 0,272 |
| | Motivation Item 4 (See Appendix A) | 0,150 | 2,710 | 0,007* |
| | Leadership | -0,005 | -0,078 | 0,938 |
| | Communication | 0,250 | 3,521 | 0,001* |
| | Decision-making | -0,035 | -0,458 | 0,648 |
| | Goal setting | 0,229 | 3,296 | 0,001* |
| | Control | 0,034 | 0,478 | 0,633 |

a. Dependent Variable: Workers' attitude towards safety

Source: Researcher's own compilation.

With regards to the above results, the following main findings can be inferred:

**Main finding 30:** The items "Safety goals are established as a group" and "I take responsibility for the safety goals that are established", together with the dimensions *Communication* and *Goals setting* are the most significant contributors to the attitude of workers towards safety.

**Main finding 31:** The G*oal setting* dimension is the most important contributor with regards to the attitude of workers towards safety.

With the main findings regarding the regression analysis on "*Workers' attitude towards safety"* dimension established, the following section focuses on the findings on the regression analysis done on the *"Workers' participation and commitment towards safety"* dimension.

#### 5.5.2.5 Regression results for dependent variable "*Workers' participation and commitment towards safety"*

Pertaining to "*Workers' participation and commitment towards safety"* as dependent variable Table 5-17 indicates the significance of the model with Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control as independent variables within the calculated ANOVA. From Table 5-17 it is evident that the p-value ($p < 0{,}000$) is smaller than 0,05, thus indicating that the model is statistically significant.

**Table 5-17: ANOVA for "*Workers' participation and commitment towards safety"***

| Model | | Sum of squares | df | Mean square | F-value | p-value |
|---|---|---|---|---|---|---|
| 1 | Regression | 62,863 | 8 | 7,858 | 34,080 | <0,000*[b] |
| | Residual | 59,026 | 256 | 0,231 | | |
| | Total | 121,889 | 264 | | | |

a. Dependent Variable: Workers' participation and commitment towards safety
b. Predictors: (Constant), Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

From Table 5-18 an $R^2$ value of 0.516 was observed, which indicates that the dependent variables Motivation (Item 2), Motivation (Item 3), Motivation (Item 4), Leadership, Communication, Goal setting, Decision-making and Control have a large practical important effect on explaining 51,60% of the variance observed in the dimension "*Workers' participation and commitment towards safety".*

**Table 5-18: Model summary for "*Worker's participation and commitment towards safety"***

| Model | R | $R^2$ | Adjusted $R^2$ |
|---|---|---|---|
| 1 | 0,718[a] | 0,516 | 0,501 |

a. Predictors: (Constant), Motivation item 2, Motivation item 3, Motivation item 4, Leadership, Communication, Goal setting, Decision-making, Control

Source: Researcher's own compilation.

Furthermore, Table 5-19 indicates that according to the β-weights and corresponding p-values, the items (Item 2 and 4 of the motivation dimension) “Safety goals are established as a group” (p = 0,003; β = -0,159), and “I take responsibility for the safety goals that are established” (p = 0,000; β = 0,410), together with the dimensions Leadership (p = 0,003; β = 0,161), Communication (p = 0,003; β = 0,182) and Goal setting (p = 0,001; β = 0,197) , all significantly contributed towards explaining the variance observed in the dependent variable. Furthermore, the item “I take responsibility for the safety goals that are established” was the most important contributor in terms of explaining the variance observed in the dimension “*Workers’ participation and commitment towards safety”.*

**Table 5-19: Coefficients for “*Workers’ participation and commitment towards safety”***

| Model | Variable | Standardised coefficient Beta-value (β) | t | p-value |
|---|---|---|---|---|
| 1 | (Constant) | | | <0,001* |
| | Motivation Item 2 (See Appendix A) | -0,159 | -2,951 | 0,003* |
| | Motivation Item 3 (See Appendix A) | -0,074 | -1,523 | 0,129 |
| | Motivation Item 4 (See Appendix A) | 0,410 | 8,551 | 0,000* |
| | Leadership | 0,161 | 2,995 | 0,003* |
| | Communication | 0,182 | 2,949 | 0,003* |
| | Decision-making | 0,093 | 1,399 | 0,163 |
| | Goal setting | 0,197 | 3,256 | 0,001* |
| | Control | 0,046 | 0,740 | 0,460 |

a. Dependent Variable: Workers’ participation and commitment towards safety

Source: Researcher’s own compilation.

With regards to the above results the following main findings can be concluded:

**Main finding 32:** The items “Safety goals are established as a group” and “I take responsibility for the safety goals that are established”, together with the dimensions *Leadership*, *Communication* and *Goal setting* are the most significant contributors to the commitment and participation from workers towards safety.

**Main finding 33:** The item "I take responsibility for the safety goals that are established", is the most important contributor with regards to the commitment and participation from workers towards safety.

With the main findings regarding the regression analysis on the "*Workers' participation and commitment towards safety"* dimension established the following section focuses on providing a summary of the main findings from the empirical results of this study in relation to the objectives that were established for the study.

## 5.6 SUMMARY OF MAIN FINDINGS

The secondary objectives for this study were established in Chapter 1 (see Section 1.5.2). In this regard, Table 5-20 provides a summary of the main findings that were presented in this chapter in relation to the secondary objectives formulated for this study.

**Table 5-20: Summary of the main findings related to the secondary objectives**

| **Secondary objective 1: To measure respondents' participative management. (Achieved)** | |
|---|---|
| Main finding 1 | All the measurement scales used to measure the participative management and safety culture constructs were deemed reliable except for the measurement scales regarding the motivation construct. |
| Main finding 2 | The scales used to measure the constructs of participative management and safety culture can be deemed valid. |
| Main finding 3 | With regards to the leadership dimension, respondents mostly indicated that they felt free to discuss issues related to safety to their manager or supervisor. |
| Main finding 4 | In relation to the motivation dimension, respondents mostly indicated that they have a positive attitude towards safety goals. |
| Main finding 5 | In reference to the communication dimension, respondents mostly indicated that they communicate with their fellow employees on how to achieve their safety objectives. |
| Main finding 6 | In relation to the decision-making dimension, respondents mostly indicated that there is enough information available when they need to make decisions regarding safety. |
| Main finding 7 | Pertaining the goal setting dimension, respondents mostly indicated that the safety goals are accepted by them without any disagreement. |
| Main finding 8 | In terms of the control dimension, respondents mostly indicated that the information available to measure their safety performance is clear to them. |
| Main finding 9 | Concerning the participative management of safety, respondents seemed to feel the most involved when it comes to setting goals for safety. |
| Main finding 10 | With regards to the participative management of safety, respondents appeared to feel the least involved when it comes to the decision-making and control of safety-related matters. |

**Table 5-20: Summary of the main findings related to the secondary objectives (continued)**

| | |
|---|---|
| **Secondary objective 2: To measure respondents safety culture. (Achieved)** | |
| Main finding 1 | All the measurement scales used to measure the participative management and safety culture constructs were deemed reliable except for the measurement scales regarding the motivation construct. |
| Main finding 2 | The scales used to measure the constructs of participative management and safety culture can be deemed valid. |
| Main finding 11 | With regards to the Management commitment and actions towards safety dimension, respondents mostly indicated that safety is given a high priority by management. |
| Main finding 12 | In relation to the Workers' knowledge and compliance to safety dimension, respondents largely indicated that they wear their safety equipment whilst doing their job. |
| Main finding 13 | In terms of the Workers' attitude towards safety dimension, respondents largely indicated that they feel it is important to encourage others to perform their job in a safe manner. |
| Main finding 14 | Pertaining to the Workers' participation and commitment towards safety dimension, respondents mostly indicated that they follow the correct safety rules and procedures while carrying out their jobs. |
| Main finding 15 | Concerning the safety culture of respondents, respondents were the most positive in relation to their attitude towards safety. |
| Main finding 16 | With regards to the safety culture of respondents, respondents were the least positive towards the commitment and actions towards safety from management. |
| **Secondary objective 3: To determine whether leadership has an effect on the establishment of a safety culture. (Achieved)** | |
| Main finding 17 | The leadership dimension of participative management has a statistically significant positive effect on the safety culture of respondents. |
| **Secondary objective 4: To assess whether motivation has an influence on the creation of a safety culture. (Not achieved)** | |
| Main finding 18 | The item "Good safety behaviour is rewarded" of motivation does not have a statistically significant effect on the safety culture of respondents. |
| Main finding 19 | The item "Safety goals are established as a group" of motivation has a statistically significant positive effect on the safety culture of respondents. |
| Main finding 20 | The item "I have a positive attitude towards safety goals" of motivation has a statistically significant positive effect on the safety culture of respondents. |
| Main finding 21 | The item "I take responsibility for the safety goals established" of motivation has a statistically significant positive effect on the safety culture of respondents. |

**Table 5-20: Summary of the main findings related to the secondary objectives (continued)**

| | |
|---|---|
| **Secondary objective 5: To determine whether communication has an impact on the construction of a safety culture. (Achieved)** | |
| Main finding 22 | The communication dimension of participative management has a statistically significant positive effect on the safety culture of respondents. |
| **Secondary objective 6: To investigate the consequence of decision-making on the design of a safety culture. (Achieved)** | |
| Main finding 23 | The decision-making dimension of participative management has a statistically significant positive effect on the safety culture of respondents. |
| **Secondary objective 7: To explore the value of goal setting on safety culture. (Achieved)** | |
| Main finding 24 | The goal setting dimension of participative management has a statistically significant positive effect on the safety culture of respondents. |
| **Secondary objective 8: To examine the importance of control on safety culture. (Achieved)** | |
| Main finding 25 | The control dimension of participative management has a statistically significant positive effect on the safety culture of respondents. |
| **Secondary objective 9: To determine the influence the dimensions of participative management has on safety culture. (Achieved)** | |
| Main finding 26 | The item “Good safety behaviour is rewarded” and the dimensions decision-making and control are the most significant contributors towards the commitment and actions towards safety from management. |
| Main finding 27 | The control dimension is the most important contributor towards the commitment and action towards safety from management. |
| Main finding 28 | The dimensions communication and goal setting are the most significant contributors towards workers’ knowledge and compliance to safety. |
| Main finding 29 | The goal setting dimension is the most important contributor towards workers knowledge and compliance to safety. |
| Main finding 30 | The items “Safety goals are established as a group” and “I take responsibility for the safety goals that are established”, together with the dimensions communication and goal setting are the most significant contributors to the attitude of workers towards safety. |
| Main finding 31 | The goal setting dimension is the most important contributor with regards to the attitude of workers towards safety. |
| Main finding 32 | The items “Safety goals are established as a group” and “I take responsibility for the safety goals that are established”, together with the dimension’s leadership, communication and goal setting are the most significant contributors to the commitment and participation from workers towards safety. |
| Main finding 33 | The item “I take responsibility for the safety goals that are established”, is the most important contributor with regards to the commitment and participation from workers towards safety. |

Source: Researcher’s own compilation.

As is indicated in Table 5-20 all the secondary objectives **for this study** were achieved, it can therefore be argued that a participative management approach for the management of safety in the forestry industry will most likely have a positive impact on the safety culture of workers in the industry.

With the main findings in relation to the secondary objectives formulated for this study established, the following section will provide the conclusions regarding the empirical results and findings of this chapter.

## 5.7 CONCLUSION

The purpose of this chapter was to present the main findings and empirical results for the dimensions of participative management and safety culture. To achieve this the chapter firstly started off with an introduction on the different topics to follow (see Section 5.1). Therefore, the first part of this chapter presented the sample response rate where the main finding was that 88% of the questionnaires collected were suitable for data analysis (see Section 5.2). Thereafter the psychometric properties of the measuring instrument used for this study were determined with the conclusion that the majority of the measurement scales used for this study are reliable and valid (see Section 5.3). After reliability and validity was established, the key items for the dimensions of participative management and safety culture were highlighted with the main findings regarding the descriptive statistics (see Section 5.4.2). In addition, the inferential statistics used for this study provided significant insights pertaining to the relationship between participative management and safety culture (see Section 5.5). Lastly this chapter ended with a summary on the main findings and a conclusion on the achievement of the objectives for this study.

With the empirical results and findings for this study established, the following chapter concludes this study with an overview of the objectives achieved, what their implications are, a discussion on the recommendations, a presentation of the limitations, and suggestions for future research.

# CHAPTER 6

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 INTRODUCTION

The purpose of this chapter is to present conclusions and recommendations regarding a participative management approach for the management of safety in forestry. The primary aim of this chapter is to address the secondary objectives that were formulated in Chapter 1 (see Section 1.5). The discussions in this chapter are formulated from the findings in the literature (Chapters 1 to 3) and the empirical results that were reported in Chapter 5. The chapter starts with an overview of Chapters 1 to 5, to provide the overall context of the study and set the foundation for the discussions to follow. Thereafter the conclusions, implications, and recommendations pertaining to the secondary objectives of this study are deliberated, followed by the contributions and limitations of the study, as well as the suggestions for future research. The chapter then concludes with a summary and the main outcome of the study.

## 6.2 OVERVIEW OF CHAPTERS

In Chapter 1 of this study it was argued that employees in the South African workforce are seldom involved in the safety management process and that ultimately many decisions regarding safety management are made by management without the consultation of their employees and might therefore have a negative impact in the working environment (see Section 1.1). Furthermore, it was proposed that involving employees in safety related matters might be a better approach to use when managing safety, especially if one wants to improve the safety culture of those employees (see Section 1.1). With this in mind, the problem statement for this study was formulated (see Section 1.2). The argument presented towards defining the research problem for the study was that the safety statistics for most of the industries in South Africa are generally concerning; however with regards to the forestry industry, which according to Harrington (2021:88) is a dangerous working environment, there is a general lack of statistics regarding safety as well as little-known knowledge on how safety is actually managed in this industry. As it was argued in Section 1.1 that a participative management approach is a better approach for safety management, it was decided to measure the level of involvement of employees as well as their attitude, values and beliefs towards safety to gain some perspective on the safety culture of workers in the forestry industry. Subsequently the theory of participative management and safety culture formed the foundations for this study with the argument being that higher levels of employee involvement (a participative management approach) in the management of safety can

have a positive effect on the safety culture of employees (see Section 1.2). In this regard, valuable insights were obtained regarding participative management and safety culture, which were then further unpacked in order to determine the effect of the relationship between participative management on safety in the forestry industry. The objectives that were formulated for this study were as follows:

The primary aim of this study was to determine the effect that participative management has on the creation of a safety culture in the forestry industry of South Africa (see Section 1.5.1). To address the primary objective a number of secondary objectives were formulated (see Section 11.5.2), which were presented as follows:

1. to measure the participative management of respondents;
2. to measure respondents' safety culture;
3. to determine whether leadership has an effect on the establishment of a safety culture;
4. to assess whether motivation has an influence on the creation of a safety culture;
5. to determine whether communication has an impact on the construction of a safety culture;
6. to investigate the consequences of decision-making on the design of a safety culture;
7. to explore the value of goal setting on safety culture;
8. to examine the importance of control on safety culture; and
9. to determine the influence of the dimensions that participative management has on safety culture.

With the background and reason for the study established, Chapter 2 specifically focused on the forestry industry of South Africa. In this regard it was established that forestry has a rich history, not only in a global context but also from a South African perspective (see Section 2.2.2). Furthermore, it was also established that forestry has a positive impact globally and in South Africa, from an economic, community and environmental outlook (see Sections 2.3 and 2.4). It was presented in Section 2.4.7 that the management of forestry is mostly guided through Acts, such as The National Forest Act (84 of 1998) and Forestry Laws Amendment Act (35 of 2005), to which the companies must adhere to. In addition, there are also certification bodies to which companies have to comply with, such as the Forest Stewardship Council (FSC) and Programme for Endorsement of Forest Certification (PEFC), to maintain their certification. Furthermore, pertaining to the management of forestry, it was indicated by most companies in the industry that

employee engagement is important towards their success, especially in terms of motivation and communication. As further noted, it was concluded in Section 2.4.8 that there is a definite lack of understanding on the way workers are managed in terms of communication, objectives towards safety, decision-making towards safety, and the control measures used to monitor the progress of safety in the forestry industry, especially form the viewpoint of their employees.

Chapter 3 put forward the theoretical points of departure pertaining to participative management and safety culture. For participative management, an argument for each of the dimensions of participative management leadership, motivation, communication, decision-making, goal setting and control were presented, and how they can be used to encourage the involvement of employees in the safety management process. The reasoning being that this would improve the safety culture of employees (see Section 3.4.3). From a safety culture perspective, it was decided that the focus should be on management commitment and actions towards safety, workers' knowledge and compliance towards safety, workers' attitude towards safety, and workers' participation and commitment towards safety, which formed the theoretical basis towards the measurement of the safety performance within a company at any given time (see Section 3.6.7.1).

To test the relationship between participative management and safety culture, a questionnaire was developed from the studies done by Likert (1967), Amzat *et al.* (2020), as well as Vinodkumar and Bhasi (2009), and adopted to fit the context of this study to serve as the measuring instrument being used. In Chapter 4, the research methodology provided context on the processes used to achieve the research objectives of this study. Accordingly, in Section 4.4.3 it was established that a quantitative research strategy was used, with a combination of the exploratory and descriptive research design being adopted (see Section 4.4.4). Moreover, the primary data were collected by administering the research instrument, using the mixed mode survey method to workers in the forestry industry of Mpumalanga, South Africa (see Section 4.4.5). After data were collected, it was prepared and coded for data analysis by the statistical services of the North-West University (NWU). The Statistical Package for the Social Sciences (SPSS) (Version 25) was used to capture, clean, edit and analyse the data collected from the questionnaires.

Chapter 5 presented the empirical results and main findings for this study. In Section 5.3 the reliability and validity of the research instrument was confirmed, except for the motivation construct of participative management. Henceforth the individual items of motivation were analysed separately in relation to the dimensions of safety culture (see Section 5.5). In Section 5.4 the descriptive statistics for participative management and safety culture were offered, with the main conclusion being that in general terms most respondents felt involved in the safety management process, as well as having a positive attitude towards safety culture. Furthermore, the relationship between participative management and safety culture was tested through

Pearson's correlation and multiple standard regression (see Section 5.5), where it was established, that participative safety management does have a significant effect on safety culture.

With the overview of the various Chapters in this study given, the following section presents the conclusions, implications and recommendations concerning the research findings and secondary objectives formulated for the study.

## 6.3 CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR THE SECONDARY OBJECTIVES

Each of the secondary objectives established for this study are discussed in the sections to follow

### 6.3.1 Secondary Objective 1

Table 6-1 presents Secondary Objective 1 for this study.

**Table 6-1: Secondary Objective 1**

| Secondary objective 1 |
| --- |
| **To measure respondents' perceptions of participative management.** |

Extensive literature regarding participative management is presented in Section 3.4. In this regard it was established that participative management is the process of empowering employees through a management system where authority is delegated and new ideas are valued by the organisation (La Cock, 2017:7). Furthermore, employees are motivated through monetary rewards and by participating in goal setting. Decisions are collectively made with all levels of the organisation in the decision-making process, and there is a free flowing level of communication that occurs, which means communication happens from top to bottom and bottom to top (Waddell *et al.*, 2019:20). The main literature findings in relation to participative management can be summarised as follows:

- As explained in Section 3.4.2, participative management is considered to be one of the four management systems as proposed by Likert which include: System 1: Exploitative authoritative; System 2: Benevolent authoritative; System 3: Consultative, and System 4: Participative management (Hashim *et al.*, 2016).
- Defined as: "*The process of empowering employees through a management system where employees are actively involved and participate in the decision-making, problem-solving, goal*

*setting, and change processes of the organisation to enhance the effectiveness of operations within that organisation*" (See section 3.4.1).

- Participative management includes a high level of employee involvement in the managerial aspects pertaining to leadership motivation, communication, decision-making, control and goal setting (See section 3.4.3).

#### 6.3.1.1 Discussion, implications and recommendations pertaining to Secondary Objective 1

**Discussions and implications:** As per Main Findings 1 and 2, all scales used to measure participative management were valid and reliable except for the motivation construct. This would suggest that the scale used to measure the participative management of respondents can be successfully implemented to measure the level of involvement of employees in terms of safety management in the South African forestry industry, except for the motivation construct.

The most positive aspect regarding the leadership of safety management was that respondents felt free to discuss issues related to safety with their manager or supervisor (see Section 5.4.1). This implies that if leadership is not involved when it comes to managing the safety of their workers, respondents might feel less free or scared to discuss safety-related matters with them. Democratic leadership is therefore an important aspect to consider in this regard, as this would promote more involvement and mutual trust between workers and their management, perhaps explaining the open relationship between managers and workers (see Section 3.4.3.1.4).

With regards to motivation, the characteristic that stood out, was that respondents mostly had a positive attitude towards safety. This would suggest that if respondents have a negative attitude towards the safety goals established, they may feel less motivated to achieve them (see Section 5.4.1). Moreover, this also links well in terms of the argument presented in the literature in Section 3.4.3.2. In this instance it was proposed that management should focus on the higher-order needs of workers, provide them with positive feedback, reward them for outstanding safety performance, and make sure they know what is expected of them on how to achieve realistic safety goals (Mohammadi *et al.*, 2018:385).

From a communication perspective, respondents mostly indicated that they communicate with their fellow employees in terms of how they are going to achieve their safety objectives (see Section 5.4.1). Therefore, it may indicate that if respondents do not communicate with their fellow employees on how to achieve their safety objectives, they are likely to be less involved in the communication process of safety management, and will most likely not achieve their safety objectives. The findings therefore, in terms of communication in safety management, highlight the

importance of an open communication climate as well as the communication of employees across boundaries and with each other in terms of achieving safety objectives as argued in Section 3.4.3.3.

In relation to decision-making, respondents mostly indicated that enough information is available when they need to make decisions regarding safety (see Section 5.4.1). This would propose that if respondents do not have enough information available regarding safety, they are more likely to make the wrong decisions regarding safety and be less involved in the safety management process. From the findings pertaining to decision-making, management should consider incorporating the participative, delegative, conceptual and behavioural decision-making styles to promote the sharing of safety-related information to workers. This will arguably allow workers to make safer workplace decisions (see Section 3.4.3.4).

Pertaining to goal setting, the most important aspect found was that respondents mostly accepted the safety goals established without any disagreement (see Section 5.4.1). This would imply that if respondents do not accept the safety goals that are established, it may lead to a negative attitude towards safety and decrease their involvement when establishing goals for safety. Therefore, for safety goals to be accepted by workers', management can focus on the involvement of workers in their roles and responsibilities towards safety, where safety goals are established at an operational level (Gao *et al.*, 2019:228), keeping in mind that goals need to be specific, measurable, achievable, relevant and time bound (see Section 3.4.3.6).

With regards to control, respondents mostly felt that the information available to measure their safety performance is clear to them (see Section 5.4.1). This proposes that if respondents are not informed and aware of how their safety performance is measured and determined, they might feel less involved and negative towards safety and perhaps also be less motivated to achieve the established safety goals. In this regard, management can consider improving the involvement of managers, supervisors and workers when their safety performance is evaluated. Additionally, it can also be helpful if employees participate in the establishment of control systems and the methods used to measure their safety performance (see Section 3.4.3.5.2).

With regards to the participative management of safety, respondents appear to feel the least involved when it comes to the decision-making and control of safety-related matters (see Section 5.4.1). This implies that workers might feel that they need to be consulted more when important decisions pertaining to safety are made, and employees might feel that management can put in more effort to help achieve their safety goals.

Based on the discussion implication in relation to Secondary Objective 1, the following recommendations regarding participative management to improve employee involvement in safety management in the forestry industry are made:

**Recommendation 1.1:** Forestry companies in South Africa can consider using the participative management scale to measure the level of involvement of employees in safety related matters pertaining to leadership, communication, decision-making, goal setting, and control in the forestry industry.

**Recommendation 1.2**: Management can advance the involvement of their employees regarding safety through leadership by focusing on the following:

- By ensuring an open communication policy with workers that allows them to feel free to discuss any safety-related matters, such as reporting incidents where workers almost got hurt but didn't (near misses) or identifying hazards and their working environment.

- By encouraging feedback from workers to obtain their opinions and inputs related to any safety matters.

**Recommendation 1.3:** Management can enhance the involvement of their employees regarding safety through motivation by concentrating on the following:

- By promoting the collective establishment of safety goals with their workers. If workers participate in the setting of safety goals, they are likely to have a positive attitude towards safety and will arguably be more motivated to achieve these goals.

- By establishing a reward system that acknowledges excellent safety performance and goal achievement.

**Recommendation 1.4:** Management can improve the involvement of their employees regarding safety through communication by addressing the following:

- By not only discussing the achievement of safety objectives between management and workers, but also encouraging workers to communicate between each other on how they are going to achieve their safety goals.

**Recommendation 1.5:** Management can increase the involvement of their employees regarding safety through decision-making by considering the following:

- Promoting the sharing of safety-related information to enable workers to make better workplace decisions regarding safety, and making sure employees are consulted before important decisions or planned changes are made regarding the safe work procedures of employees.

**Recommendation 1.6:** Management can aid the involvement of their employees regarding safety through goal setting by considering the following:

- By involving workers in the establishment of safety goals it will ensure that there is mutual agreement on exactly what safety goals must be achieved, how these safety goals are going to be achieved, when these safety goals are going to be achieved, and explaining the relevance of these safety goals with regards to safety performance.

- Management in collaboration with the workers can also incorporate the establishment of safety goals in the mission and vision, which will further serve as guidance towards what needs to be achieved and how they are going to achieve this.

**Recommendation 1.7:** Management can optimise the involvement of their employees regarding safety through control by attending to the following:

- Providing accurate and relevant performance measures that are not ambiguous to workers.

- Workers must have a clear understanding on how their safety performances are going to be measured and also be consulted and involved in establishing these safety performance measures.

**Recommendation 1.8:** Looking at the overall employee involvement of the company, management can:

- Consider improving their effort towards consulting their employees pertaining to major decisions and changes regarding safety. For example, when introducing new safety equipment to workers to perform their operational activities, it would be advisable to provide context to employees why the new equipment is being introduced, rather than just telling them to wear the equipment and not explaining the reasoning behind providing the new equipment.

- Increase their efforts to achieve safety goals by providing more support to employees to reach the safety goals, allowing them to be more involved in the establishment of safety goals and also in the measurement of their safety performance. They must further listen to workers when any concerns regarding safety are raised.

### 6.3.2 Secondary Objective 2

Table 6-2 represents Secondary Objective 2 for this study

**Table 6-2: Secondary objective 2**

| Secondary Objective 2 |
| --- |
| **To measure respondents' safety culture** |

The literature regarding safety culture was reviewed in Section 3.6. In this regard it was established that safety culture can be viewed as a shared collection of attitudes, values and beliefs amongst all employees, which determine how they view safety, and is ultimately reflected through their behaviour towards safety when they are not supervised (Fan *et al.*, 2016; Occelli *et al.*, 2011; Peightal & Singerhouse, 2020; Toft & Reynolds, 1999; Wong *et al.*, 2005). The main literature findings regarding safety culture can be summarised as follows:

- Safety culture is considered to be an extension of an organisation's corporate culture (see Section 3.6.2).
- Employees at all levels must be committed towards safety (see Section 3.6.4).
- Participation from all employees is essential to reach safety goals (see Section 3.6.3).
- Important factors that were identified in the literature to measure safety culture included management commitment and actions towards safety, workers' knowledge and compliance towards safety, workers' attitude towards safety, as well as workers' participation and commitment towards safety (see Section 3.6.7.1).

#### 6.3.2.1 Discussion, implications and recommendations pertaining to Secondary Objective 2

**Discussions and implications:** As per Main Findings 1 and 2, all scales used to measure participative management were valid and reliable. This would suggest that the scale used to measure the safety culture of respondents can be successfully implemented to measure the attitudes, values and beliefs of employees towards safety in the South African forestry industry.

With regards to the Management commitment and actions towards safety dimensions, respondents mostly felt that safety is given a high priority by management (see Section 5.4.2).

This implies that if safety is not given a high priority by management, workers will see them as less committed in their actions towards safety, and ultimately feel less positive and motivated towards being safe. In this instance, management can improve their employees' attitude towards safety by addressing any safety concerns that employees might raise and show their continuous support towards employee safety and welfare (see Section 3.6.7.1.1).

In relation to the Workers' knowledge and compliance to safety dimension, respondents largely indicated that they wear their safety equipment whilst doing their job (see Section 5.4.2). This would suggest that if workers do not have enough knowledge on how to perform their jobs in a safe manner, they would be much less compliant towards safety. Management can ensure safety compliance through regular training and providing workers with enough information on how they need to perform their work in a safe manner (see Section 3.6.7.1.2).

In terms of the Worker's attitude towards safety dimension, respondents largely indicated that they feel it is important to encourage others to perform their work in a safe manner (see Section 5.4.2). This would suggest that should workers not encourage each other to work safely, they might have a less positive attitude towards safety and pay less attention to safety in the workplace. Management can foster a positive attitude towards safety by promoting discussions between workers regarding safe work behaviour and what it is they need to do to perform their work in a safe manner (see Section 3.6.7.1.3).

Pertaining to the Workers' participation and commitment towards safety dimension, respondents mostly indicated that they follow the correct safety rules and procedures while carrying out their jobs (see Section 5.4.2). This would propose that if workers are less involved and committed towards safety, they are less likely to follow the correct safety rules and working procedures. Management can improve the participation of workers by encouraging them to report safety issues, listen to workers' suggestions on how safety in the work environment can be improved, and also allow workers to be involved in the communication and decision-making processes (see Section 3.6.7.1.4).

With regards to the overall safety culture of respondents, they appeared to be the least positive towards the commitment and actions from management towards safety (see Section 5.4.2). This would propose that management needs to be more committed in their actions towards safety. In this instance, management can improve their commitment through participation and involvement, increased support and visibility, and by demonstrating leadership by setting the example through their beliefs and values towards safety (see Section 3.6.7.1.1).

Based on the discussion and implications in relation to Secondary Objective 2, the following recommendations to improve the safety culture of workers in the forestry industry are made:

**Recommendation 2.1:** Management can enhance their commitment and actions towards safety by taking the following into consideration:

- Management can engage with workers on their roles and responsibilities on how to not only keep themselves safe, but also their fellow co-workers.
- Showing their support in this regard and making workers realise that they are accountable for the safety of each other.
- Management can also make workers understand the importance of keeping their co-workers' safety in mind and show their commitment towards safety. This will most likely improve the commitment towards safety from employees as well.

**Recommendation 2.2:** Management can uplift the knowledge and compliance towards safety from workers by taking a look at the following:

- Management can ensure safety compliance through regular safety training, which must provide workers with enough information on how they need to perform their jobs in a safe manner, thus expanding their knowledge on how to work safely.

**Recommendation 2.3:** Management can improve the attitude of workers towards safety by concentrating on the following:

- Management should encourage workers to have regular group discussions pertaining to safety-related issues before they start with their daily operational activities, also referred to as toolbox talks, thus encouraging and supporting teamwork regarding safety.

**Recommendation 2.4:** Management can build on the participation and commitment of workers towards safety by attending to the following:

- Management can improve the participation of workers by encouraging them to report safety issues, listen to workers' suggestions on how safety in the workplace can be improved and allow workers to be involved in the communication and decision-making processes regarding safety matters.

**Recommendation 2.5:** Taking into consideration the overall safety culture of the company, management can focus on creating an environment that encourages employee involvement and

participation towards safety, and also communicate with employees on a regular basis about safety. Furthermore, management can also encourage regular feedback and suggestions from employees on what they feel can be done to improve the overall safety of the company.

### 6.3.3 Secondary Objective 3

Table 6-3 offers secondary objective 3 of this study.

**Table 6-3: Secondary objective 3**

| Secondary Objective 3 |
| --- |
| **To determine whether leadership has an effect on the establishment of a safety culture.** |

In Chapter 3 it was argued that transformational and democratic leadership will most likely have a positive effect on safety culture (Adha *et al.*, 2020:118). Both of these leadership styles promote high levels of involvement from workers in management practices (see Section 3.4.3.1). To test this argument, the level of involvement from workers through the leadership approach of management was compared to the safety culture of respondents (see Section 5.5.1). The implications, discussions and recommendations of the empirical findings in this regard is discussed in Section 6.3.3.1.

#### 6.3.3.1 Discussion, implications and recommendations pertaining to Secondary Objective 3

**Discussion and implications:** In terms of Secondary Objective 3, it was established that leadership dimension of participative management has a statistically significant positive effect on the safety culture of respondents (see Section 5.5.1). This would imply that workers who have participative leaders that are involved are more likely to have a positive safety culture. Furthermore, it was found that involved leadership has the biggest impact on the commitment and participation of workers towards safety.

Assumed from the discussions and implications in respect to Secondary Objective 3, the following recommendation to enhance the safety culture of workers through participative leadership in the forestry industry is made:

**Recommendation 3.1:** Management can improve the safety culture of workers by showing visible and active participation in safety issues, and by having an open communication policy to reduce

or eliminate safety barriers. Management can also show their involvement by visiting the working premises and promote a safe working environment.

### 6.3.4 Secondary Objective 4

Table 6-4 displays Secondary Objective 4 of this study.

**Table 6-4: Secondary objective 4**

| Secondary objective 4 |
| --- |
| **To assess whether motivation has an influence on the creation of a safety culture.** |

The literature findings pertaining to motivation suggested that the safety culture of an organisation can be improved through the motivation of employees towards reaching safety goals (Bunner *et al.*, 2018:3). It was argued in Section 3.4.3.2 that it is established by focusing on the higher-order needs of employees, rewarding employees with positive reinforcement and feedback for good safety performance, and allowing employees to take responsibility for the safety goals established. This can be done by including them in the goal setting process and creating an environment where their inputs towards safety are valued. All these are likely to have the most positive effect on the safety culture of these respondents. The implications, discussions, and recommendations for the empirical findings on the effect of motivation on safety culture is further discussed in Section 6.3.4.1.

#### 6.3.4.1 Discussion, implications and recommendations pertaining to Secondary Objective 4

**Discussion and implications:** In terms of Secondary Objective 4, the effect of motivation as a construct could not be established as the scales used to measure motivation were not reliable. Therefore, it was decided to compare the individual items of motivation towards the safety culture of respondents (see Section 5.5.1). The most significant correlation in this instance was between the item “I take responsibility for the safety goals established” and “Workers’ participation and commitment towards safety”. This would imply that when workers take responsibility for goals that are established as a collective, they are more likely to be involved and committed towards safety, which could possibly lead to an improved safety culture.

Concluded from the discussions and implications in relation to Secondary Objective 4, the following recommendation to build up the safety culture of workers through increased responsibility in the forestry industry is made:

**Recommendation 4.1:** Management can improve the safety culture of respondents by allowing workers to be involved and participate in the establishment of safety goals, thus allowing them to take responsibility for these goals.

### 6.3.5 Secondary Objective 5

Table 6-5 establishes Secondary Objective 5 of this study.

**Table 6-5: Secondary Objective 5**

| Secondary Objective 5 |
| --- |
| **To determine whether communication has an impact on the construction of a safety culture.** |

The importance of communication and its effect on safety culture was deliberated in Section 3.4.3.3. From the literature gathered it was firstly established that an open communication climate plays an important role in creating a positive attitude towards safety as well as building trust between employees and managers (Neill *et al.*, 2019:291). Secondly it was argued that downward and upward communication between employees and management is important, especially in terms of feedback. To eliminate any misunderstanding in terms of safety-related issues (see Section 3.4.3.3.2). The implications, discussions, and recommendations for the empirical findings on the effect of communication on safety culture is further discussed in Section 6.3.5.1.

#### 6.3.5.1 Discussion, implications and recommendations pertaining to Secondary Objective 5

**Discussion and implications:** In terms of Secondary Objective 5, it was concluded that the communication dimension of participative management has a statistically significant positive effect on the safety culture of respondents (see Section 5.5.1). This proposes that the more involved workers are in terms of the communication towards safety-related issues, the better their safety culture will be. In addition, involving workers in the communication process has the most significant impact on the attitude of workers towards safety.

Pertaining to the discussions and implications with regards to Secondary Objective 5, the following recommendation to elevate the safety culture of workers through involved communication practises in the forestry industry is suggested:

**Recommendation 5.1:** To improve the safety culture of respondents, management can involve and promote the participation of workers in the communication process by focusing on upward and downward communication. Management must specifically focus on gaining feedback from employees in terms of their opinions regarding the reporting of near misses, identifying hazards, suggestions for the improvement of safety in the workplace, and any safety concerns that employees might have. Management must also provide workers with feedback regarding safety issues, such as communicating changes in safety procedures, providing workers with enough safety information, and by creating an open communication policy where workers can feel free to discuss safety-related issues with their management without being scared to do so. This will avoid any ambiguity and misunderstanding managers or workers might have regarding safety.

### 6.3.6 Secondary Objective 6

Table 6-6 provides Secondary Objective 6 of this study.

**Table 6-6; Secondary Objective 6**

| Secondary Objective 6 |
| --- |
| **To investigate the consequences of decision-making on the design of a safety culture.** |

The significance of the effect on decision-making on safety culture was reflected on in Section 3.4.3.4. In this instance it was established that the extent to which employees participate in the decision-making process regarding safety management is arguably determined by the decision-making style adopted by managed (see Section 3.4.3.4). In addition, it was argued that the participative, delegative, conceptual and behavioural decision-making styles can be adopted by management to enhance employee involvement and improve safety culture (Dirik & Intepeler, 2017:257). The implication, discussions, and recommendations for the empirical findings on the effect of decision-making on safety culture is further discussed in Section 6.3.6.1.

#### 6.3.6.1 Discussion, implications and recommendations pertaining to Secondary Objective 6

**Discussion and implications:** Pertaining to Secondary Objective 6, it was established that the decision-making dimension of participative management has a statistically significant positive effect on the safety culture of respondents (see Section 5.5.1). This would suggest that when workers are involved in the decision-making process regarding safety-related issues, they are most likely to have a positive safety culture. Furthermore, when employees are involved in the decisions that are made towards safety, they are likely to see their management as being more committed and involved in their action towards creating a safety culture.

In respect to the discussions and implications towards Secondary Objective 6, the following recommendation to strengthen the safety culture of workers through involved decision-making efforts in the forestry industry is advised:

**Recommendation 6.1:** Management can give workers a chance to give their inputs on decisions that are related to workplace safety polices, training and processes. Management must not only listen to their inputs but also incorporate the input from workers on how the overall safety can be improved in the workplace.

### 6.3.7 Secondary Objective 7

Table 6-7 presents Secondary Objective 7 off this study.

**Table 6-7: Secondary Objective 7**

| Secondary Objective 7 |
| --- |
| **To explore the value of goal setting on safety culture.** |

The literature in relation to goal setting and how it is used in safety management was deliberated in Section 3.4.3.6. In the context of this study, it was argued that in terms of goal establishment on safety issues the focus should be at an operational level (see Section 3.4.3.6). Further findings in the literature suggested that in order to improve a safety culture where goals are determined, it is important to let workers participate in the goal setting process (Van Loggerenberg, 2015c:122). This will make them more committed to achieve the safety goals that they establish, and will also lead to workers taking ownership towards safety goals (see Section 3.4.3.6.3). The

implication, discussions, and recommendations for the empirical findings on the effect of goal setting on safety culture is further discussed in Section 6.3.7.1.

#### 6.3.7.1 Discussion, implications and recommendations pertaining to Secondary Objective 7

**Discussion and implications:** In relation to Secondary Objective 7 it was established that the goal setting dimension of participative management has a statistically significant positive effect on the safety culture of respondents (see Section 5.5.1). This would imply that involving workers in the establishment of safety goals has a positive effect on the safety culture of workers. More specifically, workers are more likely to have a positive attitude towards safety when safety goals are established as a group and not forced from management. The safety goals that are established are accepted without disagreement when, safety goals are clear to employees.

From the discussions and implications pertaining to Secondary Objective 7, the following recommendation to advance the safety culture of workers through involved goal setting practises in the forestry industry is put forward:

**Recommendation 7.1:** Management can improve the safety culture of workers by allowing safety goals to be established as a group. This means that managers, supervisors and workers must all have an opportunity to give inputs when safety goals are determined. Management should serve as facilitators to ensure that when safety goals are established, that they are specific, measurable, attainable, relevant and time-bound.

### 6.3.8 Secondary Objective 8

Table 6-8 presents Secondary Objective 8 off this study.

**Table 6-8: Secondary Objective 8**

| Secondary Objective 8 |
| --- |
| To examine the importance of control on safety culture. |

The literature findings with regards to control argued that a decentralised approach is more likely to promote employee involved in the control process (see Section 3.4.3.5). Furthermore, it was argued that to improve safety management through control, one should focus on involving workers when establishing the standards for effective safety performance (see Section 3.4.3.5.3). In addition, workers should also be allowed to exercise an element of self-control to work safely,

without being constantly monitored whether they are performing their jobs in a safe manner (Jang *et al.*, 2017:454). The implication, discussions and recommendations for the empirical findings on the effect of control on safety culture is further discussed in Section 6.3.8.1.

#### 6.3.8.1 Discussion, implications and recommendations pertaining to Secondary Objective 8

**Discussion and implications:** With regards to Secondary Objective 8, it was established that the control dimension of participative management has a statistically significant positive effect on the safety culture of respondents (see Section 5.5.1). The implication in this regard is that when workers are more involved and participate in the control processes of safety management, it is likely that it will have a positive impact on their safety culture. Moreover, it would appear that employees are likely to view their management as more committed towards safety when there is a shared feeling of responsibility towards safety. Employees must understand exactly how their performance is being measured, and management must put in a lot of effort to help employees achieve their safety goals. Management and employees must also complete performance reviews together.

According to the discussions and implications based on Secondary Objective 8, the following recommendation for the improvement of the safety culture of workers through involved control measures in the forestry industry is proposed:

**Recommendation 8.1:** Management can expand on the safety culture of workers by involving employees when establishing the standards against which safety performance is going to be measured. This will allow employees to understand how their safety performance is going to be measured. Furthermore, workers and managers must take up the responsibly together for the achievement of excellent safety performances and not blame each other for bad safety performances. To add to this, management must make sure that workers participate in the safety performance review process as well, so that both parties can understand how safety performance can be improved in the future. Lastly, management must also make sure that they continuously support workers and assist them to keep their safety performance on track.

### 6.3.9 Secondary Objective 9

Table 6-9 puts forward Secondary Objective 9 of this study.

**Table 6-9: Secondary Objective 9**

| Secondary objective 9 |
| --- |
| **To determine the influence that the dimensions of participative management has on safety culture.** |

The literature findings pertaining to the factors influencing safety culture were presented in Section 3.6.7.1. From the literature it was found that management commitment and actions towards safety is mostly reflected through their concerns for employees' welfare, which is reflected in their efforts towards the achievement of the organisational safety goals (Gao *et al.*, 2019:224). The support, participation, leadership, attitude, and the manner by which management control safety activities, were identified as important aspects to consider for improving the commitment form management towards safety (see Section 3.6.7.1.1).

With regards to the knowledge and compliance of workers towards safety, it was found that continuous training and education will enhance workers' knowledge and understanding through behavioural changes. It is therefore important for managers to provide employees with enough information and training to reduce accidents and improve their safety awareness (see Section 3.6.7.1.2). In Section 3.6.7.1.3 it was argued that the attitude of workers can be improved by employees' involvement in terms of communication, adequate managerial support, and allowing employees to have greater influence on how safety management systems and practises are established. Lastly it was found in Section 3.6.7.1.4 that a participative style towards safety management is most likely to improve the commitment and participation of workers towards safety. The implication, discussions, and recommendations for the empirical findings on the effect of the dimensions of participative management on safety culture is further discussed in Section 6.3.9.1.

### 6.3.9.1 Discussion, implications and recommendations pertaining to Secondary Objective 9

**Discussion and implications:** To address Secondary Objective 9, a standard multiple regression analysis was applied to determine which dimensions of participative management has the most significant impact on each of the individual dimensions of safety culture (see Section 5.5.2). It was established that the most significant contributors towards the commitment and actions from managers towards safety included the item "Good safety behaviour is rewarded" as well as the dimensions decision-making and control (see Section 5.5.2.2). This proposes that management who rewards employees for good safety behaviour, engage workers in safety-

related decision-making practises, and also include employees in safety control practises. Employees are then more likely to be committed through their actions towards safety.

The most significant factors in terms of the knowledge and compliance of workers towards safety included communication and goal setting (see Section 5.5.2.3). This would imply that the more involved employees are in the communication of safety-related matters and the process of establishing safety goals, the higher their compliance and knowledge towards safety will be.

The most significant contributors regarding the attitude of workers towards safety included the items “Safety goals are established as a group” and “I take responsibility for the safety goals that are established”, together with the dimension’s communication and goal setting (see Section 5.5.2.4). This would suggest that workers are most likely to have a positive attitude towards safety when safety goals are established as a group, that they take responsibility for the safety goals that are established, if workers are involved in the communication and goal setting process of safety-related matters.

The most significant contributors for the participation and commitment of workers towards safety included the items “Safety goals are established as a group” and “I take responsibility for the safety goals that are established”, together with the dimension’s leadership, communication and goal setting (see Section 5.5.2.5). This indicates that when workers establish safety goals as a group, take responsibility for their own actions towards safety, are involved in the communication and goals setting process of safety-related matters, and have participative leaders, they are most likely to have higher participation and better commitment towards safety.

Based on the discussions and implications in relation to Secondary Objective 9, the following recommendation to improve the safety culture of workers through participative management in the forestry industry is made:

**Recommendation 9.1**: Management can improve the safety culture of workers through participative safety management by focusing on the following:

- Involve and engage with employees in terms of the communication pertaining to safety related matters.
- Include workers in the establishment of control measures to measure safety performance.
- Reward workers when excellent safety performance is achieved.
- Involve workers in the establishment of safety goals, getting their opinion and input regarding what should be achieved in terms of these safety goals.

- Through participative leadership, by building mutual trust between workers and management through the support of workers when they raise any safety concerns, and allowing them to feel free to discuss any safety-related issues with management.
- Allow workers to establish safety goals as a group.
- Make workers understand the importance of a sufficient safety culture and safe work procedures, and allow them to take responsibility for their own safety in the workplace.
- Engage and involve workers in safety-related decisions.

With the conclusions, implications, and recommendations pertaining to the secondary objectives of this study established, the following section will focus on the contributions of the study.

## 6.4 CONTRIBUTIONS OF THE STUDY

This section provides the theoretical and practical contributions that were made by this study.

### 6.4.1 Theoretical contribution

To the best of the researcher's knowledge, this study was the first study to compare the level of involvement of workers in safety-related matters towards their safety culture in the forestry industry. Furthermore, this study expanded on the knowledge on participative management and, to the best of the researcher's knowledge, is the first study to apply Likert's theory of participative management in a safety management context. Pertaining to safety culture, this study further expanded on the knowledge regarding the commitment and management of workers towards safety, the knowledge and compliance of workers towards safety, the attitude of workers regarding safety as well as the participation of workers in establishing safety goals, specifically in the context of the forestry industry.

In addition, this study also expanded on the concept of management and the history of management, as well as the concept of safety management and its importance, especially within the context of the forestry industry. Based on the findings, noticeable concepts such as the involvement of workers in the leadership, motivation, decision-making, goal setting, communication, and control aspects of safety management were associated with a positive safety culture in the forestry industry, thus emphasising the need for a more participative approach towards the management of safety in the forestry industry.

This study further elaborated on the knowledge of the forestry industry of South Africa, specifically towards the overall impact of said industry, on how forestry is managed in South Africa, as well as the trends and challenges that are faced in this industry.

### 6.4.2 Practical contribution

Based on the information of the literature review, as well as examples from previous studies, a questionnaire was developed to determine the level of involvement of workers in safety management, as well as the safety culture of workers in the forestry industry of South Africa (see Appendix A). Subsequent to the empirical analysis and the findings that were presented in Chapter 5, the following practical contributions are listed below:

- The participative management questionnaire can be used to determine and improve the overall involvement of workers in safety management in the forestry industry.
- The safety culture questionnaire can be used to determine and improve the overall safety culture of workers in the forestry industry.
- By comparing the level of involvement of workers in safety management towards the safety culture of workers, management can improve the overall safety of their workers, possibly leading to fewer incidents and fatalities in the forestry industry.
- By applying the principles of participative safety management, the trust between workers and management can be improved, thus resulting in a healthier and happier working relationship between workers and their management.
- A big part of forestry management in South Africa is to maintain their FSC certification (see Section 2.4.7). By applying the principles of participative management and safety culture as presented in this study, management can make the process to achieve FSC certification much easier, specifically in terms of the compliance of workers towards FSC standards.

## 6.5 LIMITATIONS OF THE STUDY

As is evident in all research studies, no study can be without its limitations. Consequently, the discussions, implications, recommendations, results and contribution of this study should be taken into context in light with the following limitations:

- Not all respondents who participated in this study were fluent in English and had to be assisted by an interpreter; this may have had an impact on how workers understood the context of the questions.

- The reliability of the motivation dimension of participative management as a measuring instrument could not be established, and therefore the true effect of motivation as construct on the safety culture of respondents could not be determined.

- The impact of Covid 19 coupled with bad weather conditions during the period of data collection made it difficult for the researcher to obtain a sample of 300 respondents, and thus only 280 respondents were obtained.

- It is recognised that the constructs and elements used to develop the measurement instruments for participative management and safety culture were formulated from multiple literature sources, applicable to different industries, and that some could have been excluded.

## 6.6 SUGGESTIONS FOR FUTURE RESEARCH

The following recommendations are made for future research:

- This study did not take into context the knowledge and awareness of respondents towards safety. This might play an important role in terms of the management style that is applied to improve the safety culture of any given company. Consequently, future studies can also test the knowledge and awareness of workers towards safety in relation to their safety culture, and the type of safety management style adopted by management.

- The research done in this study is only applicable to the forestry industry, thus future studies can be done to compare the involvement of workers in safety management practises in relation to their safety culture in other industries as well.

- This study can be followed up with a qualitative research study to further expand on the empirical findings that were presented in Chapter 5.

- The motivation construct used to measure the involvement of workers in this study was deemed not reliable. As a result, future studies can focus on improving the items that were used to measure the motivation construct to deem the construct reliable.

- For the purpose of this study, the focus was on the viewpoint of workers in the forestry industry. It would be worthwhile to obtain the views of management as well to provide a comparison between the two.

## 6.7 CONCLUSION

Chapter 6 provides the conclusion towards the empirical and literature findings of this study. As a result, the chapter commenced with an overview of each of the chapters of the study. Thereafter the conclusion, discussion, implication and recommendation for each of the secondary objectives for this study were presented. To conclude the chapter, the theoretical and practical contribution of the study were deliberated followed by the limitations of the study and suggestions for future research.

The following research question was put forward in Chapter 1 (Section 1.2):

"*Does a participative management approach have an influence on the management of safety in the forestry industry of South Africa*?"

To answer this question, the following conclusion can be drawn from this study:

Overall, this study made a positive contribution in the field of safety management by providing valuable insights towards the level of involvement of workers in terms of safety management and the safety culture of workers in the forestry industry. The literature towards participative management and safety culture was further extended by establishing that the involvement of workers in the forestry industry in the safety management practises of the organisation has a positive effect on the creation of their safety culture.

This study concludes with the following observation from the literature:

"*Employee involvement is key for the construction and effective implementation of a safety culture, with the main function being the maintenance of the safety level and improvement of prevailing safety standards*" (Zhang *et al.*, 2020:87).

Keeping this in mind, management in the forestry industry of South Africa should not underestimate the importance and power of employee involvement, not only on creating an effective safety culture, but also maintaining and continuously improving their safety standards.

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# APPENDIX A
# QUESTIONNAIRE

This survey forms part of a Master's study in Mangement at the North-West University (Potchefstroom Campus), with a specific focus on participative management and safety culture.

**Objective**

The objective of this study will be to determine the effect that participative management has on safety culture in the forestry industry of South Africa.

**Confidentiality and anonymity:**

Participating in this survey is completely voluntary, and you may withdraw from the process at any time. All information provided by you will be completely anonymous and will be treated with the utmost standard of privacy and confidentiality. The researcher will also take care to ensure that the data collected from respondents is stored in a secure area. The data collected will be destroyed within a period of 3 years No information will be disclosed to any other parties, and no information will be reported on an individual basis.

**Results:**

The research results will only be used empirically for the written dissertation of the study. All participants are welcome to request results upon completion of this study.

It will take approximately 15 minutes to complete this survey. When completing a question, please answer from your own point of view, by marking or completing where required.

Thank you for your willingness to participate in this survey, should you have any questions please contact me on antonie.greeff@nwu.ac.za

Antonie Greeff

Supervisor: Prof. LJ Van Staden

## Section A (Participative management)

Indicate the extent to which you agree or disagree with each of the following statements regarding how involved you feel in the management of safety in your company 1 = **"Strongly disagree"** and 5 = **"Strongly agree"**.

### Leadership

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 1. Management trusts me to act in a safe manner. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 2. I have complete trust in management regarding safety. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 3. Management supports me when I raise any safety concerns. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 4. I do not feel free to discuss things related to safety to my manager/supervisor. | ◯ | ◯ | ◯ | ◯ | ◯ |

### Motivation

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 5. Good safety behaviour is rewarded. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 6. Safety goals are established as a group. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 7. I have a negative attitude towards safety goals. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 8. I take responsibility for the safety goals that are established. | ◯ | ◯ | ◯ | ◯ | ◯ |

## Communication

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 9. I communicate with my fellow employees on how to achieve safety objectives. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 10. I can openly communicate any issues regarding safety to all levels of management. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 11. My managers are willing to share any information with regards to safety that I request. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 12. I am willing to share any information requested from my managers regarding safety. | ◯ | ◯ | ◯ | ◯ | ◯ |

## Decision-making

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 13. Most of the decisions involving safety are made by management. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 14. I am consulted when decisions need to be made regarding safety. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 15. I inform my manager/supervisor regarding any matters regarding safety. | ◯ | ◯ | ◯ | ◯ | ◯ |
| 16. Enough information is available when I need to make decisions regarding safety. | ◯ | ◯ | ◯ | ◯ | ◯ |

## Goal setting

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 17. Safety goals are established by means of group participation. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 18. Safety goals are forced from management. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 19. Safety goals are accepted by me without any disagreement. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 20. The goals to achieve good safety performance in my workplace is clear to me. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |

## Control

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| 21. There is a shared feeling of responsibility between me and my managers regarding safety performance. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 22. The information available to measure my performance is complete and accurate. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 23. There is a considerable amount of effort from the company to achieve safety goals. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |
| 24. Review of my safety performance is done by all levels of management and myself. | ⬭ | ⬭ | ⬭ | ⬭ | ⬭ |

## Section B (Safety Culture)

Indicate the extent to which you agree or disagree with each of the following statements regarding your company's safety culture, where 1= **"Strongly disagree"** and 5 **= "Strongly agree".**

### Management commitment and actions towards safety

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| **25. Safety is given a high priority by management.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **26. My company gives comprehensive training to the employees in the workplace regarding health and safety issues.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **27. Management promotes employee involvement in safety related matters.** | ◯ | ◯ | ◯ | ◯ | ◯ |

### Workers' knowledge and compliance to safety

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| **28. I know how to perform my job in a safe manner.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **29. I use all necessary safety equipment to perform my job.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **30. I know all the dangers associated with my job.** | ◯ | ◯ | ◯ | ◯ | ◯ |

## Workers' attitude towards safety

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| **31. I feel that it is important to always maintain a safe working environment.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **32. I feel that it is important to encourage others to perform their job in a safe manner.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **33. I feel that it is important to promote safety in the workplace.** | ◯ | ◯ | ◯ | ◯ | ◯ |

## Workers' participation and commitment towards safety

*Mark only one oval per row.*

| | 1 Strongly disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly agree |
|---|---|---|---|---|---|
| **34. I encourage my co-workers to work safely.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **35. I voluntarily carry out tasks or activities that help to improve workplace safety.** | ◯ | ◯ | ◯ | ◯ | ◯ |
| **36. I follow correct safety rules and procedures while carrying out my job.** | ◯ | ◯ | ◯ | ◯ | ◯ |

End thank you!

6/6

# APPENDIX B

# ETHICAL APPROVAL

NWU®
NORTH-WEST UNIVERSITY
NOORDWES-UNIVERSITEIT
YUNIBESITI YA BOKONE-BOPHIRIMA

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

**Senate Committee for Research Ethics**
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

1 Maart 2022

## ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on Round Robin, the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-RERC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

**Study title: A participative management approach for the improvement of a safety culture in forestry**
**Study Leader/Supervisor (Principal Investigator)/Researcher: Prof LJ van Staden – MCom in Business Management**
**Student: Greeff, A (21664315)**

**Ethics number**: N W U - 0 1 2 2 - 1 9 - A 4
(Institution – Study Number – Year – Status)
**(Amendment)**

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Application Type:**
**Commencement date: 01/03/2022** **Risk:** Low
**Expiry date: 01/03/2023**
**Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.**

**Special in process conditions of the research for approval (if applicable):**

- 

**General conditions:**

*While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:*

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
- *In the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*
  - *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*

- *withdraw or postpone approval if:*
  - *any unethical principles or practices of the study are revealed or suspected;*
  - *it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;*
  - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
  - *new institutional rules, national legislation or international conventions deem it necessary.*

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely

Mark Rathbone

Digitally signed by Mark Rathbone
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA
Date: 2022.03.03 11:03:25 +02'00'

**Prof M. Rathbone**
**Chairperson NWU Economic and Management Sciences Research Ethics Committee**

# APPENDIX C
# STATISTICAL ANALYSIS CONFIRMATION

Private Bag X6001, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Web: http://www.nwu.ac.za

**Statistical Consultation Services**
Tel: +27 18 285 2016
Fax: +27 0 87 231 5294
Email: suria.ellis@nwu.ac.za

18 May 2022

**Re: Dissertation, Mr A Greeff, student number 21664315**

We hereby confirm that the Statistical Consultation Services of the North-West University analysed the data of the above-mentioned student and assisted with the interpretation of the results. However, any opinion, findings or recommendations contained in this document are those of the author, and the Statistical Consultation Services of the NWU (Potchefstroom Campus) do not accept responsibility for the statistical correctness of the data reported.

Kind regards

**Prof SM Ellis (Pr. Sci. Nat.)**
**Associate Professor: Statistical Consultation Services**

1

# APPENDIX D
# LANGUAGE EDITING CONFIRMATION

This certificate declares that the dissertation with the title,

**A participative management approach for the improvement of a safety culture in the forestry industry**

by **A.S. Greeff**, was edited by:


Ann-Lize Grewar

BA in Language and Literature Studies

BA Hons in Translation Studies

SATI-membership number: 1002647

SATI Accreditation: APSInterp Afr-Eng

Chairperson of SATI Freelancers' Chapter

Language Director at Language Matters PTY(Ltd)

annlizeboshoff@gmail.com / 072 758 5797

Signed on 12/05/2022


Ann-Lize Grewar
Language Practitioner
B.A. Language and Literature Studies
B.A. Hons. Translation Studies

Contact us:
info@languagematters.co.za
www.languagematters.co.za

Ann-Lize Grewar
Taalpraktisyn
B.A. Taal- en Literatuurstudies
B.A. Hons. Vertaalkunde

Kontak ons:
info@languagematters.co.za
www.languagematters.co.za


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