

**AN ORGANISATION DEVELOPMENT APPROACH TO THE IMPROVEMENT OF  
ROAD TRAFFIC SAFETY IN ZIMBABWE**

by

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## **Abstract**

In the study, I explored how to achieve sustained road-traffic accidents reduction in Zimbabwe. Road traffic accidents are indiscriminant and each year hundreds of people lose their lives in road traffic accidents in Zimbabwe. A mixed methods research approach was used to conduct the study. The study was therefore done in two phases. Phase 1 was a quantitative survey using questionnaires, and phase 2 was a qualitative case study using semi-structured interviews. A sample of 500 road-users drawn at random from internet databases formed the respondents for the quantitative phase of the inquiry. A further 20 snowball selected participants, formed the qualitative inquiry group. The key findings from the study were that effective intervention planning, timely measurement, adequate resourcing, and inclusive organization development interventions were the key drivers of successful road safety programmes. Additionally, critical interventions for sustainable road traffic safety in Zimbabwe included; community consultation and involvement in road traffic safety strategy formulation and implementation, mainstreaming road traffic safety education in the schools' curricula, behavioral changes, financial, and engineering interventions.

**Key Terms:** Road traffic safety; Interventions; Accident Prevention; Organisation development; Culture; Injury; Values, Change management; safety performance; sustainability

# TABLE OF CONTENTS

Abstract .....	ii
<b>TABLE OF FIGURES AND TABLES.....</b>	<b>7</b>
<b>CHAPTER 1 .....</b>	<b>9</b>
1.INTRODUCTION.....	9
1.1 THE RESEARCH PROBLEM.....	10
1.2 THE PURPOSE OF THE STUDY .....	10
1.3 THE OBJECTIVES OF THE STUDY .....	11
1.4 THE RESEARCH QUESTIONS .....	11
1.5 IMPORTANCE AND BENEFITS OF THE STUDY .....	11
2.DELIMITATIONS, LIMITATIONS AND ASSUMPTIONS.....	12
2.1 DELIMITATIONS.....	12
2.2 LIMITATIONS.....	13
2.3 ASSUMPTIONS.....	14
2.4 DEFINITIONS OF KEY TERMS.....	15
2.4.1 Organisation development.....	15
2.4.2 Road traffic safety .....	16
2.4.3 Traffic safety culture.....	16
2.4.4 Road traffic safety interventions.....	16
2.4.5 Evaluation .....	17
<b>3. PRELIMINARY LITERATURE REVIEW.....</b>	<b>18</b>
3.2 ORGANISATION DEVELOPMENT THEORY.....	19
3.2.1 Action research model .....	19
3.3 EVALUATION .....	20

3.4	OD INTERVENTION PRIORITISATION FRAMEWORK.....	20
<b>4.</b>	<b>THE RESEARCH METHODOLOGY .....</b>	<b>22</b>
4.1	RESEARCH DESIGN .....	22
4.2	DATA SOURCES.....	23
4.2.1	Data collection techniques.....	24
4.2.2	Quantitative techniques .....	24
4.2.3	Qualitative techniques.....	25
4.2.4	Secondary data.....	25
4.3	ISSUES OF RELIABILITY AND VALIDITY .....	26
4.3.1	Content validity .....	26
4.3.2	Internal validity.....	26
4.3.3	External validity.....	27
4.3.4	Face validity.....	27
4.3.5	Test of reliability.....	28
4.3.6	Rigour .....	29
4.3.7	Authenticity .....	30
4.3.8	Trustworthiness.....	30
4.3.9	Triangulation of data from several sources .....	31
4.4	SAMPLING TECHNIQUES .....	31
4.5	DATA ANALYSIS AND INTERPRETATION .....	32
4.5.1	Measures of central tendency.....	33
4.5.2	Measures of dispersion.....	33
4.5.3	Measures of asymmetry.....	33
4.5.4	Inferential statistics .....	34
4.6	ETHICAL CONSIDERATIONS.....	35

4.6.1 Confidentiality .....	35
4.6.2 Informed consent .....	36
4.7 PRETEST OR PILOT STUDY .....	36
5.MY PERSONAL STUDY WORK PLAN .....	37
6.ORGANISATION OF THE DISSERTATION .....	37
7.CONCLUSION .....	37
<b>CHAPTER 2 .....</b>	<b>39</b>
<b>2.0 LITERATURE REVIEW/THEORETICAL FRAMEWORK .....</b>	<b>39</b>
2.1 INTRODUCTION.....	39
2.2 DEFINITIONS OF KEY TERMS.....	42
2.2.1 Organisation development theory .....	42
2.2.2 Road traffic safety .....	43
2.2.3 Road traffic accident injuries .....	43
2.2.4 Traffic safety culture.....	44
2.2.5 Road traffic safety interventions.....	44
2.2.6 Evaluation.....	44
2.2.7 Motor insurance claims loss ratio.....	45
2.3 ORGANISATION DEVELOPMENT THEORY .....	45
2.3.1 Organisation Development Models of Change .....	46
2.3.2 Road traffic safety approaches and interventions prioritisation framework ...	48
2.3.3 Road Traffic Safety Interventions.....	49
2.3 ROAD TRAFFIC SAFETY MEASUREMENT .....	52
2.4 APPLICATION OF SYSTEMS THEORY TO ROAD TRAFFIC SAFETY .....	52
2.4.1 Grey systems theory.....	54
2.4.2 The Hexagon Spindle model.....	56

2.4.3 Person centered transport design and management system.....	56
2.4.4 International Standards Organisation (ISO): 39001 .....	57
2.5 RECOMMENDATIONS ON ROAD TRAFFIC MANAGEMENT SYSTEMS .....	59
2.6 ROAD TRAFFIC SAFETY EVALUATION .....	62
2.6.1 Population.....	63
2.6.2 Vehicle fleet .....	63
2.6.3 Road length .....	63
2.6.4 Fuel consumption.....	63
2.6.5 Driver population.....	64
2.6.6 Vehicle kilometers.....	64
2.6.7 Emergency services and trauma management capability.....	64
2.7 CONTEXT OF THE RESEARCH .....	65
2.8 CONCLUSION .....	69
<b>CHAPTER 3 .....</b>	<b>71</b>
<b>3.0. RESEARCH DESIGN AND METHODOLOGY .....</b>	<b>71</b>
3.1 CONCEPTUALISATION, DEFINITIONS AND KEY VARIABLES .....	71
3.1.1 Road traffic safety .....	71
3.1.2 Road Traffic Safety Culture.....	71
3.1.3 Road traffic accident injuries .....	71
3.1.4 Road Traffic Safety Interventions.....	72
3.1.5 Traffic safety evaluation .....	72
3.2 CONDUCTING THE LITERATURE REVIEW .....	72
3.3 THE PLAN DO CHECK ACT CYCLE.....	78
3.4 THE ACTION RESEARCH FRAMEWORK TO EFFECTING CHANGE.....	79

3.5	RESEARCH DESIGN, SAMPLE DESIGN AND SAMPLING METHODS .....	82
3.5.1	Research Design: An Overview .....	83
3.5.2	Research strategy justification and visual model .....	85
3.5.3	Phase1: Quantitative enquiry .....	88
3.5.4	Phase 2: Qualitative enquiry .....	96
3.5.5	Data Analysis and Interpretation .....	100
3.5.6	Role of the Researcher .....	106
3.5.7	Issues of Rigour, Authenticity and Trustworthiness .....	107
3.6	VOLUNTARY CONSENT, ANONYMITY AND ETHICS IN RESEARCH.....	110
3.6.1	Voluntary Consent .....	110
3.6.2	Protection of Privacy .....	110
3.6.3	Research Ethics.....	110
3.7	SHORTCOMINGS AND SOURCES OF ERROR .....	111
	<b>CHAPTER 4 .....</b>	<b>113</b>
<b>4</b>	<b>RESULTS PRESENTATION AND DISCUSSIONS .....</b>	<b>113</b>
4.1	INTRODUCTION.....	113
4.2	SAMPLE PROFILES.....	114
4.2	PRESENTATION OF RESULTS.....	116
4.2.1	Demographics.....	117
4.2.2	Phase 1: Quantitative research.....	120
4.2.3	Phase 2: Qualitative Enquiry.....	139
4.4	CONCLUDING INTERPRETATIONS .....	166
	<b>CHAPTER 5 .....</b>	<b>170</b>
<b>5.0</b>	<b>CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>170</b>
5.1	SUMMARY AND DISCUSSION OF SALIENT POINTS.....	170

5.2	INTERPRETATION OF RESULTS IN TERMS OF LITERATURE .....	174
5.3	DISCUSSION OF GAPS, ANOMALIES AND/OR DEVIATIONS .....	177
5.4	SIGNIFICANCE OF THE STUDY AND FUTURE RESEARCH.....	178
5.5	POLICY AND OTHER IMPLICATIONS .....	181
	<b>LIST OF REFERENCES .....</b>	<b>186</b>
	Annexures .....	196



## TABLE OF FIGURES AND TABLES

Figure 1.1: Road traffic safety conceptual framework design.....	18
Figure 1.2: The OD cube: A classification of interventions.....	21
Figure 2.1: The road traffic safety literature map .....	36
Figure 2.2: Diagrammatic view of the unfreezing, change and freezing process.....	41
Figure 2.3: The expanded 7-stage change process.....	42
Figure 2.4: The OD cube.....	44
Figure 2.5: Road traffic safety strategy framework.....	53
Figure 3.1: Literature review conceptual framework.....	72
Figure 3.2: Search flow for literature on road traffic safety.....	73
Figure 3.3: Cause, Action, Actor mapping framework (On compilation).....	87
Figure 3.4: Colour coding scheme for thematic data analysis.....	98
Figure 4.1: Results presentation Question 10.....	113
Figure 4.2: Results presentation Question 11.....	114
Figure 4.3: Results presentation Question12 .....	114
Figure 4.4: Results Presentation: Question 13 .....	1335
Figure 4.5: Population distribution map by province in Zimbabwe.....	1176
Figure 4.6: Cross-tabulation of women's responses versus men's responses .....	12623
Figure 4.7: Results Presentation: Question 5.....	118
Figure 4.8: Results Presentation: Question 7.....	118
Figure 4.9: Results Presentation: Question 8.....	119
Figure 4.10: Conceptual presentation of the results of the qualitative inquiry.....	163
Figure 5.1: Intervention Prioritisation Framework based on research findings.....	171
Figure 5.2: Cause, Action, Actor Mapping Framework .....	18077

Table 1.1: The research proposed timeline.....	32
Table 4.1: Questionnaire response analysis.....	110
Table 4.2: Cronbach's Alpha analysis .....	117
Table 4.3: Inter-item correlation analysis.....	117
Table 4.4: View alpha if item delted.....	118
Table 4.5: One-sample Kolmogorov-Smirnov test .....	120
Table 4.6: Cross-tabulation of gender and satisfaction level.....	122
Table 4.7: Research results analysis: Question 1.....	123
Table 4.8: Other high impact interventions observed.....	125
Table 4.9: Results analysis Question 2.....	125
Table 4.10: Research results analysis Question 9.....	129
Table 4.11: Correlation analysis of road dualisation and road road traffic safety.....	131
Table 4.12: Correlation analysis of road markings and road traffic accidents.....	132
Table 4.13: Correlation analysis of road maintenance and road traffic accidents.....	133
Table 4.14: Correlation analysis of cellphone use when diriving and road traffic accidents.....	134

## CHAPTER 1

### 1. INTRODUCTION

Road traffic accident fatalities in Zimbabwe increased from 35 deaths to 45 deaths per thousand accidents, between 2002 and 2010 (Test in Road Safety Campaign, 2010). According to the United Nations (2010), every year nearly 1.2 million people throughout the world were killed on the roads and over half of them were young adults aged between 15 to 44 years. The World Road Association-PIARC Technical Committee (2006) posited that in Zimbabwe, most casualties were the elite in society, the professionals, and senior civil servants because they were the most mobile and have access to vehicles. It is evident from the literature that road traffic accidents have a negative effect on the national talent pool, which is detrimental to the sustained development of the country (United Nations, 2010).

In Zimbabwe, the Traffic Safety Council of Zimbabwe (TSCZ) manages road-traffic safety interventions. The TSCZ is a statutory body established by the Traffic Safety Council of Zimbabwe Act of 2002 (Traffic Safety Council of Zimbabwe, 2012). The World Health Organisation (2010) recommended that nations should use evidence-based policies to tame the road-traffic accident scourge. The WHO proposed road-traffic safety improvements that anchor on experiential learning and agreed with Senge (2006) who proposed the concept of *learning organisation*. Senge, Kleiner, Roberts, Ross and Smith (1994) had earlier observed that there was an expansion of scope from corporation-based organisation development to an open systems view, which included whole communities or the nation at large. Similarly, Cummings and Worley (2009) proposed that government departments adopt organisation

development interventions because governments faced challenges similar to those of the business sector and must adopt organisation development techniques to improve service delivery and customer satisfaction. The expanded scope of organisation development presented by Senge, *et al.*, (1994), ties in with the focus of this study and is the definition adopted throughout the study. It is with this background in mind that the study seeks to explore ways of achieving sustained road traffic accident reduction in Zimbabwe.

## **1.1 THE RESEARCH PROBLEM**

Road traffic accident fatalities in Zimbabwe continue to increase despite the increasing investment in road traffic safety campaigns by the Traffic Safety Council of Zimbabwe (Mukarati, 2011; Test in Road Safety Campaign, 2010; Traffic Safety Council of Zimbabwe, 2012). Most of the tried and tested models of road traffic safety were based on American experience or that of the Western world whose social, economic, and environmental conditions bore little semblance to the underlying conditions in Zimbabwe (Cummings & Worley, 2009). Where literature was available about studies on road traffic safety in Africa, it was scarce and of questionable rigour and authenticity (Chen, 2010). The challenge therefore was how to achieve sustained road traffic accident reduction in Zimbabwe using experiential evidence based on valid research, and it is this gap, which this study seeks to bridge.

## **1.2 THE PURPOSE OF THE STUDY**

The purpose of the study is to evaluate the current road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe. The study also proposes new or revised interventions, and intervention models based on valid and reliable research that can achieve sustained road traffic accidents reduction in Zimbabwe. The study can therefore potentially reduce death and bodily injuries, reduce property damages, and aid in enhancing business

viability through reduced accident induced costs, whilst contributing to the body of knowledge on road traffic safety.

### **1.3 THE OBJECTIVES OF THE STUDY**

The objectives of the study were to understand and evaluate the current road-traffic safety interventions and intervention approaches employed by the Traffic Safety Council of Zimbabwe between 2009 and 2012. The study also proposes recommendations on how to achieve sustained road traffic accidents reduction in Zimbabwe based on valid research. The study bridges a gap in knowledge on road traffic safety in Zimbabwe, as currently there is limited literature about Zimbabwe's road-traffic safety initiatives.

### **1.4 THE RESEARCH QUESTIONS**

In order to fulfill the objectives of the study, the following research questions must be answered:

- i. Which road traffic safety interventions did the Traffic Safety Council of Zimbabwe implement from 2009 to 2012?
- ii. How were the road traffic safety programmes implemented?
- iii. How effective were the interventions in bringing about sustained road traffic accident reduction in Zimbabwe?
- iv. What recommendations can be offered to achieve sustained road traffic accidents reduction in Zimbabwe?

The benefits and importance of carrying out the study provides further motivation and support for the study.

### **1.5 IMPORTANCE AND BENEFITS OF THE STUDY**

In the study, the researcher explores gaps in road traffic safety problem diagnostics, intervention design, and implementation in Zimbabwe. The study further provides

recommended improvements, which potentially improve the efficiency and effectiveness of the road-traffic safety interventions. The Traffic Safety Council of Zimbabwe did not conduct formal research before implementing the current road-traffic safety intervention programmes (Chronicle Reporters, 2012; Mukarati, 2011; Test in Road Traffic Safety Campaign, 2010). In addition to the advancement of the literature on organisation development and road traffic safety, the study can potentially reduce death and bodily injuries, and reduce property damages by proposing effective road safety intervention planning and implementation based on valid research findings. Additionally, road-traffic accident interventions can reduce the costs associated with road traffic accidents and thereby increase business viability, profitability, and sustainability (Diedericks, 2014). The study therefore envisions aiding in fostering the economic development of Zimbabwe by reducing the road traffic accident induced costs on business and society in general. The research scope is limited because of considerations such as limited time and limited resources.

## **2. DELIMITATIONS, LIMITATIONS AND ASSUMPTIONS**

The following sections discuss the scope, limitations, and the assumptions underpinning the research.

### **2.1 DELIMITATIONS**

In the study, the researcher followed a mixed-methods cross sectional research design, investigating the road-traffic safety programmes carried out by the Traffic Safety Council of Zimbabwe from 2009 to 2012. The study does not compare the Traffic Safety Council of Zimbabwe interventions against those of any other institution involved with similar work in Zimbabwe or anywhere else in the world. Management of the conceivable limitations of the study purposefully sought to reduce the impact of the limitations on the study.

## 2.2 LIMITATIONS

The researcher managed the following limitations:

- 1) The use of e-mail databases for sample selection for the questionnaire administration during the quantitative phase of the inquiry (Phase 1) led to the exclusion of the Zimbabwean population, which did not have access to internet from the research (Somekh & Lewin, 2011).
- 2) Additionally, the exclusion of the young aged below 18 years, and the old aged over 65 years resulted in the exclusion of 63 sampled respondents from the quantitative phase of the study. However, the diversity of the people on internet and the stratified random sampling technique used in selecting the research subjects reduced the adverse impact of the exclusion limitation. Levin and Rubin (2008: 302) argued that stratified sampling guarantees that every element in the population has an equal chance of participating in the research and when properly designed, “they more accurately reflect characteristics of the population from which they are chosen than do other kinds of samples”.
- 3) Pilot testing of the questionnaire and having an experienced researcher to preview and comment on the research instruments design was used to mitigate any personal biases that could arise during phase1 or the quantitative stage of the inquiry (Taylor, Sinha & Ghoshal, 2011).
- 4) Furthermore, there is the problem of non-response by the survey population during phase 1 of the inquiry (Taylor, *et al.*, 2011). The researcher introduced the study politely, and used clear and precise questionnaire instructions, clearly articulating the potential benefits of the research to the participants and the country at large and used follow-up e-mails to remind those who did not respond in order to increase the response rate (Somekh & Lewin, 2011).

5) Finally, during the qualitative phase of the study (Phase 2) the researcher personally conducted the interviews, which potentially imports personal biases and prejudices into the study. The researcher took a cue from Morrow (2005) and Creswell (2013) who proposed the following approaches to reduce or eliminate subjectivity in qualitative research: (a) Bracketing or monitoring of self and becoming aware of one's implicit assumptions and predispositions and setting them aside to avoid having them unduly influence the research, (b) making the researchers' implicit assumptions and biases overt to themselves and others, (c) reflexivity or self-awareness by keeping a self-reflective journal of the experiences, reactions, and emerging awareness of any assumptions or biases that arise during the course of fieldwork, (d) representation by asking questions whose reality is represented in the research, seeking clarification and delving deeper into the meanings given by participants, and approaching the study from a naïve inquirer perspective, (e) greater grounding in the literature by expanding the researcher's understanding of multiple ways of viewing the phenomenon, and (f) participant checks to learn from the respondents how well the researcher's interpretations reflect the participant's meanings through follow up interviews. According to Morrow (2005), the strategies for managing subjectivity aim to achieve fairness in research by representing participant viewpoints equitably and avoiding lopsided interpretations that represent the biases of the researcher or only a few participants.

The next section discusses the research assumptions focusing on the feasibility of the study.

### **2.3 ASSUMPTIONS**



The following assumptions underpin the study: (a) The participants and respondents have the answers and knowledge to share, (b) raising US\$2 000 for the research budget, (c) obtaining access to records and data from the identified sources, (d) obtaining the co-operation of respondents, and (e) anybody can be a road user whether as a driver, passenger, or pedestrian. Key terms and definitions anchor this study. It was important to articulate the key definitions and terms influencing the study in order to put the discussions into context.

## 2.4 DEFINITIONS OF KEY TERMS

The following terms are central to the topic under study and are discussed in greater depth in subsequent chapters.

### 2.4.1 Organisation development

Beckhard (1969:9) defined *organisation development* as; “An effort, (1) planned, (2) organisation wide, and (3) managed from the top, to (4) increase organisation effectiveness and health through (5) planned interventions in the organisation’s processes, using behavioral-science knowledge”. A closely related definition given by French and Bell (1990:17) stated that;

Organisation development is a top management supported long range effort to improve an organisation’s problem solving and renewal processes, particularly through a more effective and collaborative diagnosis and management of organisation culture with special emphasis on formal work team(s), temporary team(s), and intergroup culture with the assistance of a consultant-facilitator and the use of the theory and technology of applied behavioural science including action-research.

Senge (2006) presented an expanded view of organisation development in the term *learning organisation*. Learning organisations were firms, which sought new frontiers of knowledge and emphasised the need for collective learning (Senge, 2006). It is obvious from the

definition by Senge that there is an expansion of scope from corporation-based organisation development to an open systems view, which includes whole communities or the nation at large (Senge, *et al.*, 1994). Similarly, Cummings and Worley (2009) argued in favour of government departments adopting organisation development interventions in order to improve efficiency and service delivery. From the earliest definitions by Beckhard (1969) to French and Bell (1990), and Senge (2006), common themes emerge as organisation-wide collaboration, and collective learning to improve organisational effectiveness. This study follows the open systems definition of organisation development provided by Senge (2006). Road traffic safety is a central theme in this study and is the next definition discussed in the next section.

#### 2.4.2 Road traffic safety

Road traffic safety refers to all the efforts aimed at reducing the risk of a person using the road network being killed or seriously injured (SafetyNet, 2009; WHO, 2010). Underpinning road traffic safety is the concept of a traffic safety culture.

#### 2.4.3 Traffic safety culture

Road traffic safety culture are the beliefs, norms, habits people have, the behaviours they think are normal, and how they react to any changes to these behavioral norms (SafetyNet, 2009). The desired road safety culture is shaped through road traffic safety interventions.

#### 2.4.4 Road traffic safety interventions

Road traffic safety interventions comprise strategies and intervention action plans to address safety targets (SafetNet, 2009; Chen, 2010, WHO, 2010). In order to assess the

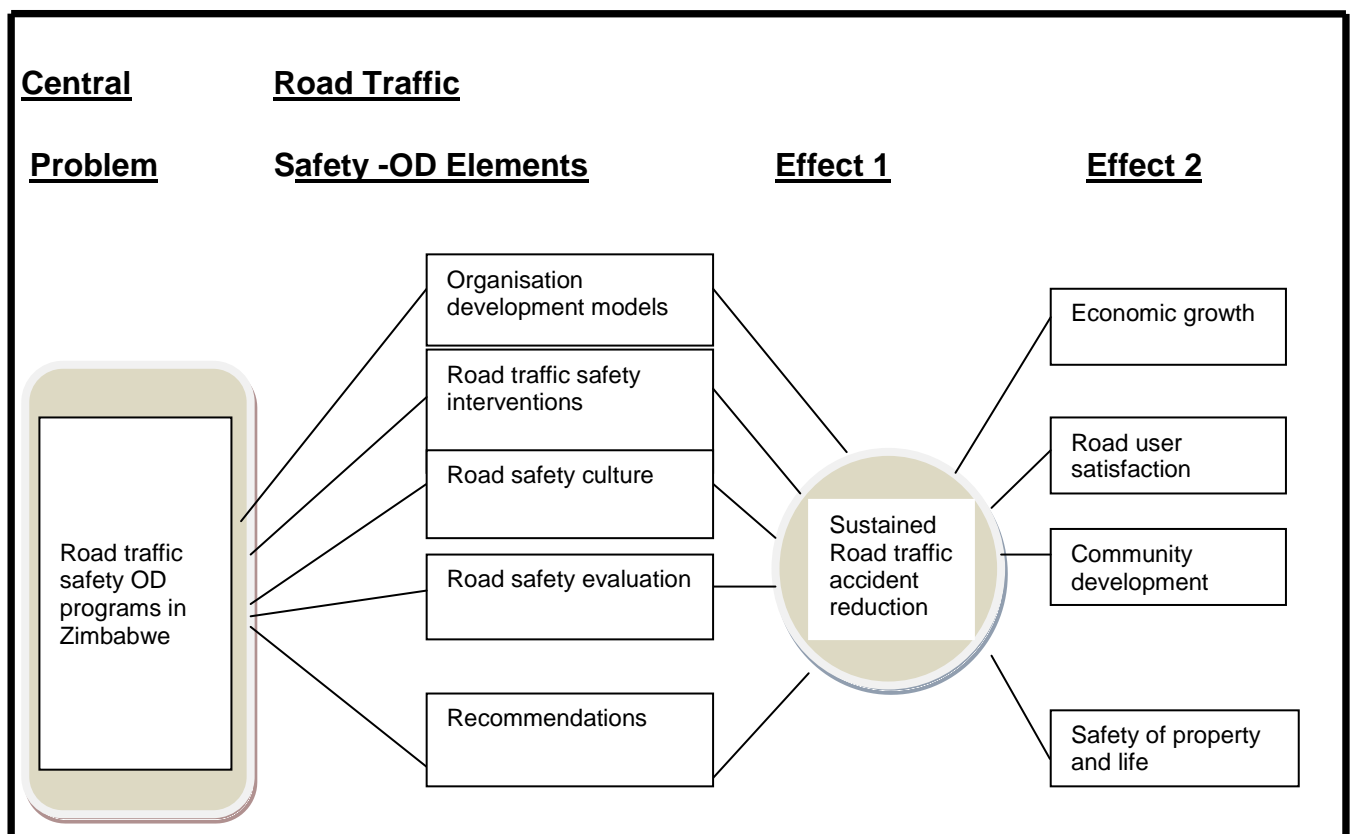
effectiveness of road traffic safety interventions, it is necessary to measure the effectiveness of the interventions.

#### 2.4.5 Evaluation

Evaluation is a systematic collection of evidence to determine if desired changes were taking place (Hale, 2007). Evaluation is therefore, a critical step in deciding whether to proceed with an intervention or to stop. If desired results are not being achieved continued interventions without modifications to the pre-existing conditions or methods of implementation could be a waste of resources. This is an important observation in the current study given that in Zimbabwe road traffic accidents continue to increase despite road traffic safety interventions being implemented (Test in Road Traffic Safety, 2010). It was important to conduct a critical review of the literature in order to reveal what is already known about road traffic safety in Zimbabwe, the gaps in current knowledge and to guide the researcher in carrying out a study of this nature.

### 3. PRELIMINARY LITERATURE REVIEW

Leedy and Ormrod (2005) posited that conducting literature reviews, was an acknowledgement that there were others, who have conducted similar studies before and their work could guide the current studies by informing methodology, discussion of outcomes or by exposing gaps in current knowledge. The preliminary literature review stemmed from a conceptual map that linked the central problem, the action taken and the outcomes of the action taken (See figure 1.1 below).



**Figure 1.1. Road Traffic Safety Conceptual framework design (Own compilation)**

According to Creswell, *et al.*, (2012), a conceptual framework is an explanation for events, which links the key concepts or principles. A critical review of the literature exploring relevant and contemporary sources on the subject topics depicted in the conceptual map served as background knowledge to the study and also helped to reveal the gap in terms of what was

written on the topic of study and what has not been written and the possible shortcomings in the literature. Saunders, Philip and Thornhill (2009), further argued that when carrying out the literature review, the key consideration is to assess how the literature contributes to the current research question. Organisation development theory can explain the transformation required in order to achieve sustained road traffic safety in Zimbabwe and is explored in the following section (Cummings & Worley, 2009).

### **3.2 ORGANISATION DEVELOPMENT THEORY**

The Traffic Safety Council of Zimbabwe launched various interventions in an attempt to reduce the carnage on the Zimbabwean roads but accidents continued to increase despite these efforts (Chen, 2010; Test in Road Traffic Safety Campaign, 2010; Traffic Safety Council of Zimbabwe, 2014; Mukarati, 2011; Chronicle Reporters, 2012). According to Cummings and Worley (2009) organisation development techniques go to the root cause of the problem and seek to find lasting solutions to problems by the building capacity of the people affected by the problem and empower them to solve their own problems. A need therefore exists to link research findings to the intervention programs using organisation development techniques in order to narrow the gap between action and results and in order to build sustainability by enhancing system-wide capacity (Senge, *et al.*, 2010).

#### **3.2.1 Action research framework to effecting change**

French, Bell and Zawacki (2005:224) described the action research model as, “a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action”. It is apparent from the definition that in order for research findings to drive action, a need exists to develop an efficient information management system that ensures that accurate information reaches the right people on time to enable them to take

timeous action based on valid research findings. The action research model was the most appropriate to guide the study because of its reliance on action to be preceded by research and evaluation in a helical fashion, with each round of actions being followed by research and evaluation.

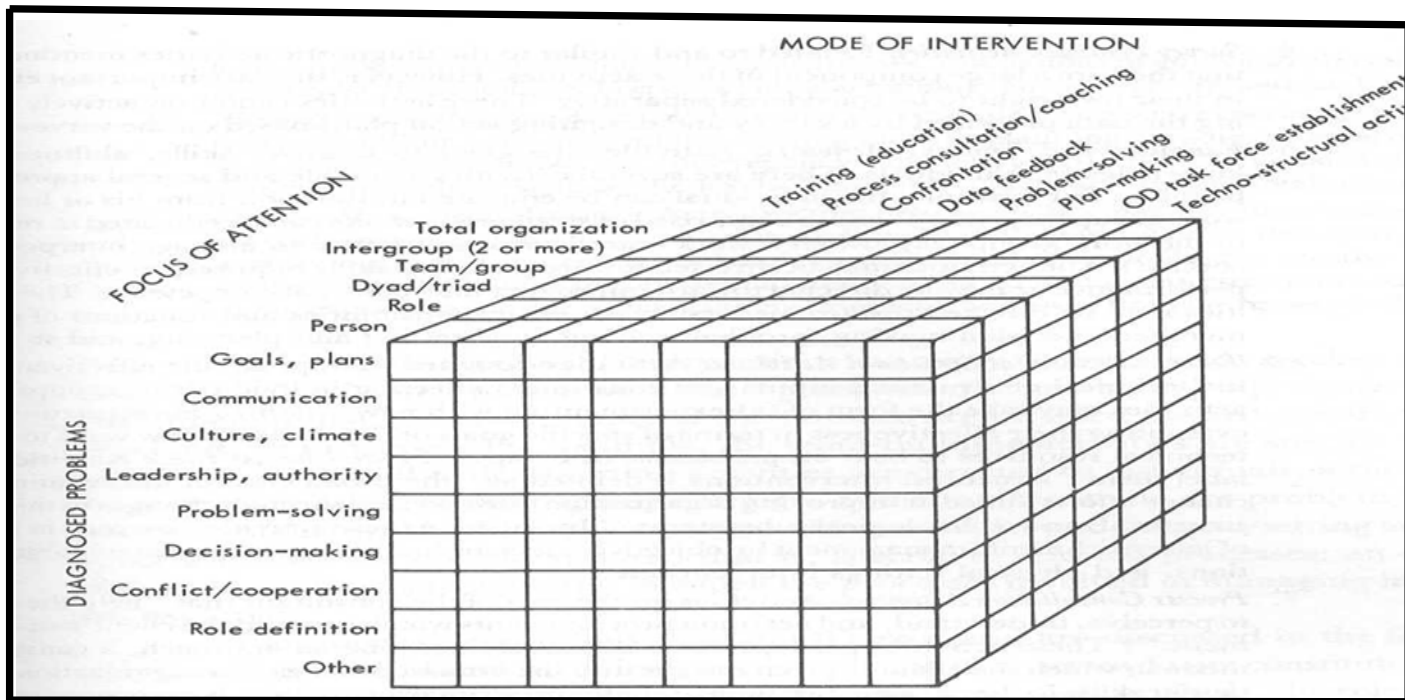
### **3.3 EVALUATION**

Evaluation research seeks to reveal whether the interventions are achieving the desired results (Mouton, 2011). Evaluation is at the heart of this research; to establish whether road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe were achieving sustained road traffic accidents reduction in Zimbabwe. Ideally, measurement should occur at three points during the life cycle of an intervention (Hale, 2007). Hale went further to posit that the results of the measurement activity created a business case for supporting an intervention and once the intervention commences, measurement was done to ensure that it was workable. It is therefore important to plan the timing of the interventions and their evaluation. In the evaluation of the road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe, it becomes important to establish how often evaluations were being done and to assess whether or not the evaluations were in alignment with the recommendations by Hale (2007).

### **3.4 OD INTERVENTION PRIORITISATION FRAMEWORK**

Schmuck and Miles (1971) developed the organisation development cube (OD cube), a diagnostic tool used to illustrate the focus of the intervention process and to provide a way of understanding the link between the diagnosed problems, and the mode of intervention designed to resolve the problems (See figure1.2). The OD cube however, is a static tool that does not take into account the evolving nature of phenomena and the intervention protocol.

The OD cube is therefore not an intervention-action prioritisation tool. However, the OD cube provides vital insights on which actions can potentially address which causes.



**Figure 1.2. The OD cube: A classification of interventions. Source: French and Bell (1990: 117, fig 9-1)**

There is a lot of literature on organisation development programmes impacting on road traffic safety particularly based on studies conducted in America, Asia and the western world (Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia Institute of Road Safety Research, 2012; SafetyNet, 2009). However, there is limited literature about organisation development interventions addressing road traffic safety in Zimbabwe.

#### **4. THE RESEARCH METHODOLOGY**

The study follows an interpretivist-postpositivist paradigm. Paradigms are ways of viewing reality for the community that shares them, especially in an intellectual discipline (Walliman, 2011). Walliman (2011:68) further posited that, “the researcher is not observing phenomena from outside the system, but is inextricably bound into the human situation which he/she is studying”, hence the interpretivist notion that human beings cannot be studied using models developed for the natural sciences.

Although the study follows an interpretivist approach, there were positivist elements due to the use of the questionnaire in the study and the need to establish relationships among variables. An important aspect of the positivist approach is the belief that findings can be generalised to the whole population (Infante, Rancer & Womack, 2003). This research does not seek to generalise the findings, but to come up with action plans that will help achieve sustained road traffic safety in Zimbabwe. Questionnaires were administered first, which generated quantitative data, which was analysed to assess relationships and the trends in the data. Follow-up interviews were conducted to extract in-depth meanings of the trends, relationships and findings from the questionnaire responses.

##### **4.1 RESEARCH DESIGN**

The overarching design was an explanatory mixed methods design, because the research questions dictated so. In order to answer the research questions both qualitative and quantitative data was required. According to Creswell and Plano Clark (2011), mixed methods research offset the weaknesses of both quantitative and qualitative research methods applying independently.



The researcher used a cross-sectional, sequential descriptive-explanatory survey research designs. The cross sectional study enabled the researcher to undertake a snapshot study at a point in time. A survey research design enabled the researcher to learn about a large population by surveying a sample of that population in a fast and economical way (Saunders, *et al.*, 2009). A sequential descripto-explanatory survey design has elements of both descriptive and explanatory research designs but applying in sequence or one after the other. Phase 1, was a quantitative inquiry, which was conducted using questionnaires, and phase 2 was a qualitative inquiry, conducted using semi-structured interviews.

A descriptive research design sought to describe how it all happened and to give an accurate profile of events, people or situations in order to gain a detailed understanding of the context, background, relationships or behaviour of people in each situation (Leedy & Ormrod, 2005). The descriptive survey research design was a precursor to an explanatory research study because of the need to establish not only the descriptions of what happened but also to find out why it happened in the manner in which it did. The explanatory design helped to find out how it happened, why it happened, answered what if analysis questions, and exposed what caused the outcomes observed (Saunders, *et al.*, 2009).

The study also followed an inductive research approach. In the inductive approach, data was collected and analysed resulting in the development of a theory as opposed to a deductive approach, in which a theory and hypothesis were developed first followed by the designing of a research strategy to test the hypothesis and theory (Saunders *et al.*, 2009). The researcher chose the inductive evaluation research approach because it allowed the data to expose the new insights and or theory that may come out from such evaluation.

## **4.2 DATA SOURCES**

The primary sources of data were the questionnaire responses and interview transcripts.

#### 4.2.1 Data collection techniques

Primary data was collected using questionnaires and interviews. The questionnaires and interviews had sets of questions each derived from the research questions. Questionnaire data was collected first and follow-through data was gathered by way of interviews. The questionnaires and interviews measured attitudes, knowledge, perceptions, awareness, views and recommendations on road traffic safety management in Zimbabwe. The conceptual framework design in figure 1.1, was the base from which the researcher created categories of questions included in the questionnaire, each focusing on a particular research question and also addressing specific aspects of the conceptual framework. The interview schedules were designed after the analysis of the questionnaire data and as a follow-up to elicit more specific information or explanations (Silverman, 2011).

#### 4.2.2 Quantitative techniques

Introductory letters were sent electronically to the participants introducing the research and inviting them to participate in the survey on a voluntary basis. The respondents were drawn from the general road-user population of Zimbabwe. Five hundred electronic or internet-mediated questionnaires were distributed to collect data from a large population in a fast and economical manner. An online survey management system, Survey Console (2013) was used to distribute the questionnaires. Pre-validated questionnaire templates were edited from the Survey Console's "Questionpro" question-templates database to create the questionnaire for this survey (Annexure A). Question formats and measuring scales were adapted from a pre-validated questionnaire used by the University of Tasmania (2006) which also used the Survey Console software to administer its questionnaire. According to

Creswell (2013) a borrowed research instrument was advantageous because it had known validity.

#### 4.2.3 Qualitative techniques

Contact telephone calls were made introducing the research and seeking appointments to conduct the interviews. Twenty snowball-selected interviewees formed the inquiry group for the qualitative stage of the study. The selection criteria for the snowball sample was based on the expertise of the respondent on road traffic safety matters and therefore the respondents were selected from the senior officers of the Traffic Safety Council of Zimbabwe and the Zimbabwe Republic Police. The recruitment of interviewees stopped when the collection of new data stopped shedding new light on the issue under investigation, which implied the saturation point had been reached. A set of predetermined open-ended questions were used in order to guide the researcher. Sequential timing of collection and analysis of quantitative data followed by collection and analysis of qualitative data was adopted.

#### 4.2.4 Secondary data

The study did not employ secondary data. All the research findings were based on primary data. The researcher was particularly comfortable with administering both questionnaires and interviews as the researcher previously used the questionnaire in his previous studies (Chikono, 2010). However in this research a new questionnaire was designed using the Survey Console (2013) pre-validated questionnaire templates which were edited by the researcher to suite the requirements of this survey. The structure of the questions and analytics were similar to a previous questionnaire used by the University of Tasmania in collaboration with the Hong Kong Baptist University (University of Tasmania, 2006).

Addressing issues of validity and reliability became necessary in order to obtain valid research results.

### **4.3 ISSUES OF RELIABILITY AND VALIDITY**

Sound measurement must meet the tests of validity and reliability. Validity measures the extent to which an instrument measures what it is intended to measure, while reliability deals with whether the same results were achieved with repeated applications of the instrument (Green & Browne, 2009). These measures were incorporated at instrument design stage. The following sections briefly explain the tests of validity the researcher adopted with respect to the quantitative element of the research design.

#### **4.3.1 Content validity**

Content validity is achieved when a measuring instrument provides adequate coverage of the topic under study and is determined by consulting subject experts to judge the effectiveness of the instrument used (Madan, Paliwal & Bhardwaj, 2011). Starting from the research questions and guided by the conceptual framework in figure 1.1, the researcher created categories of questions each category dealing with one of the research questions and covering all the aspects of the conceptual framework (Annexure A). This approach ensured that the questionnaire and interview schedule addressed the subject under study (Silverman, 2011).

#### **4.3.2 Internal validity**

Internal validity measures whether the questions asked can explain the outcome of the research. The researcher looked for relationships between independent variables for example, road traffic satisfaction level for male and female respondents and the dependent

variable for example, road traffic safety (Madan, *et al.*, 2011). The relationship between the level of measurement and the appropriateness of data analysis was important. For example, if cross-tabulation of variance is one mode of data analysis; the independent variable must be measured on a nominal scale with two or more levels; yes, no, not sure, and the dependent variable must be measured on an interval/ratio scale; strongly agree, disagree and strongly disagree for each of the sample elements to be cross-tabulated for example cross-tabulations between male and female respondents. The researcher measured the ability of the questionnaire designed to predict some outcome or to estimate the existence of some current condition.

#### 4.3.3 External validity

External validity is the extent to which the results can be generalised to the general population the survey sample is representing (Green & Salkind, 2014). The stratified sampling technique ensured that the population had an equal chance of being included in the sample, which is the first criterion for validity (Madan, *et al.*, 2011). The questions contained in the questionnaire had to be free from bias and the absence of biases aided external validity (Green & Salkind, 2014). Pilot testing of the research instruments improved the construct validity, as the final questions were fine-tuned to reflect the field conditions and in order to improve their clarity (Madan, *et al.*, 2011).

#### 4.3.4 Face validity

Face validity is a measure of how representative a research project is at face value and whether it appears to be a good project (Singh, 2008). The questionnaire must be measuring what it is intended to measure in order to achieve face validity (Leedy & Ormrod, 2014). The questionnaire questions must represent the content of the study (Saunders, *et*

*al.*, 2009). Furthermore, the questionnaire must be appropriate for the sample/population. Additionally, the questionnaire must be comprehensive enough to collect all the information needed to address the purpose and goals of the study (Singh, 2008). The researcher obtained reviews from subject experts who evaluated the quality of the questionnaire, the flow of the questions, and the whether the research was good and representative enough (Madan, *et al.*, 2011).

The following section discusses the tests of reliability with respect to the quantitative research design.

#### 4.3.5 Test of reliability

The questionnaire must produce consistent results with repeated measurements. The researcher sought to improve reliability of the questionnaire by standardising the conditions under which the measurement took place and carefully designed directions or instructions of measurement with no variations from subject to subject (Leedy & Ormrod, 2005). The sample also ought to be representative of the population in order to eliminate biases (Madan, *et al.*, 2011). Cronbach's alpha was used to test the internal consistency of the questionnaire when there were multiple Likert questions in a survey/questionnaire that form a scale and the researcher wishes to determine if the scale is reliable (Green & Salkind, 2014). Cronbach's alpha generally increases as the inter-correlations among test items increase (Laerd Statistics, 2012). A cut-off point of 0.7 is an acceptable indicator of reliability (Green & Salkind, 2014). The Cronbach's alpha test results on the data was 0.872 (see Table 4.2).

According to Radhakrisma (2007), further reliability is established by conducting a pilot test of the questionnaire whereby the researcher collects data from 20-30 subjects not included

in the sample. Data collected from the pilot test was analysed using SPSS (Statistical Package for Social Sciences). The SPSS package was used to assess the "correlation matrix" and "view alpha if item deleted". The researcher continued to delete additional items to test if reliability would improve substantially by deleting an item, and in any case, no more than 20% of the items would be deleted. The reliability coefficient (alpha) can range from 0 to 1, with 0 representing an instrument full of errors and 1 representing total absence of error. A reliability coefficient (alpha) of 0.70 or higher is acceptable. The minimum reliability co-efficient if item is deleted was 0.70 and the maximum was 0.85 which was within the acceptable range.

For the qualitative stage of the enquiry, the focus was more on rigour, authenticity and trustworthiness using the following tests:

#### 4.3.6 Rigour

The researcher interrogated the methodology of the research in order to establish whether the data collection tools produced information that was appropriate for the level of precision required. The researcher assessed the data collection tools to check if they maximized the chance of identifying the full range of the phenomenon under study. The researcher also had to evaluate the extent to which the data collection tools generated the level of detail needed for answering the research questions (Silverman, 2011). Finally, an assessment was done of the ability of the data collection tools to produce data with discernible patterns.

With the data at hand, the analytical techniques were interrogated to assess their ability to discover the full range of relevant and salient themes and topics (Creswell, 2013). The analysis needed to expose relationships between themes and topics (Yin, 2014). Cross-case validation was employed to ensure that the trends discovered were not superfluous,

and to ascertain the standards of evidence available to ensure readers that the results were supported by the data (Silverman, 2011). Rigour in qualitative research therefore demanded that the researcher demonstrated to the readers, faculty, and colleagues how the research was done in plain language (Creswell, 2013; Silverman, 2011).

#### 4.3.7 Authenticity

Authenticity gathers the understanding of people's experiences and beliefs through open-ended questions, recordings or interviews. The researcher sought to establish confidence in the truth of the findings based on the research design, respondents and the context of the study. Supporting the authenticity of the research were such procedures as auditing the research process whereby another researcher can follow the steps used by the researcher in the study to arrive at the findings and evaluate if the same conclusions can be reached (Silverman, 2011; Singh, 2008). Another method of testing the authenticity of evidence was to use disconfirming evidence. Disconfirming evidence is a qualitative validation technique whereby, information that presents a perspective that is contrary to the one indicated by the established evidence is also reported (Creswell & Plano Clark, 2011). Additionally, block quotations would be used in presenting the research results to enhance the truth value of the research findings (Finlay, 2014)

#### 4.3.8 Trustworthiness

Trustworthiness assesses the researcher's degree of familiarity with the phenomenon and the research setting (sampling, methodology, data analysis techniques chosen etc.); the researcher's conceptual and theoretical grounding on the subject; the ability to approach the subject under study from a multi-dimensional perspective and finally the researcher's investigative skills and critical reading and thinking skills (Creswell, 2013). These



assessments were important in establishing the truth-value of the researcher's findings (Silverman, 2011).

#### 4.3.9 Triangulation of data from several sources

Triangulation is a qualitative validation technique in which the researcher builds evidence for a code or theme from several sources or individuals (Creswell & Plano Clark, 2011).

Evidence from police officers will be validated against evidence from Traffic Safety Council of Zimbabwe officers (Creswell, 2013).

### 4.4 SAMPLING TECHNIQUES

The researcher used the stratified random sampling technique to select respondents during phase 1 of the inquiry, and during phase 2 of the inquiry, a snowball sampling technique was used to select research participants. The choice of the stratified random sampling technique in conducting the survey research was based on the need to collect data from a sample that had characteristics and composition, which was a mirror of the population in order to avoid biases (Singh, 2008). Randomness ensured that every element of the population had an equal chance of selection into the sample, which enabled generalisation of research findings (Levin & Rubin, 2008). The proportional stratification ensured that the proportion of the different population sub-groups such as male and females remained as they were in the population (Singh, 2008).

Respondent e-mail addresses were obtained from commercial database administrators. The addresses were ordered, categorised and numbered clearly separating men from women. The stratum was based on gender. Zimbabwe has a population of 1 445 717 people with access to e-mail/internet and this formed the population for the study and a sample of 150 was desired (Internet World Stats, 2011). However, in order to receive at least 150

responses, 500 questionnaires were sent out to allow for a possible low response rate. For each stratum, the first respondent was chosen at random and thereafter the 2 891<sup>st</sup> man and separately for women was chosen until 247 men and 253 women were selected to make the desired number of questionnaires sent out 500. Microsoft Excel was used to sort the data and to do the random selections. Women accounted for 50.57% of the total Zimbabwean population, with men making up the remaining 49.43% (Tradingeconomics, 2012).

The choice of the snowball sampling technique in conducting the interviews was based on the need to interview subject experts on road traffic safety (Yin, 2014). The subject experts were required to explain and/or clarify the trends and to answer follow-through questions resulting from the observations from the quantitative data that was collected through questionnaires. According to Creswell, *et al.*, (2012:176) the starting point with snowball sampling is making contact with one or more people who belong to the population and after interviewing them, they will lead to the next best contact in terms of subject knowledge. Saturation is reached when the responses received from each additional contact does not bring any new dimensions or insights (Creswell, 2013). Since road traffic safety interventions is a specialized field, the sample of 20 was chosen from the Traffic Safety Council of Zimbabwe and from the Zimbabwe Republic Police.

#### **4.5 DATA ANALYSIS AND INTERPRETATION**

The study followed a sequential descriptive-explanatory mixed methods design (Creswell & Plano Clark, 2011). Quantitative data was collected and analysed and subsequently qualitative data was collected and analysed as a follow-through on the results from the quantitative inquiry. Qualitative data collected by way of face-to-face interviews was used to explain and give meaning to quantitative data collected in the first phase of the inquiry by way of questionnaires. Creswell and Plano Clark (2011:206) posited that, “exploring the

data means examining the data with an eye to developing broad trends and the shape of the distribution or reading through the data, making memos, and developing a preliminary understanding of the database". The quantitative data required multiple analytical approaches, discussed in the following sections.

#### 4.5.1 Descriptive statistics

Descriptive statistics were used to describe the trends and patterns in the data (Green & Salkind, 2014).

##### 1). Measures of central tendency

Central tendency is a measure of the point about which items have a tendency to cluster such as the mean, median and mode (Levin & Rubin, 2008; Taylor, Sinha, & Ghoshal, 2011).

##### 2) Measures of dispersion

Dispersion measures the scatter of the values of items of a variable in the series around the true value of average and includes measures such as the range, mean deviation and standard deviation (Levin & Rubin, 2008; Taylor, Sinha & Ghoshal, 2011).

##### 3) Measures of asymmetry

Asymmetry measures the skewness or shows the manner in which the items were clustered around the average (Levin & Rubin, 2008; Taylor, Sinha & Ghoshal, 2011).

Measures of asymmetry assist the study by exposing any relationships between variables.

#### 4.5.2 Inferential statistics

Inferential statistics measure the relation of two or more variables in the data to one another and attempt to draw meaning of the behavior of one variable from the other (Levin & Rubin, 2008; Taylor, Sinha & Ghoshal, 2011). A statistical package SPSS was used to do the quantitative data analysis (Creswell & Plano Clark, 2011). Inferential statistics were useful in exposing relationships or associations between variables.

Similarly, qualitative data analysis techniques were employed and these involved the following major processes according to Taylor, *et al.*, (2011):

- 1) **Editing** or examining the collected raw data to detect errors and omissions and to correct the errors when possible.
- 2) **Classification** or arranging data in groups based on common characteristics.
- 3) **Coding** or assigning numerals or symbols to responses so that they can be put into a limited number of categories or classes, for example data from field notes, memos, journals, and minutes from interviews.

A codebook was developed to categorise the notes into general themes for analysis (Creswell & Plano Clark, 2011). The researcher used thematic analysis, which entails the identification of concepts in the text as opposed to content analysis, which relies on identifying specific words in the scripts. Thematic analysis enabled the researcher to search for groups of words as they related to a specific meaning or concept and this approach helped to overcome the main shortcoming of content analysis in that the meaning of a particular concept or word can be expressed in a number of different ways or words. Thematic analysis enabled the researcher to check all the content for related themes, and

organise the data in terms of recurring themes, then drew meaning from that analysis (Yin, 2014).

The researcher determined if the results of the quantitative and qualitative data analyses provided answers to the research questions. Interpretation of data according to Creswell and Plano Clark (2011:212), “involves looking across the quantitative results and the qualitative findings and making an assessment of how the information addresses the mixed methods question in a study”. In the next section, the researcher discusses ethical considerations applied in this study.

## **4.6 ETHICAL CONSIDERATIONS**

Fox and Bayat (2012:148) argued that, “ethics in research involves getting the informed consent of those who were going to be interviewed, questioned, observed or from whom materials are taken”. The researcher ensured that transparent, honest and fair means were used to gain respondents feedback and the research did not expose anyone to harm or danger by participating in the research (Creswell, 2013). The researcher obtained the informed consent of research participants and survey respondents before conducting the research.

### **4.6.1 Confidentiality**

The confidentiality of information and respondents privacy was guaranteed by reporting findings in the aggregate and using pseudo names so that the actual respondent or participant names would not appear anywhere in the research report. A software package, Survey Console (2013) was used to manage respondent anonymity by activating the respondent anonymity assurance (RAA) function of the software package, which automatically allocates pseudo names to each respondent so that data analysis would be

done using the pseudo names and not the actual names of respondents. Insight was drawn from Fox and Bayat (2012) who argued that respondents should be assured that no identifying information would be made available to anyone not directly involved in the project.

#### 4.6.2 Informed consent

Respondents were informed of the risks of participating in the research, the cost in terms of their time, and that they must give their informed consent to participate. Respondents were at liberty to withdraw at any time whenever they felt that they were at risk. Participants were not exposed to any undue harm whether physical, emotional or psychological because of their participation in the survey. Kalof, Dan and Dietz (2008:47) posited that, “participation in research should be voluntary. Researchers must tell potential research participants what they are being asked to do so they can make an informed decision about whether or not to participate”. Furthermore, respondents and participants were at liberty to choose the questions to answer or to withdraw from the study completely at any time without any costs or penalties.

#### **4.7 PRETEST OR PILOT STUDY**

According to Fox and Bayat (2012:103), “a pilot study is a trial run of an investigation conducted on a small scale to determine whether the research design and methodology are relative and effective”. In order to test the efficiency and effectiveness of the research instruments, in this case the questionnaires and interview schedules, a pre-survey pilot test was conducted by sending out 20 questionnaires and conducting five interviews to randomly selected respondents drawn from the survey population. The pilot test group provided feedback on the instruments design, clarity of questions, the order of the questions, and the ease with which instructions can be understood and followed. The results of the pilot study

enabled the researcher to fine-tune and improve on the quality of the research instruments before they were employed on the bigger chosen sample of the population.

## **5. ORGANISATION OF THE DISSERTATION**

The remainder of the dissertation is organised as follows:

Chapter 2: **Literature review.** The theoretical frameworks, models, and previous research done related to the research problem are discussed and evaluated in this chapter.

Chapter 3: **Research methodology and designs.** In this chapter, a detailed discussion of how the research was carried out will be given covering the research approaches, the choice of the research instruments, and the approach and processes of data collection and storage.

Chapter 4: **Data analysis and discussions.** In this chapter, the researcher presents the analysis of data, the interpretation, presentation, and discussion of the research findings.

Chapter 5: **Conclusion and recommendations.** In this chapter, the researcher summarises the main outcomes of the research in terms of both contributions and limitations thereof, and a presentation of the future scope for further research will be discussed.

## **7. CONCLUSION**

The research discusses what the Traffic Safety Council of Zimbabwe did in order to improve road traffic safety in Zimbabwe and proffers recommendations on potential strategies to achieve sustained road traffic safety in Zimbabwe. The researcher relies on input from the research participants on what could be done for Zimbabwe to achieve sustained road traffic accidents reduction. The organisation development conceptual frameworks provided the

benchmarks against which the Traffic Safety Council of Zimbabwe efforts were measured, as best practice in managing change in human systems. The random sampling technique used in selecting the research sample for the questionnaire administration ensured that Zimbabweans had an equal chance of contributing to this enquiry. Semi-structured interviews with subject experts enabled the researcher to obtain expert advice and clarification on the data collected from the respondents through questionnaires. In the next chapter, a critical review of the literature informs and guides the researcher on what was researched already and how the previous researchers carried out their studies and identify any gaps in those studies.



## **CHAPTER 2**

### **2. LITERATURE REVIEW/THEORETICAL FRAMEWORK**

Leedy and Ormrod (2005) posited that literature reviews inform a study by exposing what is known and what is not known about a subject. Literature reviews therefore guide a study by informing methodology and current gaps in knowledge, which were the foundations for future research projects. Creswell (2013), further argued that literature reviews informed future studies by providing the theoretical grounding upon which future research was conducted.

#### **2.1 INTRODUCTION**

Road traffic accidents were indiscriminant and robe the business community of its skilled human resources and physical assets such as vehicles and other property damaged in accidents (World Health Organisation, 2010). Training and development of new skills take time, and costs both governments and corporations significant sums of money each year (Chen, 2010). Reducing road traffic accidents therefore frees resources for national development and helps corporations reduce costs and to focus on new skills development and innovation as opposed to expending resources on replacements. Insurance companies bear the most burden of road traffic accidents, as they ultimately settle claims for their insured clients (Insurance and Pensions Commission, 2013).

The economic cost of road traffic accidents worldwide is estimated at US\$518 billion and more specifically, 2% of the gross domestic product (GDP) of the developed countries and 3% of the GDP of developing countries (Albate, Fernandez & Yarygina, 2013). In Ghana for

instance, the average cost of road traffic accidents to a business according to a study carried out between 2006-2011 is \$6 007 with a mean cost per household of \$49 which is 183% of the average household average income per month (Abagale, *et al.*, 2013). As a result of high road traffic accidents, the short term insurance industry in Zimbabwe had 18% of the registered insurers winding up business between 2009 and 2013 (Insurance and Pensions Commission, 2013). In South Africa for instance, 58% of road-traffic accident victims go on early retirement and this imposes a huge cost on businesses (Diedericks, 2014). A need therefore exists to link research findings to the accident-reduction intervention programmes in order to narrow the gap between action and results.

The first step in reducing road traffic accidents is to identify the causes of road traffic accidents (Gonzalez-Iglesias, Gomez-Fraguela & Luengo-Martin, 2012; Bergel-Hayat, *et al.*, 2013; Martinez, Mantaras & Luque, 2013; Nordfjaern, Jorgensen & Rundmo, 2012; Piccinini, *et al.*, 2012). It is imperative for governments, business community, research community and the non-governmental organisations to work together in the search for solutions to the road traffic accident scourge as they face the same debilitating effects of loss of key personnel in road traffic accidents (Chen, 2010; World Health Organisation, 2010).

A critical review of the literature did not only serve as background knowledge to the study but also helped to reveal the gaps in terms of what was written on the topic of study and what has not been written and the possible shortcomings in the literature. The researcher took a cue from Saunders, *et al.*, (2009:94) who argued that when carrying out the literature review, the key consideration is, “to ask yourself how it contributes to your research question(s) and objectives and to make notes with this in focus”. According to Creswell (2009), a literature map outlines the major topics and the authors of the topics and links these major topics to

the related subtopics at the same time denoting the authors of the subtopics as illustrated in figure 2.1.

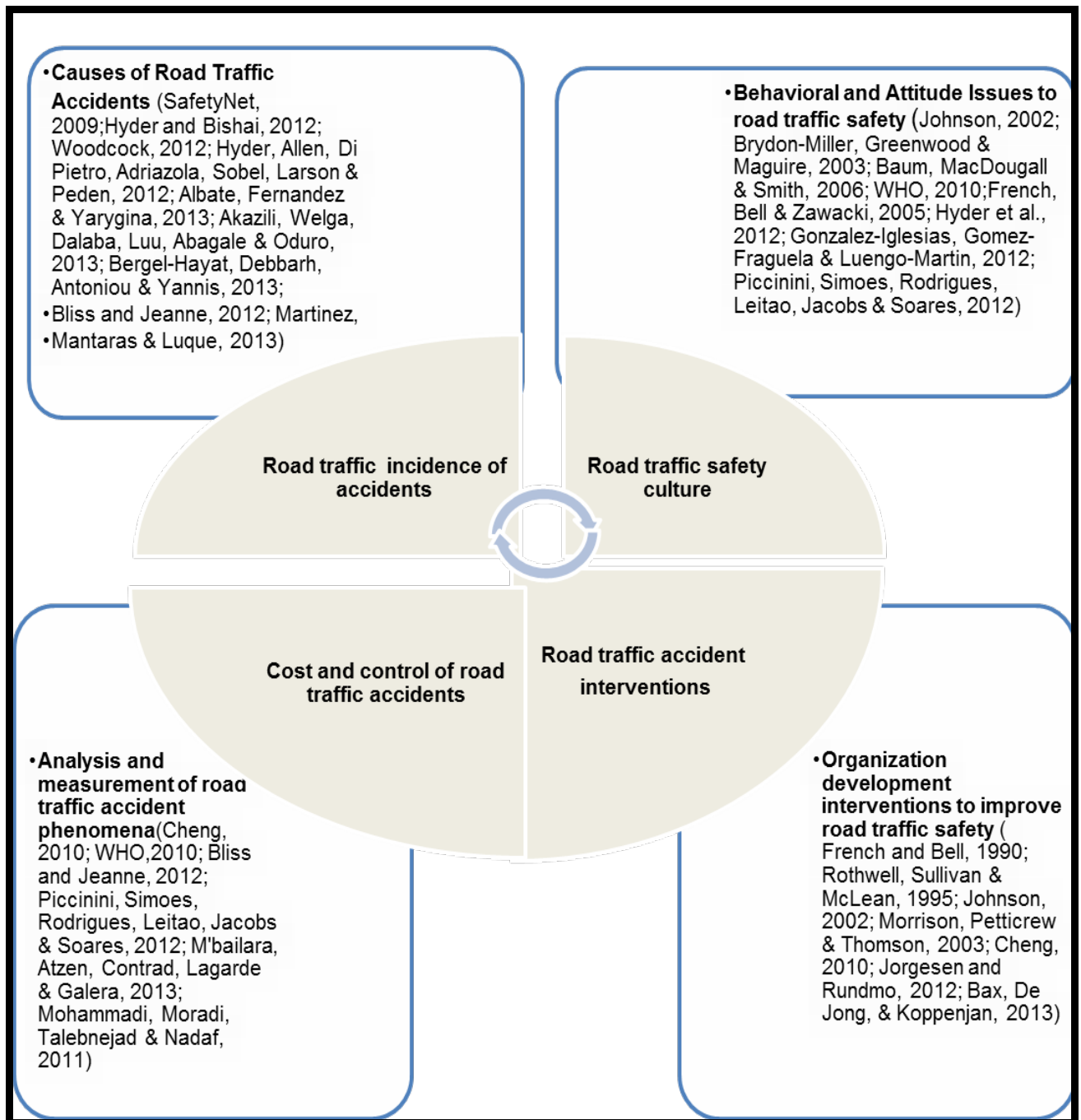


Figure 2.1: A road traffic safety literature map (Own compilation)

This chapter covers the following topics: (a) Definitions of key terms, (b) organisation development theory, (c) the road traffic safety approaches, (d) road traffic safety theories, and (e) road traffic accidents mitigation measures. The choice of organisation development theory premises on the fact that organisation development theory can explain the transformation required in order to reduce road traffic accidents through OD programmes in Zimbabwe (Johnson, 2002; Cummings & Worley, 2009; Brown & Harvey, 2012).

## **2.2 DEFINITIONS OF KEY TERMS**

Road traffic safety and organisation development are specialised fields and use special words and terms, which are defined hereunder, as they are central to this study.

### **2.2.1 Organisation development theory**

Beckhard (1969:9) defined *organisation development* as; “An effort, (1) planned, (2) organisation wide, and (3) managed from the top, to (4) increase organisation effectiveness and health through (5) planned interventions in the organisation’s processes, using behavioral-science knowledge”. French and Bell (1990:17) gave the following closely related definition to that of Beckhard:

Organisation development is a top management supported long range effort to improve an organisations’ problem solving and renewal processes, particularly through a more effective and collaborative diagnosis and management of organisation culture with special emphasis on formal work team(s), temporary team(s), and intergroup culture with the assistance of a Consultant-facilitator and the use of the theory and technology of applied behavioral science including Action-Research.

Senge (2006) presented an expanded view of organisation development in the term, *learning organisation*, defined as organisations, which seek new frontiers of knowledge and emphasised the need for collective learning. It is obvious from the definition by Senge that there is an expansion of scope from corporation-based organisation development to an open

systems view, which includes whole communities or the nation at large (Senge *et al.*, 1994). Similarly, Cummings and Worley (2009) and Morrison, Petticrew, and Thomson (2003) argued in favor of government departments adopting organisation development interventions in order to improve efficiency and service delivery.

From the earliest definitions from Beckhard (1969) to French and Bell (1990), and Senge (2006), common themes emerge as organisation-wide collaboration and collective learning to improve effectiveness. This study follows the open systems definition of organisation development provided by Senge (2006). According to Von Bertalanffy (1950), a system is closed if no material or influence enters it or leaves it and a system is open if there is import and export of material or influence into and out of the system. Road traffic safety is a central theme in this study and the interventions seek to reduce the incidence of road traffic accidents, which in turn translates into road traffic safety, reduced wastage due to accidents, business profitability and general economic growth.

### 2.2.2 Road traffic safety

Road traffic safety refers to all the efforts aimed at reducing the risk of a person using the road network being killed or seriously injured (SafetyNet, 2009; Chen, 2010; World Health Organisation, 2010). Underpinning road traffic safety is the concept of traffic safety culture.

### 2.2.3 Road traffic accident injuries

Accident injuries refer to the external and visible disabilities, and invisible discomfort, dislocation, disfigurement, dismemberment including pain, suffering and trauma, resulting from a road traffic accident (Diedericks, 2014).

#### 2.2.4 Traffic safety culture

Traffic safety culture are the beliefs, norms, habits people have, the behaviors they think are normal, and how they react to any changes to these behavioral norms (SafetyNet, 2009; World Health Organisation, 2010; Brown & Harvey, 2012). The desired road safety culture evolves from road- traffic safety interventions (Hyder, *et al.*, 2012).

#### 2.2.5 Road traffic safety interventions

Road traffic safety interventions comprise strategies and intervention action plans to address safety targets (SafetNet, 2009; Hyder, *et al.*, 2012). In order to assess the effectiveness of road-traffic safety interventions, it is necessary to measure the effectiveness of the interventions (Hale, 2007).

#### 2.2.6 Evaluation

Evaluation is the systematic collection of evidence to determine if desired changes are taking place (Hale, 2007; Mohammadi, *et al.*, 2011). Evaluation is therefore a critical step in deciding whether to proceed with an intervention or to stop. If desired results are not being achieved continued interventions without modifications to the pre-existing conditions or methods of implementation could be a waste of resources (Chen, 2010). This is an important observation in the current study given that in Zimbabwe road traffic accidents continue to increase despite road traffic safety interventions being implemented (Test in Road Traffic Safety, 2010).

### 2.2.7 Motor insurance claims loss ratio

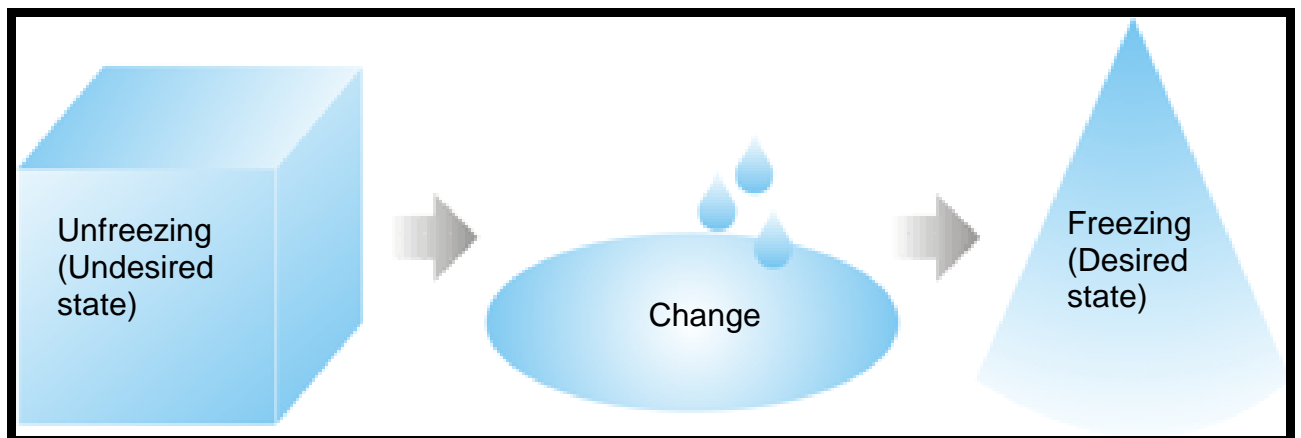
Motor insurance claims loss ratio refers to the proportion of motor insurance claims in any one year to the proportion of insurance premiums collected for the motor insurance class of business in that particular year (Insurance and Pensions Commission, 2013). A ratio of claims to premiums above 100% shows that the insurance companies are losing money by insuring motor vehicles and a ratio below 100% shows profitability by the insurance industry. Many approaches can help reduce road traffic accidents. The following section, discusses the organisation development approaches to road traffic safety.

## 2.3 ORGANISATION DEVELOPMENT THEORY

Three main categories of strategies can effect change in human systems (French, Bell & Zawacki, 2005). The first category is termed empirical-rational strategies and premise on the belief that human beings are rational and will follow their self-interest. Humanity therefore, accepts change where it is evident that by embracing the change they will stand to benefit (French, *et al.*, 2005; Brown & Harvey, 2012). The next category of change strategies is the normative-re-educative group of strategies (French, *et al.*, 2005; Brown & Harvey, 2012). Whilst accepting the rationality and wisdom of humanity, this family of change strategies assumes that sociocultural norms, beliefs and values shape human behavior. For change to happen there must be underlying changes in the normative orientations such as attitudes, values, skills, education level, relationships, and information. The final class of change strategies relies on the use of power, influence and politics in one form or the other (French, *et al.*, 2005; Brown & Harvey, 2012). Using power and influence, people are required to comply with a new way of doing things and often penalties and rewards induce compliance.

### 2.3.1 Organisation Development Models of Change

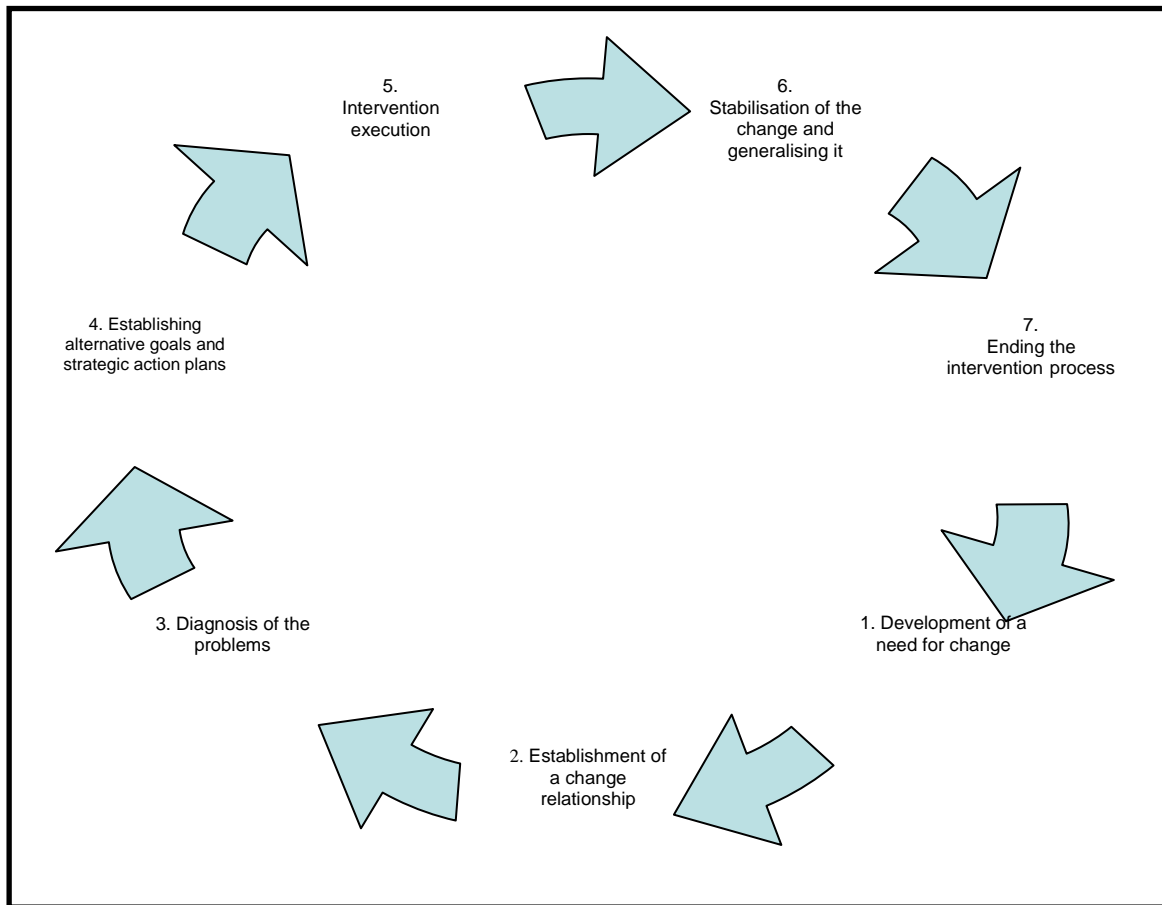
French, Bell and Zawacki (2005) summarised the 1948 work by Lewin on introducing change by exposing that organisations were open systems. Open systems are sets of interrelated elements, communities or components each feeding from each other in an interrelated fashion (Von Bertalanffy, 1950). It is therefore imperative that in order to change the status quo, a change agent has to thoroughly understand not only the organisation in which the change must be introduced but the interrelationships that keeps the organisation and its environment in harmony (French, *et al.*, 2005). French, *et al.*, (2005:107) in citing Lewin's 1948 work posited that for permanent change to take place there must be "unfreezing of old behavior, moving to a new level of behavior, and freezing the behavior at the new level" (See figure 2.2). The freezing and unfreezing of behaviours ties in with the normative-re-educative family of change strategies.



**Figure 2.2. Diagrammatic view of the unfreezing, change and freezing process (Source: Mindtools, 2014)**



French, *et al.*, (2005) observed that Lippit, Watson, and Westley (1958) refined Kurt Lewin's three-stage change process by outlining seven stages of change (See figure 2.3 below).



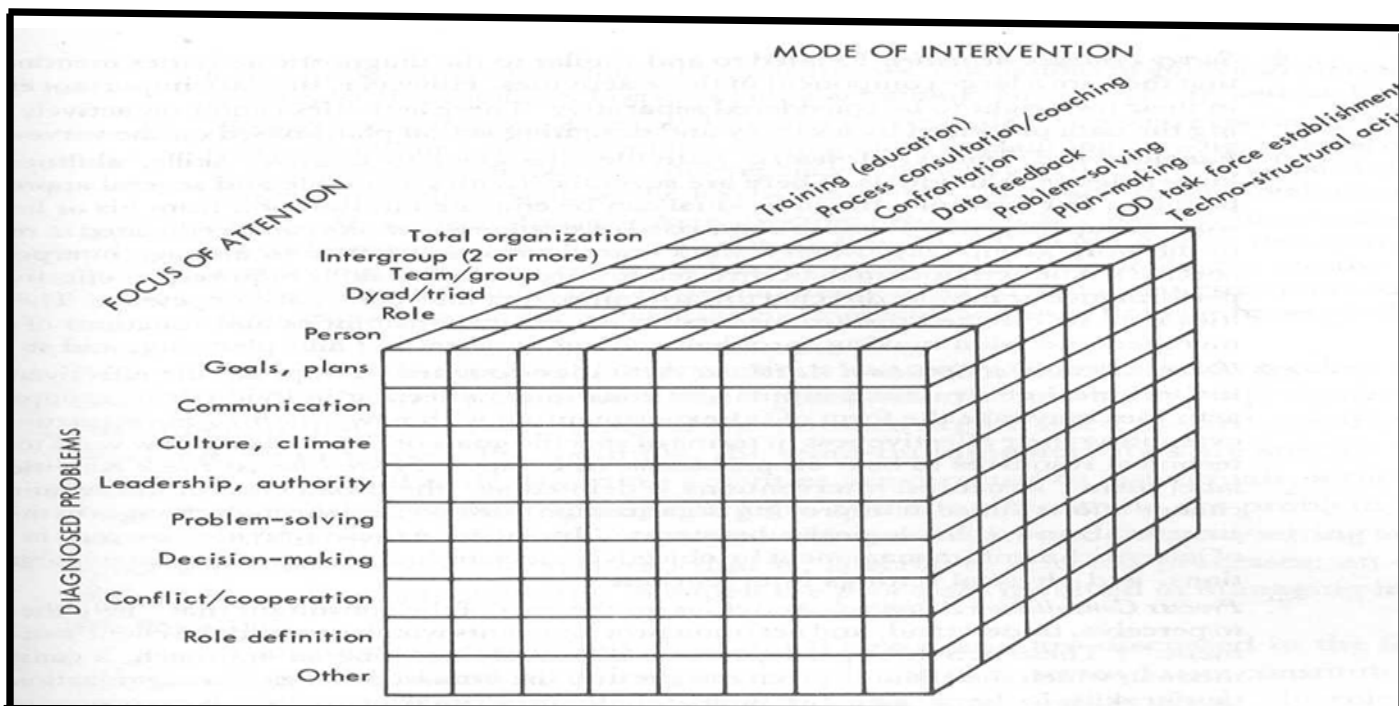
**Figure 2.3. The expanded 7-stage change process (adapted from Lippit, Watson, & Westley, 1958)**

The change processes proposed by Lewin and Lippit, Watson, and Westley (as cited in French, *et al.*, 2005) were in harmony with each other. The significance of this literature review is that it gives direction to the study of organisation development and change interventions. It is evident from the literature that change is planned and not haphazard (French & Bell, 1990). It is also evident from the literature that the effectiveness of a change effort relates to the degree of involvement of the people affected by the change effort (Cummings & Worley, 2009; Brown & Harvey, 2012). It is apparent from the literature

that there is no one best strategy to effect change but multiple change approaches are necessary depending on the situation.

### 2.3.2 Road traffic safety approaches and interventions prioritisation framework

Schmuck and Miles (1971) developed the OD cube, a diagnostic tool used to illustrate the focus of the intervention process and to provide a way of understanding the link between the diagnosed problems, and the mode of intervention designed to resolve the problems (See figure 2.4). According to M’bailara, Atzen, Contrand, Lagarde and Galera (2013), the correct diagnosis of the road traffic accident problem is a part of the solution finding process.



**Figure 2.4. The OD cube: A classification of interventions. Source: French and Bell (1990: 117, fig 9-1)**

There is a lot of literature on organisation development programs influencing road traffic safety particularly based on studies conducted in America, Asia and the western world but there is very limited literature about organisation development interventions on road traffic

safety in Zimbabwe in particular, and where it is available; it is of questionable rigor and academic integrity (Chen, 2010). It is this gap, which this study seeks to bridge by providing current empirical studies of academic integrity.

### **2.3.3 Road Traffic Safety Interventions**

Interventions comprise standards, rules and action plans specifying the safe use of the road network by;

- 1) Setting speed limits or governing the permissible speeds at which vehicles can be driven on certain sections of the road.
- 2) Drink-drive alcohol consumption limits or the specification of the legally allowable alcohol consumption levels for someone to drive a car on the public roads.
- 3) Occupant restraints or the provision at vehicle manufacture stage, safety aids such as seat belts, airbags or crush-helmets to protect vehicle occupants from injuries resulting from vehicle crashes.
- 4) Helmet requirements are a legal requirement for bicycle and motor cycle riders' to protect them from head injuries following a vehicle crush.
- 5) Vehicle safety standards or the specification of the minimum standards of safety a vehicle must pass before it can be sold to the public.
- 6) Vehicle licensing requirements are a legal requirement that enforces that all road vehicles are registered and maintained properly before they can be used on public roads.
- 7) Driver licensing requirements are a legal requirement that every driver must pass a competence test on vehicle handling, road signs, and traffic laws before the driver can be allowed to drive on public roads.

- 8) Road construction-engineering standards among many other interventions (Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia.Malaysia Institute of Road Safety Research, 2012; SafetyNet, 2009; Hyder, *et al.*, 2012).

Interventions also comprise measures for ensuring compliance with standards and rules using a combination of education, enforcement, and incentives (French, *et al.*, 2005; SafetyNet, 2009; WHO, 2010; Hyder, *et al.*, 2012).

According to Hyder and Bishai (2012) road traffic safety interventions should follow a relatively standardised approach. At the national level, a high-level working group of stakeholders should be created, a joint national work plan should be developed, and two or more focused intervention sites (i.e., cities, districts, or regions) should be identified in each country to serve as the pilot projects from which lesson will be drawn (Hyder & Bishai, 2012). The World Health Organisation (2010) further posited that each site must be encouraged to focus on at least two to four potential risk factors and work towards correcting the risk factors. SafetyNet (2009) collaborate the approach proposed by Hyder and Bashai (2012) and the World Health Organisation (2010) where a few risk factors are addressed at a time. According to the Malaysia Institute of Road Safety Research (2012) factors such as; drunk-driving, excessive speed, lack of seat belt and child restraint use, and lack of helmet use, among other factors could be targeted and an evidence-based and nationally relevant set of interventions that address the chosen risk factors would be implemented at each site.

Hyder and Bishai (2012) were in agreement with Chen (2010), and the World Health Organisation (2010) in arguing that interventions ranged from infrastructure improvement initiatives to traffic-law enforcement initiatives. All relevant government departments were

involved as needed and encouraged to participate at the specific locations where the interventions took place (Bliss & Jeanne, 2012; World Health Organisation, 2010).

SafetyNet (2009) further argued that an evaluation of the intervention approaches should be planned at each site from the outset, integrating regular monitoring of outputs and an outcome assessment at the end of the implementation period. This evaluation approach is in tandem with the recommendations by Hale (2007) who argued that interventions should be evaluated at the beginning of the intervention, during the intervention and at the end of an intervention.

Hyder, *et al.*, (2012) proposed that a successful response to road traffic safety should include domains such as strong political will, capacity building, use of evidence-based interventions, rigorous evaluation, increased global funding, multi-sector action, and sustainability, which is analogous to the World Health Organisation (2004) recommendations on road-traffic safety improvement. It is evident from the literature that no one strategy can guarantee results in change initiatives and hence organisations were encouraged to implement multiple strategies in order to achieve sustained improvement of results (Bliss & Jeanne, 2012).

Hyder, *et al.*, (2012) were in agreement with the World Health Organisation (2010) and Chen (2010) on the proposition of an action research approach to traffic safety implementation by encouraging continuous feedback and feed-forward communication through regular partner and national meetings to aid in successful project implementation. In conclusion, Hyder, *et al.*, (2012:1065) argued that, “evidence-based interventions are available, and yet governments around the world are not adopting and implementing them”.

The literature review exposed a large number of researches carried out on road traffic safety but what remained to be exposed is why road traffic accidents continue to rise in Zimbabwe despite there being so much literature from which to draw lessons. According to Chen (2010) in 1996, Zimbabwe witnessed 34 fatalities per 10,000 vehicles as compared to the United States of America which witnessed 1.7 fatalities per 10,000 vehicles yet the vehicle population of Zimbabwe is miniscule when compared to that of America. Literature based on the Zimbabwean context is conspicuously lacking and is the gap in knowledge, which this research seeks to bridge. The next section presents a discussion on road safety measurement.

### **2.3 ROAD TRAFFIC SAFETY MEASUREMENT**

Road traffic safety measurement refers to the tools and techniques used to estimate road traffic usage, road traffic accidents and the propensity of road traffic accidents occurring given a certain level of interface between the road infrastructure and the population using the road (Bliss & Jeanne, 2012). According to Hale (2007), to measure is to ascertain with known units of measure, the quantity or amount of a variable under study. Measurement is therefore important in this study as the researcher seeks to establish if the current road traffic safety interventions are achieving the intended results of reducing road traffic accidents in Zimbabwe.

### **2.4 APPLICATION OF SYSTEMS THEORY TO ROAD TRAFFIC SAFETY**

Systems theory provides the theoretical constructs, which define the relationship between elements in a universe and the inter-relationship of the elements amongst themselves,

which in turn define the general relationships of the empirical world (Boulding, 1956). Road-traffic systems premise around simulation data and attempt to replicate the real world environment on a computer with the aim of interrogating the transport system to evaluate how it reacts to changing stimuli (Pursula, 1999; Krogscheepers & Kacir, 2001). The reasons for the use of simulation in the field of traffic safety are the same as in all simulation; to solve problems, to test, evaluate and demonstrate a proposed course of action before implementation, and to learn in an artificial environment and to train people (Pursula, 1999). Transportation systems are man-machine systems, that include both human interaction and interaction between driver-vehicle-elements and man-machine-interactions---driver interaction with the vehicle, with the traffic information and control system and with the physical road and street environment (Bella, 2008). In addition, the observations and reactions of drivers, derive from human perception and not from technology based sensors and monitoring systems (Pursula, 1999; Bella, 2008).

Road traffic safety simulation covers diverse areas depending on the problem but the following are the more common areas (Pursula,1999; Krogscheepers & Kacir, 2001; Bella, 2008):

- Road section analysis: which studies what happens or what can happen on a particular stretch of road.
- Intersection analysis; studies how traffic could flow and potential accident incidence during the flow of traffic.
- Traffic flow analysis; studies flow data and potential traffic flow bottlenecks.
- Car following analysis; attempts to anticipate and model the behaviour of the car following.
- Driver response analysis; measures the driver reactivity to various stimuli.

- Road network simulations; provides capacity and impact assessments of traffic flow on the road network.
- Effects of advanced traffic information and control systems; evaluates traffic and driver behavior given more advanced information.
- Road traffic density estimation through microscopic simulation; helps in planning the road network and traffic flow by anticipating traffic volumes and what could possibly happen at each traffic volume level.

The study focused on the grey systems theory, hexagon spindle model, person centered transport design and management system, and the International Standards Organization (ISO): 39001-road traffic safety management system, as they were the most appropriate to the current study. The three systems theories attempt to explain how sustained road traffic safety can be achieved hence their selection to underpin this study.

#### 2.4.1 Grey systems theory

The occurrence of road traffic accidents is often a manifestation of the rising vehicle fleet size against a static road infrastructure (World Health Organisation, 2004). The ability to manage the road accident menace begins with accurately forecasting the road traffic accidents given a particular national road infrastructure (Martinez, Mantaras & Luque, 2013; SafetyNet, 2007). Road traffic accidents can be predicted scientifically based on the related statistical indexes. Accurate forecasting of the road traffic accidents is important not only for governments, but also for insurance companies making decisions on insurance claims projections (Mohammadi, *et al.*, 2011). The Grey system theory was selected as a focal model for predicting road traffic accidents in this study as it helps to improve road-traffic safety management decisions.



According to Mohammadi, *et al.*, (2011) grey system theory is a multidisciplinary mathematical model dealing with systems that are characterized by both partially known and partially unknown information. Grey system theory has been widely used in several fields such as agriculture, industry and environmental systems studies. Grey systems forecasting models have gained in popularity in time-series forecasting due to their simplicity, high precision, and the ability to characterize unknown system variables by using few data points.

In their study, Mohammadi, *et al.*, (2011) used the grey system mathematical models (Verhulst Model-GM [1, 1]) to forecast road traffic accidents in Iran. The road-traffic accident data in the Fars province of Iran from 2002 to 2010 was adopted to demonstrate the effectiveness and practicability of these models. The road-traffic accident data in 2002-2007 was employed to set up the three grey prediction models and the traffic accident data from 2008 to 2010 was used as data set to compare the three models accuracy. The outcome of the study by Mohammadi, *et al.*, (2011) was that the effectiveness and accuracy of the Verhulst Model-GM (1, 1) was very high. It is evident from the study that the grey system theory could deal with the problems of incomplete or unknown information on road traffic accidents. Based on these research findings, the Verhulst Model-GM (1, 1) appeared to be intrinsically better because it had merits of both simplicity of application and high forecasting precision.

The literature revealed that despite the fact that the research was conducted in Iran, a country with very different cultures, climate, road infrastructure and vehicle population as compared to Zimbabwe, the findings could still influence decision making in Zimbabwe if similar studies were done. Road safety management decisions must be based on empirical

studies and accurate predictions of future trends (World Health Organisation, 2010; Mohammadi, *et al.*, 2011; Hyder, *et al.*, 2012). This discussion leads to transport management systems and models that can improve road traffic safety.

#### 2.4.2 The Hexagon Spindle model

Woodcock (2012) used the Hexagon Spindle (H-S) model of transport ergonomics to outline a framework for creating vehicle and transport designs centered on the person based on their studies in Great Britain. The study focused on how to improve the quality, safety, and efficiency of transport. The outcome of the study was that the H-S model can guide researchers and transport designers by taking a systems view of road traffic safety. The study emphasised road traffic safety by placing people at the centre of road-traffic safety interventions. Piccinini, *et al.*, (2012) also supported this line of thinking by placing people at the center of the safety initiatives by studying human behavior with respect to driving using safety-technology aids. The following section reviews the study by Piccinini, *et al.*, (2012) to reveal the benefits of the person centered road-traffic safety designs.

#### 2.4.3 Person centered transport design and management system

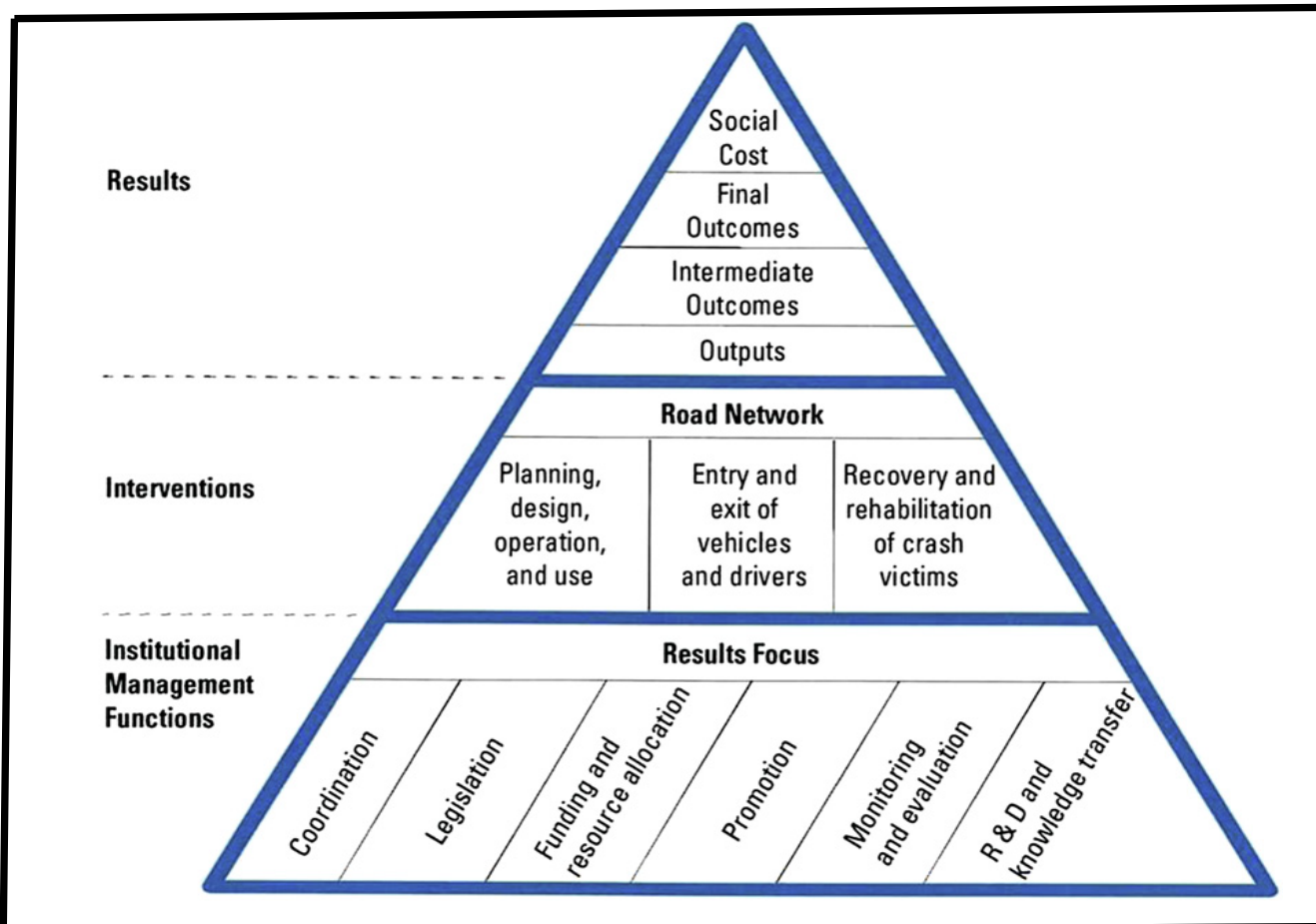
Piccinini, *et al.*, (2012) outlined a research proposal to evaluate the drivers' acceptance of blind spot detection systems. The researchers used multiple methods to collect data using pre-tested questionnaires, focus group interviews and the field operational tests (FOT). The results of the study were that a vehicle safety aid-system that is not appreciated by drivers, would not be used effectively. The multi-dimensional approach used by the authors to the study of driver safety behavior is supported by Woodcock (2012) and is in line with this current study in that the study integrates an inclusive OD approach where the design of an intervention has to involve the users for it to be successful (Worley & Cummings, 2009). In

the following section, a discussion on the creation of road traffic safety standards provides a framework that can be universally followed by stakeholders concerned with the improvement of road traffic safety.

#### 2.4.4 International Standards Organisation (ISO): 39001: Road Traffic Safety

##### **Management Systems**

Managing road safety is a shared responsibility at international, national, regional, and local levels that engages government, industry, and civic society across a wide range of sectors (World Health Organisation, 2004; Chen, 2010; World Health Organisation, 2010; Bliss & Jeanne, 2012). The multi-disciplinary scope of road traffic safety and related challenges require sustained institutional leadership, collaboration and delivery capacity within government agencies as well as with their industry, business sectors and civic society partnerships to achieve country goals (Masuri, Isa & Tahir, 2012). Government leadership and related performance targets, tools and incentives are necessary for organisations to be responsive to their safety interests and the secondary co-benefits arising from improved road safety (Masuri, *et al.*, 2012). At the same time there is always a risk that competing interests will submerge this shared responsibility and hence the requirement for effective governance (Chen, 2010). The need for consistency and sustained effort led to the development of the International Standard Organisation (ISO): 39001 Traffic Safety Management System (Bliss & Jeanne, 2012).



**Figure 2.5. Road traffic safety strategy framework: Source: Bliss & Jeanne (2012:51, fig.1)**

The International Standards Organisation (ISO) is developing a new road safety management system standard (ISO 39001) to assist organisations of all types and sizes to establish and implement road safety management systems that address the safety of their staff and other road users impacted by their operations (Bliss & Jeanne, 2012). According to Bliss and Jeanne (2012), ISO 39001 is a family of ISO management system standards, and uses Shewhart's *Plan-Do-Check, and Act* framework of organisation development as illustrated in Figure 2.5. Key elements in the ISO model include the requirements for an organisation to adopt the safe system and decide on targets and objectives for improved safety outcomes covering all areas within the organisation's sphere of influence that are known to help achieve road traffic safety. The aim is to guide organisations through a process of continual improvement in road safety performance towards the goal of no road

deaths or serious injuries arising from their activities and supports the transfer of knowledge about successes achieved elsewhere (Hyder, *et al.*, 2012). The next section, discusses the recommendations on the road-traffic safety management systems and strategies.

## **2.5 RECOMMENDATIONS ON ROAD TRAFFIC MANAGEMENT SYSTEMS AND STRATEGIES**

Efficiency in the management of road traffic safety is achievable by developing a public transport system and putting social constraints for private vehicle use (Raina & Mushtaq, 2011). For the traffic management system to be effective, the following factors need to be in place (Morrison, Petticrew & Thomson, 2003; Chen, 2010; Raina & Mushtaq, 2011; Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia Institute of Road Safety Research, 2012; SafetyNet, 2009):

- Involvement of entire communities or the nation at large; in order to win the support of the communities, people must be informed why certain actions are being taken.
- Setting road traffic safety targets (specific, measurable, realistic, and time-bound); for the targets to be shared and for collective effort to be harnessed towards the attainment of the targets.
- Development of a public sector transport system which can effectively reduce the number of private vehicles on the road and will help the weaker section of the society to easily and respectfully manage their transport needs.
- Developing a centralised transport database for all vehicles on the road, which help in maintaining law and order, help in accidents probing and restricts traffic offenders.

- Reducing the need to travel by adopting virtual workgroups, and teleworking schemes; which also reduce the number of vehicles on the roads and the potential road accidents.
- Increase in cycling and walking through creation of safe walking and cycling routes and cycling facilities; this measure also reduces the number of vehicles on the roads, which reduce the traffic accident burden.
- Reducing vehicle speeds, which reduces crash impact, and lessens injury severity and road accident mortality.
- Promoting car sharing through voluntary planning of trips and discouraging sole ridding; which also decongests the roads and reduces the incidence of road accidents.
- Improving road safety skills and behaviour, in order to enhance pro-activeness, reactiveness and consequently reduces crash incidence and to some extent crash severity.
- Child road safety education promoting the teaching of safe road usage and traffic rules as part of the education curriculum.
- Introducing school and work travel plans with the aim of cutting congestion caused by school-run or work-run.
- Introducing traffic calming measures that discourage non-local traffic from using residential streets and reducing the speed of the remaining traffic.
- Modifying risk factors for child pedestrian injuries; (for example; in order of effect size are: age, behaviour, race, and sex. Social and cultural risk factors increasing likelihood of child pedestrian injuries are income, crowding, mother's working status and history of hospitalisation, illness in the family, and mother's education. Physical environment risk factors are, in descending order, volume of traffic, speed limit,

predominant type of dwelling, absence of play area, location on road, protection of play area, proportion of curb side parking, street mean vehicle speed, shared driveway, type of road, time of day, weather, and street-lighting.

- Installing guardrails to reduce both the number of accidents, and their severity.
- Installing crash cushions to reduce both number and severity of accidents.
- A review of traffic laws and penalties to serve as a deterrent to would be traffic offenders.
- Promoting road safety campaigns and mass education.

According to Bliss and Jeanne (2012); Chen (2010); and the World Health Organisation (2010), the road-traffic safety management strategy should encompass the following:

- i. Identifying a lead agency in government to guide the national road safety effort.
- ii. Assessing the problem, policies and institutional settings relating to road traffic injury and the capacity for road traffic injury prevention in each country.
- iii. Preparing a national road safety strategy and plan of action to guide collective action against road traffic accidents.
- iv. Allocating financial and human resources; to address the problem by making the assigned people accountable for their task-accomplishment and results.
- v. Implementing specific actions to prevent road traffic crashes, minimize injuries and their consequences, reduce traffic volumes, and evaluate the impact of these actions.
- vi. Supporting the development of national capacity and international co-operation; through collaboration, inclusive action and information sharing.

The key outcome of this literature review is that the concepts of traffic safety management were implemented with notable successes in the developed world particularly in Sweden, Netherlands and Great Britain, where the number of road accidents have been decreasing gradually over time and Zimbabwe can draw evidence based lesson from such countries (Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia Institute of Road Safety Research, 2012). However, there is no empirical evidence of successes in sustainable road-traffic safety improvements in Zimbabwe (Chen, 2010), which is the focus of this study to explore how sustained road traffic safety can be achieved in Zimbabwe. The next section discusses road-traffic safety evaluation.

## **2.6 ROAD TRAFFIC SAFETY EVALUATION**

According to Vis and Van Gant (2007) road safety performance-indicators are any measurements that are causally related to vehicle crashes, fatalities and/or injuries used to indicate safety performance or to understand the process that leads to road traffic accidents. Safety performance indicators therefore are a means of monitoring, assessing and evaluating the processes and operations of road safety systems concerning their potential to solve the traffic safety problems on the roads (Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; SafetyNet, 2007). According to Martinez, Mantaras and Luque (2013) the first step in reducing road traffic accidents is to identify the causes of road traffic accidents and interventions should be prioritized based on the significance of each cause of accident which brings to the fore the issue of measurement. In order to expose the road exposure data amongst different countries, it is important to relate the number of accidents, injuries or fatalities to some indicator of traffic volume, which is the exposure (Vis & Van Gant, 2007). Fatal accident figures on their own cannot help in comparing the numbers for one country with the numbers for another country (Hale, 2007). According to SafetyNet



(2009) and Martinez, *et al.*, (2013), the following indicators were central in road-traffic safety measurement.

#### 2.6.1 Population

Population data includes all nationals and non-nationals legally residing in the country but excluding temporary visitors to a country, tourists and illegal immigrants (World Health Organisation, 2004; Chen, 2010; Bliss & Jeanne, 2012). Population characteristics such as alcohol and drug use, race, age and occupations are also important determinants of road traffic-safety behavior as they influence road user behaviour (Elvik & Veisten, 2005).

#### 2.6.2 Vehicle fleet

Vehicle fleet includes data on national fleet numbers by make and model (Bliss & Jeanne, 2012). National vehicle fleet is the national stock of road vehicles registered and licensed to use roads open to the public excluding military vehicles. Vehicle fleet characteristics such as protective or in-built vehicle safety systems, daytime running lights and age of the fleet are also important determinants of road traffic safety (World Health Organisation, 2010).

#### 2.6.3 Road length

Road length includes both public and private roads to which the public has right of access, for the primary use of road motor vehicles running on their own power and wheels (Elvik & Veisten, 2005).

#### 2.6.4 Fuel consumption

Fuel consumption is the total consumption of energy by road motor vehicles in the country. It is a very rough estimator of vehicle population in a country as motorists from

neighbouring countries can also buy large quantities of the country's fuel particularly where the country has a transit route to neighbouring countries (Bliss & Jeanne, 2012).

#### 2.6.5 Driver population

The driver population includes both local and foreign licensed drivers plying the country's roads (Elvik & Veisten, 2005). Statistics are usually not up to date due to emigration/immigrations of drivers, and as a result of deaths, and deceased drivers not being removed from the registers (Chen, 2010).

#### 2.6.6 Vehicle kilometers

Vehicle kilometers are a measure representing the movement of a road motor vehicle over one kilometer of road surface (Bliss & Jeanne, 2012). This performance indicator entails the recording of odometer readings annually through the annual inspection of vehicles (Datta, Sharma & Schattler, 2003).

#### 2.6.7 Emergency services and trauma management capability

Emergency services and trauma management capability are a key measure of the capacity to respond to a road traffic accident and save life through the provision of health and safety emergency services (World Health Organisation, 2010).

It is imperative from this discussion on traffic-safety indicators and measures, that governments maintain central data on road safety indicators (World Health Organisation, 2010). The accuracy of the data collected determines the accuracy of decisions made based on that data (Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia Institute of Road Safety Research, 2012). It is evident from the discussion that relating the

number of vehicles to the population, vehicle kilometers to the road length etcetera will enable comparative analysis across nations as opposed to comparing absolute figures (Hale, 2007; SafetyNet, 2009; World Health Organisation, 2010). The literature review revealed that the setting up of data management systems that maintain all the necessary data elements will be the challenge of many developing nations such as Zimbabwe due to inadequate financial, human and material resources with which to achieve this kind of infrastructure (Chen, 2010; World Health Organisation, 2010). In the next section, the study brings the literature review into perspective by integrating all the pieces of information together and drawing conclusions on the significance of the literature review in shaping the road traffic-safety interventions planning and execution in Zimbabwe.

## **2.7 CONTEXT OF THE RESEARCH**

Road traffic accidents are indiscriminant and rob the country of its skilled human resources and physical assets such as vehicles and other property damaged in accidents (World Health Organisation, 2010). Training and development of new skills takes time and costs corporations significant sums of money each year (Chen, 2010). Reducing road traffic accidents therefore frees resources for firm development and helps corporations focus on new skills development and innovation as opposed to expending resources on replacements (Diedericks, 2014; World Health Organisation, 2010).

Road traffic safety is a multi-faceted problem embodying; a phenomenon---the incident of accidents, a structural problem---the infrastructure capacity, a process issue---how the road traffic safety interventions are implemented and finally a behavioural issue---how culture impacts on road traffic safety behaviour. It is therefore imperative for Zimbabwe to explore ways of intervening in the fight against road traffic accidents in order to reduce or eliminate

the costs associated with road traffic accidents, which threaten people's safety, business viability and sustainability. The cost of road traffic accidents to the business in Zimbabwe is not available anywhere in the literature and even in government publications and it is a research gap which is outside the scope of this research but can be covered in future studies. It is therefore in the interest of every Zimbabwean that road safety interventions be developed based on valid research to reduce or eliminate accident-induced costs and achieve sustained road traffic safety.

While there are various qualitative studies addressing safety issues, very few studies have specifically focused on how to mitigate against the burden of road traffic accidents on society in general such as was covered by this study. Shaik (2012) carried out a qualitative study on critical success factors for the implementation of a safety culture in South Africa based on the BP Shell South Africa case study. The study provided vital insights on how to conduct a qualitative research study. According to Shaik (2012), multi-methods ranging from structured interviews, observation, and ethnography were employed. The research team comprised of people with experience and knowledge on the field of study. According to Shaik (2012), the qualitative research approach gives flexibility to a study as it does not follow rigid processes and procedures and can have its steps varied to align with the changes happening on the ground hence its selection as a research methodology for this study.

Shaik's (2012) study was important to the current study as it informs methodology and addresses a common challenge regarding system-wide change interventions. However this study bridges a gap in Shaik's study in that whilst Shaik provided a broad based framework for addressing the safety culture challenge, this study provides a more focused study

concentrating on just road traffic safety and explored what the TSCZ did to address the road traffic safety challenge from an organisation development perspective.

Guruva (2009) conducted a mixed methods study that inspired this research. Guruva (2009), researched on the effectiveness of defensive driving as a preventative strategy for road traffic violations and collisions in Zimbabwe. Guruva's study followed a research question and hypothesis. The study was based on a sample of 100 defensive driving students trained by the Traffic Safety Council of Zimbabwe (TSCZ) between January 1999 and December 1999.

Guruva's (2009) study followed a cross-sectional study of the driver behaviours before and after taking the defensive driver training course. Twenty respondents were recruited from five companies in each of the five cities in Zimbabwe who had taken the defensive driving course based on the training records of the TSCZ. Guruva (2009) used a descriptive survey research to obtain descriptions of behaviours of drivers before and after they took the defensive driver course.

Guruva (2009) employed a stratified random sampling technique to select the respondents. A self-administered open-ended questionnaire was mail-posted to the respondents after a visit to each of the selected companies by the researcher to explain the purpose of the study, and to obtain permission to conduct the research. A pilot test of the questionnaire was carried out on a limited part of the sample to improve the design of the questionnaire, clarify the instructions for completing the questionnaire and consequently improve the reliability of the questionnaire (Guruva, 2009). The collected data was sorted, categorised,

coded and thematic analysis was employed to decipher trends and meanings from the data.

The significance of the study carried out by Guruva (2009) to this study is that the studies share common themes in that both the current study and the Guruva study focus on a common problem—road traffic safety. The Guruva (2009) study therefore, informed the methodology of the current study. The current study bridges a gap in Guruva's study in that whilst Guruva focused just on defensive driving as a preventive measure for road traffic accidents, the current study went further, and explored the problem of road traffic safety in its entirety by proposing an organisation development approach, embracing all stakeholders, causes, effects, and potential remedies.

González-Iglesias, Gómez-Fraguela, and Luengo-Martín (2012) studied the impact of driver anger on the incidence of road traffic accidents among sexes. The qualitative study used a questionnaire and a five point Likert scale was employed. Five hundred and forty one drivers aged between 18 years and 73 years made up the sample. A driving anger scale adopted from a 2008 study by González-Iglesias as cited in González-Iglesias, *et al.*, (2012) was used to evaluate driver behaviors such as discourtesy, traffic obstruction, hostile gestures, slow driving, and illegal driving. The respondents were asked to imagine themselves in different situations and to explain how they would react to each such situation (González-Iglesias, *et al.*, 2012).

Data was collected on an individual basis with each respondent being given the background to the study and being invited to take part in the survey voluntarily when they went for the assessment visits (González-Iglesias, *et al.*, 2012). Data analysis was done

using the SPSS software package. Descriptive statistics, tables of analysis, and regression analyses were used to decipher the data and to understand the phenomenon.

The qualitative and mixed methods studies briefly described, inform the methodology of the current study and illustrate how qualitative data can be informed by quantitative-statistical methods, which added insightful dimensions to the current study.

## **2.8 CONCLUSION**

The literature exposed that sustained road traffic safety does not come about by accident (Chen, 2010; Bliss & Jeanne, 2012; Hyder, *et al.*, 2012). Concerted effort and strategic planning by entire communities led by a lead government agency, following organisation development approaches, is required in order to bring about the desired change in road traffic-safety culture (SafetyNet, 2009; Bliss & Jeanne, 2012). A national road-traffic safety strategy is required, which is understood, shared by all the inhabitants of a nation, fully supported and funded from central government, and backed by all the stakeholder parties (Hyder & Bishai, 2012; World Health Organisation, 2010). Community ownership of the intervention programs needs to be inculcated, and regular evaluation and feedback of progress or the lack of it should be communicated to all the relevant stakeholders (Hale, 2007; World Health Organisation, 2010). For quality decisions, an objective system of data management and event measurement needs to be in place and this requires central organisation on the part of government (Bliss & Jeanne, 2012). Finally, the literature exposed numerous case studies of successful models of road traffic safety interventions, particularly the case of Sweden, Netherlands and the United Kingdom, from which Zimbabwe can draw evidence-based lessons and does not have to re-invent the wheel

(Hyder, *et al.*, 2012). The next chapter discusses the research methodology used in this study.



## **CHAPTER 3**

### **3. RESEARCH DESIGN AND METHODOLOGY**

This chapter presents a detailed account of how the study was conducted. Underpinning the study were the following key definitions.

#### **3.1 CONCEPTUALISATION, DEFINITIONS AND KEY VARIABLES**

The following section discusses the key definitions underpinning this study.

##### **3.1.1 Road traffic safety**

Road traffic safety refers to all the efforts aimed at reducing the risk of a person using the road network being killed or seriously injured (Diedericks, 2014; SafetyNet, 2009; World Health Organisation, 2010). Underpinning road traffic safety is the concept of traffic safety culture (World Health Organisation, 2010).

##### **3.1.2 Road Traffic Safety Culture**

Traffic safety culture are the beliefs, norms, habits people have, the behaviors they think are normal, and how they react to any changes to these behavioral norms (Gonzalez-Iglesias, Gomez-Fraguela, & Luengo-Martin, 2012; SafetyNet, 2009). A safety culture is expected to reduce road traffic injuries and fatalities (World Health Organisation, 2010).

##### **3.1.3 Road traffic accident injuries**

Accident injuries refer to the external and visible disabilities, and invisible discomfort, dislocation, disfigurement, dismemberment including pain, suffering and trauma, resulting

from a road traffic accident (Diedericks, 2014). Injury prevention can be achieved by implementing interventions aimed at reducing exposure to accidents or minimizing the severity of accidents when they occur (Chen, 2010; World Health Organisation, 2004; World Health Organisation, 2010; SafetyNet, 2009).

#### 3.1.4 Road Traffic Safety Interventions

Road traffic safety interventions comprise strategies and intervention action plans to address safety targets (Bliss & Jeanne, 2012; Raina & Mushtaq, 2011; SafetyNet, 2009; Masuri, Isa & Tahir, 2012 ). According to M'bailara, *et al.*; (2013) interventions should appeal to the driver's mental status, which deals with driver emotional reactivity, and mental alertness. Masuri, *et al.*, (2012) posited that interventions should be premised on detailed understanding of the human-machine-environment so that interventions address the right causes.

#### 3.1.5 Traffic safety evaluation

Evaluation research reveals whether the intended results of the interventions are being achieved (Mouton, 2011; Hale, 2007). Evaluation is at the heart of this research; to establish whether road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe are achieving sustained road traffic accidents reduction in Zimbabwe.

### **3.2 CONDUCTING THE LITERATURE REVIEW**

According to Creswell (2009), a mixed method study anchors on literature reviews, which inform and justify the gap in knowledge the study is intended to bridge. The literature review premises on the following principles of systematic literature review:

1. Mapping the field of study through a scoping review by limiting the scope of the search using topic clusters, key terms and definitions.
2. Comprehensive search using multiple search engines and databases in order to achieve saturation and completeness of the investigation.
3. Quality assessment by judging the quality and experience of previous researchers guided by a self-designed literature review template and annotated bibliography.
4. Synthesis through the use of the *meal* plan to write the literature review such that each paragraph contains (Walden University, 2013):
  - M - Main point of the paragraph or thesis statement
  - E - Evidence supporting the main point with citations
  - A - Analysis of the evidence
  - L - Lead to the next paragraph or sign posting
5. Saturation assessment by judging whether further literature searches yields new insights or not.

A search plan was developed comprising the research questions, the keywords, and a set of inclusion and exclusion criteria (Snaebjornsson & Edvardsson, 2013). Research articles and/or publications centered on road traffic safety, and organisation development interventions were relevant to the study as they captured the essence of this study. One of the purposes of the study was to establish which aspects of road traffic safety in Zimbabwe had been previously researched. Which methods had been used and in which parts of the world? The study also sought to find out what conclusions from research on road traffic safety were available with the focus on system-wide interventions to achieve sustained road traffic safety.

A general literature search on the internet on road traffic safety yielded 202 results. The researcher decided to focus on the key phrases, "Road Traffic Safety AND/OR road traffic safety interventions" as these terms were interdisciplinary and could be used in everyday language. This validated search proceeded by conducting multiple library searches on road traffic safety and/or road traffic safety interventions.

Primary searches were done in various databases such as; EBSCO host, articles by topic, business management, business source complete, and this yielded 10 results. Other searches were done as follows; EBSCO host, articles by topic, Health sciences, Health and medical complete and 19 articles were found about road traffic safety. The same approach was carried out for many other databases thus generating the 202 relevant articles.

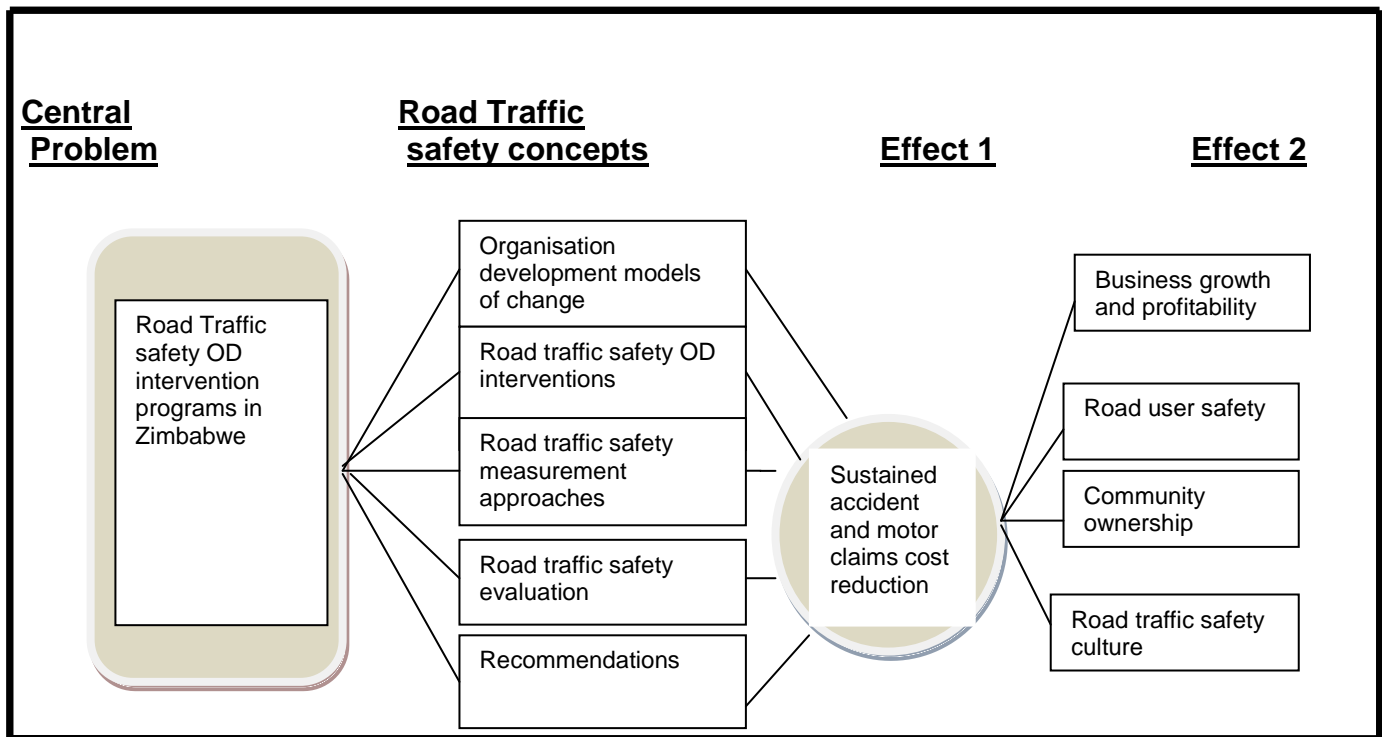
Further synthesis of the articles revealed that most of them were concerned with the terminology, statistical comparisons or conceptual/philosophical aspects of the subject--- road traffic safety and road traffic safety organisation development interventions, and were not relevant to this study. Specific search was made possible by the use of inclusion and exclusion search criteria. Inclusion criteria were: Publication period 2009 to 2013, English language, full text, peer reviewed, and *Road traffic accidents OR Road traffic safety AND/OR road traffic safety interventions*.

An annotated bibliography that consisted of the key aspects of the field of interest created the literature bank from which citations were drawn. In this case it was author(s), year of publication, place of research, research aim/objective, research method, main findings. The Mendeley reference management system was used to maintain the literature reviewed. The reason for starting the search at the year 2009 was twofold: (a) the study focuses on road

traffic safety interventions carried out during the period from 2009 to 2012 and; (b) the study focuses on the most recent research within the field of study. After reading titles and abstracts, the number of articles narrowed even further, focusing only on those related to road traffic safety and organisation development approaches. After this stage, the number of articles reduced to 87. After reading the titles, abstracts and conclusions, a further review of the sources was done. The following articles were included in the review:

1. Those related to road traffic safety
2. Those that used organisation development techniques to solve the road traffic safety challenge.
3. Those that were based on empirical research and were peer reviewed
4. Government publication or those of the United Nations agencies.
5. Leading books on organisation development studies

A conceptual framework denoted the focal areas. According to Creswell, *et al.*, (2012:15), a conceptual framework is an explanation for events, which links key concepts or principles, “hierarchically with the larger concepts at the top and flowing out to subsidiary concepts”. In figure 3.1, the central problem is road traffic accidents in Zimbabwe, and this central theme branches out into five concepts beginning with OD models of change, road traffic-safety interventions, road traffic-safety measurement approaches, road traffic-safety evaluation and finally recommendations on how to achieve sustained road traffic safety. This literature review stems from this conceptual framework and covers the five concepts outlined in figure 3.1.



**Figure 3.1. Literature review conceptual framework (Own compilation)**

Figure 3.2, shows the search process. After the screening, the researcher reviewed 66 full text papers. The 66 articles were grouped according to their focal areas. The following literature categories formed the basis of the literature review: (a) Road Traffic Safety Management Systems, (b) Road traffic safety interventions and intervention models, (c) Road traffic safety measurement and evaluation.

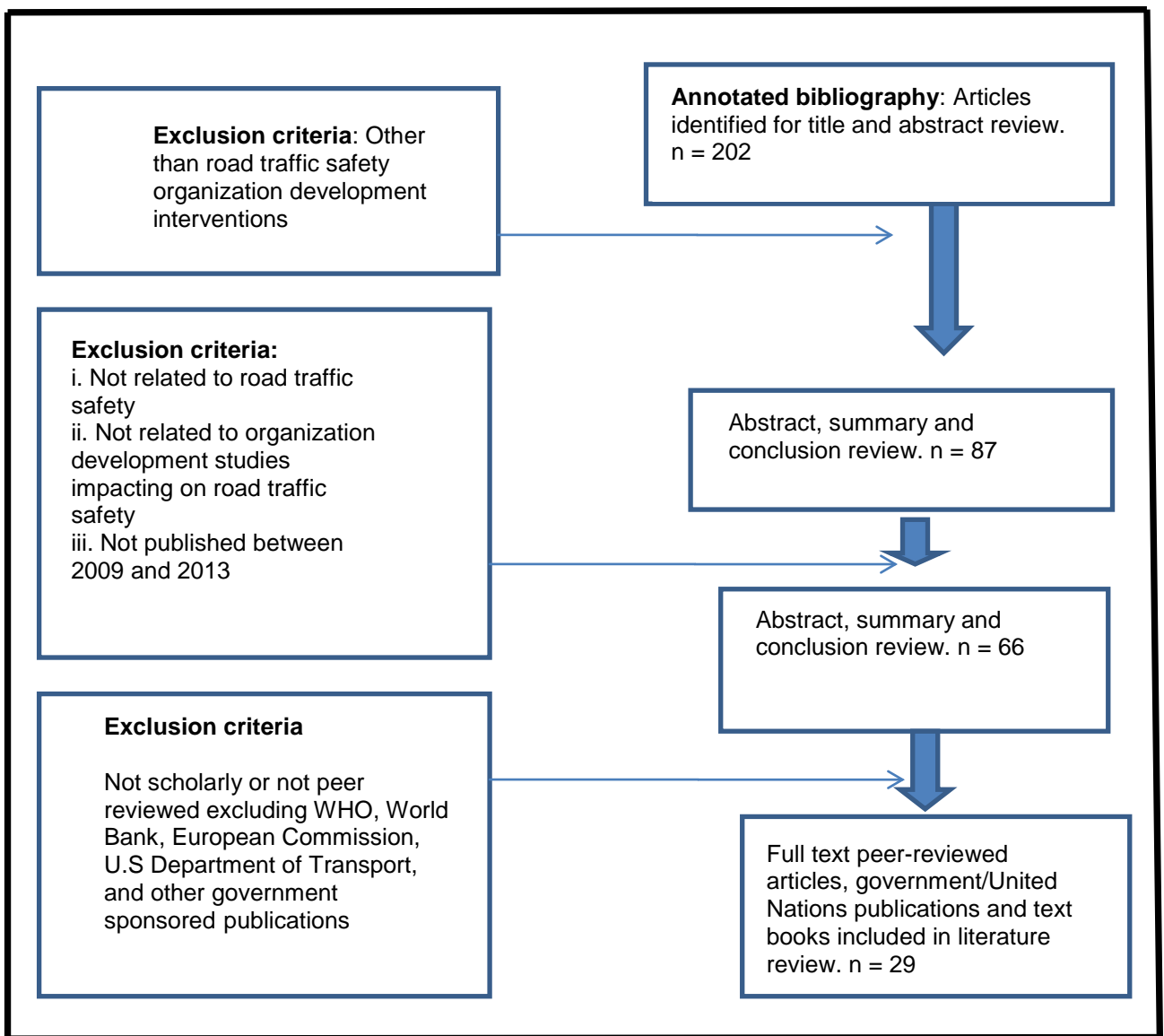


Figure 3.2. Search flow for literature on road traffic safety based on organisation development techniques (Own compilation)

The two concept models underpinning this study are the OD cube (figure 1.2) and the literature review conceptualization-framework (figure 1.1). The OD cube explains which interventions address which causes given a particular setting or situational factors (French & Bell, 1990). The literature review concept-map explains how the key themes in the study are connected and flow from each other (Creswell, *et al.*, 2012). The significance of these two models in this study is that the two models underpin the structure of the study and inform what is directly connected to the study and what is not. The OD cube focuses the study on interventions to change the status quo whilst the conceptualisation framework directs focus to road traffic-safety matters. Effecting change in human systems requires

planning and decision-making and in the next section, models of intervening in human systems are discussed to guide the approaches used in evaluating the road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe between 2009 and 2012. The plan-do-check-act (PDCA) framework and the action research approaches were selected as the benchmarks with which to judge the intervention approaches used in the Zimbabwe road traffic safety initiatives because the two approaches focus on change and emphasize measurement and evaluation, which is in line with the purpose of this study.

### **3.3 THE PLAN DO CHECK ACT CYCLE: A FRAMEWORK FOR EFFECTING CHANGE**

The plan-do-check-act (PDCA) cycle (also known as the Shewhart's PDCA cycle, or the Deming cycle) is a framework for continual process improvement, which outlines how organisations implement change efforts (Johnson, 2002). The PDCA cycle was chosen as an underlying philosophy of this study as it helps in the evaluation of how the Traffic Safety Council of Zimbabwe carried out the road traffic safety interventions. The PDCA cycle has the following four steps for change implementation:

1. Plan: identify the need for change, and plan the change.
2. Do: execute the change.
3. Check: Review results of the change effort and identify new or emerging insights.
4. Act: Take action based on outcomes or what you would have learnt in step number three.

The choice of the PDCA model as the theoretical framework underpinning this study premises on the need to introduce systematic intervention planning, execution of planned action, reviewing of the results of the action and the taking of further action based on evaluation of the results of action already taken (Moen & Norman, 2010). The systematic



intervention approach outlined by Johnson (2002) is a tool that can help in identifying where Zimbabweans could be lacking in the fight towards sustained road traffic safety. There are similarities between the PDCA approach to change interventions and the action research approach in that both approaches rely on systematic data collection, evaluation and action taking based on objective diagnostics (Moen & Norman, 2010; French & Bell, 2010). The next section presents a discussion on the action research model.

### **3.4 THE ACTION RESEARCH FRAMEWORK TO EFFECTING CHANGE**

The action research approach is the change-intervention evaluation framework used in this study to guide the evaluation of what was done by the Traffic Safety Council of Zimbabwe in attempt to control the road traffic safety scourge in Zimbabwe. According to Brydon-Miller, Greenwood and Maguire (2003:10), action research is:

A participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities.

Baum, MacDougall, and Smith (2006) reinforced the definitions given by Brydon-Miller, *et al.*, (2003) by adding that action research is research whose purpose is to enable action. Action research is a helical reflective process, whereby participants collect and analyse data, then determine what action should follow (Singh, 2008). The resultant action is researched and an iterative reflective process perpetuates data collection, reflection, and action in a helical fashion (Fals Borda & Rahman, 1991; Baum, *et al.*, 2006). French, Bell and Zawacki (2005:224) described the action research model as, “a spiral of steps, each of which is composed of a circle of planning, action and fact-finding about the result of the action”. It is apparent from the definitions that in order to derive actions from research

findings, a need exists to develop an efficient information management system that ensures that accurate information is disseminated on time to the right people to enable them to take timeous action based on valid research findings (French & Bell, 1990).

According to Brown and Harvey (2012), organisations frequently use the action research approach to effect change because action research is evidence based and inclusive in approach. According to Brown and Harvey, the change agent guides the client organisation to diagnose their own problems and propose solutions to their problems in a five-stage process as follows:

1. **Stage One:** The need for change is anticipated. There must be a felt need because only when there is a compelling need can people accept change.
2. **Stage Two:** Development of the practitioner-client relationship begins at this stage. Once a need for change is identified by the organisation, an OD practitioner is identified to guide the change process.
3. **Stage Three:** The diagnostic phase is set in motion. Information gathering using various tools of enquiry such as interviews, observation and questionnaires assist in identifying what is causing the problem.
4. **Stage Four:** Action plans, strategies and techniques are developed in preparation of the intervention process. Planning to take action against the identified problems begins by breaking down action items, assigning roles, responsibilities and budgets.
5. **Stage Five:** Self-renewal, monitoring and stabilisation of the change processes begin. As the client and practitioner engage with the problem, and measuring their successes and failures, corrective action is taken along the way until the change momentum is internalised. The team develops capacity to diagnose own problems and to solve them and it will be time for the practitioner–facilitator to leave and the organisation carries on with the change initiative.

Action research provides for sustenance of existing relationships, advocating for authority and power to be deliberately shared between the researcher and the researched thereby blurring the line between the researcher and the research subjects until the researched become the researchers (Baum, *et al.*, 2006). The researched cease to be objects and become partners. The parties work together in the whole research process, including selecting the research topic, data collection, and analysis and deciding what action to take resulting from the research findings (Baum, *et al.*, 2006).

The definitions of action research by French and Bell (1990), Brydon-Miller, *et al.*, (2003), Baum, *et al.*, (2006) and Singh (2008) expose that people's knowledge and ability to understand and solve issues and problems confronting them in their communities must be recognized and respected. It is a learning point from the definition of action research that people need support, guidance and resources for them to solve issues confronting them in a manner that is congruent to their cultural context and lifestyles (Cummings & Worley, 2009). The action research approach anchors on the belief that desired results are achievable when people work in collaboration with others (Chen, 2010; Senge, 2006; Singh, 2008). The choice of the action research approach was motivated by the fact that action research is a continuous process of learning by doing, involving listening, learning, creativity and democratic participation (Rothwell, Sullivan, & McLean, 1995; Baum, *et al.*; 2006; Brown & Harvey, 2012).

The action research model was the most appropriate to guide the study because of its reliance on action to be preceded by research and evaluation in a helical fashion, with each round of actions being followed by research and evaluation (French & Bell, 1990; Cummings & Worley, 2009). According to Brown and Harvey (2012), to sustain the change

momentum, capacity for self-renewal must be in-built and it is critical to know where you are before charting a new course. This study focuses on action research because action research requires action by the people for their own benefit and integrates theory and practice. Collaborative problem solving is central to the scale of participation required in achieving sustained road traffic safety in Zimbabwe, as all Zimbabweans are required to play a part in safe road use, which is the purpose of this study. After defining the key concepts and definitions, and demarcating the theoretical constructs to guide the study, the next section presents the decisions made regarding the choice of research methods, samples and the sampling methods.

### **3.5 RESEARCH DESIGN, SAMPLE DESIGN AND SAMPLING METHODS**

This study follows the mixed methods research approach. The mixed methods research approach can be defined as a methodology that incorporates “multiple approaches to data collection” such as “observations and interviews” combined with the use of questionnaires (Creswell, 2009:14). It is the use of multiple approaches that neutralises research bias that might emerge from using a single qualitative or quantitative research design (Creswell, 2009). As Creswell (2009) revealed, the historical aspects of the mixed methods research design emerged from the psychology discipline and was introduced by research pioneers such as Campbell and Fiske (1959), Jick (1979), Tashakkori and Teddlie (1998), and Creswell and Plano Clark (2007). According to Creswell, *et al.*, (2009), the mixed methods research design is becoming more popular among researchers in many disciplines because it integrates both qualitative and quantitative research into a more comprehensive research methodology.

This chapter will outline the strategy used in the mixed methods research methodology. This chapter also outlines; (1) a description of the research design, phase 1 and phase 2, (2) a justification for using mixed method research, (3) the approach to data collection and analysis---phase 1 and phase 2, (4) population and sample size---phase 1 and phase 2, (5) proposed survey instrument---phase1 and phase 2, (6) variables assessed in the research, (7) data analysis and interpretation---phase 1 and phase 2 and, (8) the researcher's role. In addition, this mixed-method study will bridge a gap in knowledge on road traffic safety in Zimbabwe using organisation development approaches as very few studies explicitly employ OD techniques to solve the road traffic safety challenge.

### 3.5.1 Research Design: An overview

The study follows a concurrent and sequential descriptive-explanatory mixed methods research approach. The quantitative inquiry or phase 1 of the study, focuses on what causes road traffic accidents and the effectiveness/ineffectiveness of some road-traffic safety interventions while the qualitative inquiry or phase 2 of the study, focuses on the in-depth descriptions of the phenomena of road traffic accidents and road traffic safety, and the understanding of road traffic safety behaviours.

The purpose of this mixed-methods study is to explore what needs to be done for sustained road traffic safety to be achieved in Zimbabwe. The study examines the road traffic safety interventions implemented by the Traffic Safety Council of Zimbabwe between 2009 and 2012 and evaluates how these interventions influenced the road-traffic safety outcomes in Zimbabwe. The study is a multi-sectorial and multi-factor study, which embodies multiple worldviews.

### 3.5.1.1 Research paradigms or worldviews

The study explores the causes of road traffic accidents and explores why certain road traffic safety interventions are effective/ineffective together with an evaluation of the cause-and-effect mapping and this required the postpositivist worldview, which anchors on quantitative research methods---phase 1, of the inquiry. Further, an in-depth understanding and explanation of human safety behaviour and the structural factors that cause road traffic accidents is achievable through the lenses of social constructivist/interpretivist worldview, which rely on qualitative research methods in phase 2, of the inquiry.

The social constructivist worldview and interpretivist worldviews using qualitative research methods may not answer the how many and the causation questions, which are addressed by the postpositivist worldview using the quantitative methods of inquiry. The advocacy and participatory worldview present better chances for the protection of the marginalised societal groups and rely on the qualitative methods of inquiry but are outside the scope of this research, which specifically excludes the young aged below 18 and the old, aged above 65 years.

The road-traffic safety challenge requires solutions for sustained road traffic accident reduction to be achieved. The search for solutions to the road-traffic accident challenge brings in the pragmatic worldview, which anchors on the mixed methods of inquiry. Multiple methods help reduce the limitation imposed by single methods in problem diagnostic and solution finding (Creswell, 2009). It is evident from this discussion that the choice of the mixed methods research approach was driven by the need to answer the research questions and to come up with solutions to the research problem.

### 3.5.2 Research strategy justification and visual model

The problem statement presents behavioral, structural, process and relational tenets, which dictate the adoption of an interpretivist-postpositivist paradigm. Although the main study orientation will be the social constructivist/interpretivist paradigm, there are elements of postpositivism due to the need to understand the relationships between variables particularly causation (Creswell, 2009). According to Creswell and Plano Clark (2011), the community's understanding of phenomena derives from experiences, interactions, exposures and people's inherent biases, which are varied, and complex. In the quest to understand relational phenomena, it became imperative to link outcomes to causes (Creswell, 2009; Kalof, Dan & Dietz, 2008) hence the use of elements of the postpositivist paradigm. In a sense, the problem statement imports the pragmatic worldview into the discussion because of the need to establish what works in reducing road traffic accidents and the search for road-traffic safety solutions.

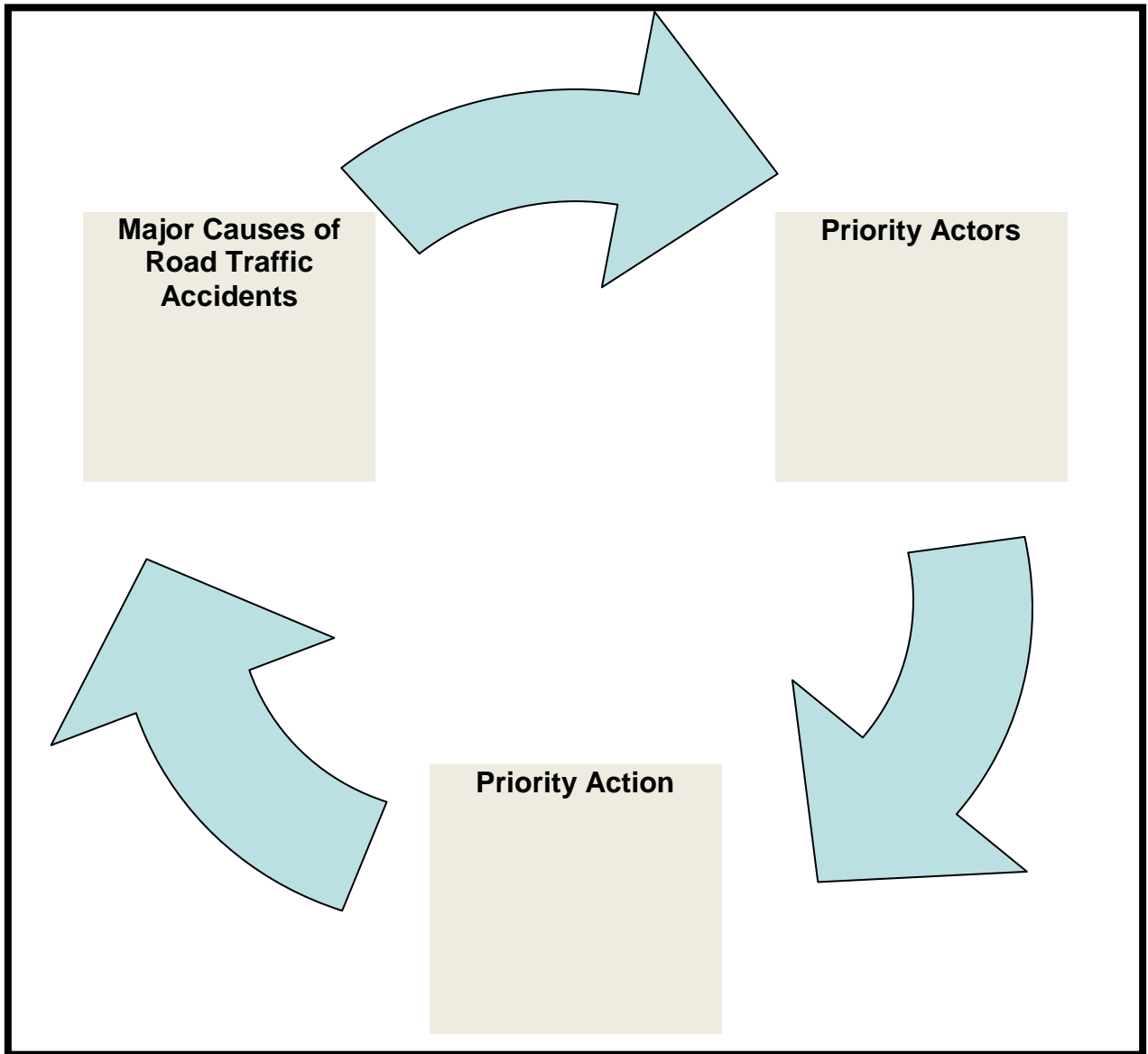
The problem statement therefore dictated a concurrent and sequential descriptive-explanatory mixed methods research approach. The quantitative phase of the inquiry focuses on what causes certain outcomes to occur, during phase 1 of the study while the qualitative phase of the study focuses on the in-depth descriptions of the phenomena, and the understanding of behaviours, during phase 2 of the inquiry.

The advocacy worldview matches with a qualitative research method (Creswell, 2009). The intent behind this approach is to advocate for the marginalized groups in society. In the proposed study, the young below 16 years and the mature over 65 years form an interest group that may require protection in terms of the road traffic laws. This study however,

does not use the advocacy worldview and the young below 16 years and the old, above 65 years were specifically excluded from the study.

The pragmatic approach matches with a mixed method research design (Creswell, 2009). The intent is to find solutions to problems and the research approach employs multiple methods to derive solutions. The pragmatic worldview therefore employs both the qualitative and quantitative approaches to solving the road-traffic accident challenge and the mixing of the methods can occur at question generation or data analysis and interpretation (Creswell & Plano Clark, 2011). It is from the pragmatic worldview that the following diagrammatic representation of the change effort is presented for addressing road traffic safety challenges in Zimbabwe using organisation development techniques:





**Figure 3.3. Cause, Action, Actor mapping framework (Own compilation)**

The diagrammatic representation, Fig. 3.3, informs intervention prioritisation and highlights recommended action against specified major causes of accidents. The prioritisation of action matched against the priority causes and the identification of priority stakeholders who should be an integral part of the implementation team, offers an approach to addressing the road-traffic safety challenge. Figure 3.3, illustrates the prioritisation mapping, linking causes, to action and to the action initiators.

The postpositivist paradigm anchors in quantitative methods and seeks to establish the relationships between variables. The study isolates outcomes from causes and seeks to expose which causes result in which outcomes. Reductionist approaches to problem solving narrow the focal point to individual elements and studies their impact on the other elements (Creswell, 2009). Post positivist worldviews rely on scientific measurements and established theories of conducting quantitative studies to guide the inquiry (Creswell & Plano Clark, 2011). From the problem statement, an investigation of what causes road traffic accidents and what makes certain interventions effective and other interventions ineffective are variables studied using the quantitative research methods.

### 3.5.3 Phase1: Quantitative inquiry

The quantitative stage of the research design relies on research questions only. The research questions seek to expose the relationship between the independent and the dependent variables. Quantitative strategies expose trends for the phenomena under study or the determination if a specific variable influences an observed outcome (Creswell, 2009). The purpose of this quantitative stage of the study is to examine which factors were the leading causes of road traffic accidents in Zimbabwe and also to evaluate why certain road traffic safety interventions were effective whilst other interventions were not effective. The quantitative study was a cross sectional survey of road users in Zimbabwe. The questions underpinning the quantitative phase of the inquiry were as follows:

- 1) Which road traffic safety interventions did the Traffic Safety Council of Zimbabwe implement from 2009 to 2012?
- 2) How effective were the interventions in bringing about sustained road traffic accident reduction in Zimbabwe?

### 3.5.3.1 The independent and dependent variables

Two main sets of variables were studied during phase 1 of the enquiry. The first set of variables had the independent variable being road-traffic safety behaviours whilst the dependent variable was the incidence of road traffic accidents given particular road-traffic safety behaviours. The second category had the independent variable being road-traffic safety interventions and the dependent variable was the incidence of road traffic accidents given a particular road traffic safety intervention protocol.

### 3.5.3.2 Case study research design

The researcher followed a case study research design in which the one issue of concern—road traffic accidents, was studied from people with diverse backgrounds to illustrate the multiple perspectives of the problem (Lee, 2012). The case study design used the logic of replication, to replicate the procedures for each person included in the inquiry (Creswell, 2013). The case study research design ensured that background relationships were exposed during the quantitative phase of the inquiry, in preparation for an in-depth qualitative study to decipher why the behaviours and relationships emerged as they did (Lee, 2012; Singh, 2008). A case study design was appropriate because there was a clearly identifiable case within boundaries and the objective of the study was to come up with in-depth understanding of the case (Creswell, 2013; Creswell, Hanson, Plano-Clark & Morales 2007; Yin, 2014). A cross sectional survey of road users in Zimbabwe who experienced the interventions implemented by the TSCZ—the case study, formed the boundary of the study. The study followed a cross sectional descriptive-exploratory case study research design.

### 3.5.3.3 Research instruments

In order to collect data from a large sample in a fast and economical way, questionnaires were chosen as the primary research instrument for the quantitative stage of the inquiry. An

online survey management system, Survey Console (2013) was used to distribute the questionnaires. Question formats and measuring scales were borrowed from a pre-validated questionnaire used by the University of Tasmania (2006) which also used the Survey Console software to administer its questionnaires. Borrowed research instruments have an advantage of having known validity and reliability as compared to a self-designed questionnaire (Creswell, 2013). The Surveyconsole or *Questionpro* online survey software (SurveyConsole, 2013) was chosen for this study because it has in-built capabilities to export data to various formats such as Microsoft Word, Microsoft Excel and to statistical software packages such as Statistical Package for Social Sciences (SPSS). The quantitative data was exported to the SPSS software package for storage, editing and analysis. The survey consisted of a self-administered internet questionnaire (Annexure A) with 11 close-ended questions developed using the Questionpro software. The self-administered internet mediated questionnaire design was utilised because it can reach out to many respondents in a fast and economical way (Veele-Brice, 2010).

Potential weaknesses of the self-administered online survey were that it assumes that the participants possess the skills to comply with the directions for completing the survey, have internet access at the time the instrument is made available and have the time to complete the survey. These weaknesses potentially increase the chances of response bias resulting from non-responses on the survey.

#### 3.5.3.4 Negotiating access to respondents

Written permission to study the TSCZ activities on road traffic safety as well as access to the respondent e-mail databases in Zimbabwe were obtained from database managers for the purposes of administering the questionnaire. The self-administered internet mediated questionnaire was selected as the primary research instrument for the quantitative stage of

the study because internet mediated, self-administered questionnaires offer greater flexibility and convenience as respondents can complete them at their own convenient time and are a fast and economical way of gathering data from a large population.

#### 3.5.3.5 Fieldwork

Introductory letters were sent electronically to the respondents introducing the research and inviting them to participate in the survey on a voluntary basis. The risks and benefits of participating in the study were explained to the respondents. The research instrument was a self-administered internet mediated questionnaire.

The respondents were further required to confirm their voluntary consent to participate in the study by electronically accenting to participation in the study. The internet mediated questionnaire had a voluntary consent validation field which if not ticked, would lock-out respondents from the survey. Additionally, the internet mediated questionnaire also had age validation logic, that locked out any respondents who indicated their age to be below 18 or above 65 years of age. This validation approach ensured the selection of respondents who met the University of South Africa Institutional Review Board standards for academic research.

#### 3.5.3.6 Sampling and sampling methods

Five hundred electronic or internet-mediated questionnaires were distributed to road users selected randomly using the stratified random sampling technique, with the stratum being gender, to collect data from a large population in a fast and economical manner. The inclusion and exclusion criteria for the inquiry group selection was road users, aged from 18years and not older than 65 years. The purpose of the sample size is to select a sample that is representative of the target population and is large enough to minimize the effects of random variation (Creswell, 2009).

The proper selection of a population and sample size is critical to the success of a research project (Creswell, 2009). The population for this study is Zimbabwean road users with internet access. The selected population was identified through a systematic random sample. The sample size is 500 road users with names registered with commercial e-mail databases.

#### 3.5.3.7 Data capturing and data editing

The data was exported to the SPSS software package for sorting and analysis. The SPSS software can perform various quantitative data analytics including regression analysis, measures of central tendency, and cause and effect analytics. Data validation and reliability assessment were also conducted using the SPSS package.

#### 3.5.3.8 Data analysis and interpretation

The data from the questionnaires was downloaded from SPSS into an Excel spreadsheet to enable editing and formatting of results. From the data analysis, collective mean scores for the population were calculated for each road traffic safety characteristic to produce a correlation index between the chosen variable and the incidence of road traffic accidents.

The independent variables measured in the study were road-traffic safety behaviour and road traffic safety interventions carried out by the TSCZ and the dependent variable is the incidence of road traffic accidents resulting from such behaviours or from road-traffic safety interventions. The survey data analysis and interpretation was conducted using the IBM SPSS software (Singh, 2008). The research interpretation includes descriptive analyses detailing the means, standard deviations, correlation analysis and range of scores for each variable. Charts of results were derived from the observations. Using SPSS, the data was

analysed in terms of occupation of respondent, geographical region, level of education, gender and age group.

The value of this quantitative stage of the study is that it addresses a gap in knowledge on road traffic safety in Zimbabwe by bridging the gap identified by Chen (2010) of infrequent studies of questionable validity and reliability, by providing current and valid research based answers to the road-traffic safety challenge in Zimbabwe. Secondly, by focusing on the relationship between road safety variables and the incidence of road traffic accidents, the study challenges the Zimbabwean road users to embrace safe road-use practices, as any one of them is exposed to the risk of road traffic accidents whenever they are on the Zimbabwean roads. According to Creswell (2009), quantitative research is useful in explaining the existence of relationships of the dependent and independent variables. Green and Salkind (2014) posited that relationship does not imply causation but indicates that one or more variables move in sympathy with specified other variables. Co-efficients of correlation will be used to determine relationships, and the following correlation co-efficients determine the strength of the relationships (Green & Salkind, 2014):

- $\pm.75$  to  $\pm 1.0$  Very strong relationship
- $\pm.50$  to  $\pm.75$  Moderate strong relationship
- $\pm.25$  to  $\pm.50$  Weak relationship
- $\pm.00$  to  $\pm.25$  Low to no relationship

#### 3.5.3.9 Establishing validity and reliability

Validity measures the extent to which an instrument measures what it is intended to measure, while reliability deals with whether the same results can be achieved with repeated applications of the instrument (Green & Browne, 2009). These measures were addressed at

instrument design. The following sections briefly explain the tests of validity the researcher adopted with respect to phase 1 or the quantitative stage of the research design.

*a. Content validity*

Content validity is achieved when a measuring instrument provides adequate coverage of the topic under study and is determined by consulting subject experts to judge the effectiveness of the instrument used (Madan, Paliwal & Bhardwaj, 2011). Starting from the research questions and guided by the conceptual framework in figure 1.1, categories of questions were created with each category dealing with one of the research questions and also covering all the aspects of the conceptual framework (see Annexure A). This approach ensured that the subject under study was adequately addressed by the questionnaire (Silverman, 2011).

*b. Internal validity*

Internal validity measures whether the questions asked can explain the outcome of the research. The relationships between independent variables such as; road traffic safety interventions and road traffic safety behaviour and the dependent variables such as number of road traffic accidents given a particular intervention or behaviour were explored (Madan, *et al*; 2011). The questionnaires were designed to predict some outcome or to estimate the existence of some current condition through careful selection of questions and follow-up questioning. Cronbach's alpha was used to test the internal consistency of the questionnaire when there are multiple Likert questions in a survey/questionnaire that form a scale. A cut-off point of 0.7 is considered an acceptable indicator of reliability (Singh, 2008).

Further reliability was established by conducting a pilot test of the questionnaire whereby the researcher collected data from 20 subjects not included in the sample. Data collected



from the pilot test was analysed using SPSS (IBM SPSS, 2014). The SPSS package was used to assess the "correlation matrix" and "view alpha if item deleted". The researcher ensured that items that have 0s, 1s, and negatives were eliminated, then viewed the "alpha if item deleted" column to determine if alpha could be raised by deletion of items. The researcher continued to delete additional items to test if reliability would improve substantially whilst preserving the content, and in any case, no more than 20% of the items would be deleted. The reliability coefficient (alpha) can range from 0 to 1, with 0 representing an instrument full of errors and 1 representing total absence of error.

c. *External validity*

External validity is the extent to which the results can be generalised to the target population the survey sample is representing. The stratified random sampling technique was employed to ensure that the population has an equal chance of being included in the sample which is the first criteria for validity (Saunders, *et al.*; 2009). External validity was reinforced by ensuring that the questions contained in the questionnaire were free from bias. Pilot testing of the research instruments immensely improved the construct validity, as the final questions were fine-tuned to reflect the field conditions and in order to improve their clarity (Fraenkel, Wallen & Hyun, 1993; Singh, 2008).

d. *Face validity*

Face validity is a measure of how representative a research project is at face value and whether it appears to be a good project. The following questions were central in achieving face validity: Is the questionnaire measuring what it is intended to measure? Does it represent the content? Is it appropriate for the sample/population? Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and goals of the study? Does the instrument look like a questionnaire? The researcher obtained

reviews from subject experts who evaluated the quality of the questionnaire, the flow of the questions and the whether the research is good and representative enough (Leedy & Ormrod, 2014). Following feedback from the pilot test results, some questions were rephrased to improve clarity and follow-through questions had to be added. The following sections present the methodology with respect to the qualitative phase of the inquiry.

#### 3.5.4 Phase 2: Qualitative inquiry

A social constructivist/interpretivist worldview holds that people seek understanding of the world in which they live (Creswell, 2009; Lee, 2012). Historical influences, past experiences, interactions, interdependences, cultures and contextual settings that vary with the diversity of the people involved shape the subjective meanings of phenomena (Creswell, *et al.*, 2007). In order to gain in-depth understanding of the situations and behaviours, it is therefore essential to employ open-ended question formats and interview schedules, which fall under the domain of qualitative research methods. The intent is to provide detailed descriptions and explanations of the phenomena and decipher meanings based on the understanding of the population under study's interpretation of the world phenomena. According to Silverman (2011), the focus of the qualitative inquiry will be to answer the how-question as opposed to the how many question.

##### 3.5.4.1 The Study's central research question

The qualitative stage of the research design sought to answer the questions; how, what, why and where of that which is being studied---road traffic safety in Zimbabwe. The research design was composed of a central question and a series of sub questions. Creswell (2009:129) stated that, "the central question is a broad question that asks for an exploration of the central phenomenon or concept in a study". The research design exposes patterns and deeper meanings of observed phenomena to find answers to the

research questions. The study's central question is; what should be done for sustained road traffic accidents reduction to be achieved in Zimbabwe? The central question exposes the main problem under investigation, the behaviours towards the observed phenomenon, and reveal how Zimbabweans were responding to the problem of increasing road traffic accidents.

A qualitative case study research design was employed to gain deep insights into the problem of road traffic safety by carrying out an in-depth study of a few elements of the population. The purpose of the research was to evaluate the TSCZ's response to the road-traffic accident scourge from an organisation development perspective. Lee (2012) stated that qualitative research seeks to answer a central question, and associated sub-questions. The qualitative research design calls for a central question and a related set of sub questions addressing a real-life bounded situation or situations—*the case* (Yin, 2014). In this proposed study, the case is the Traffic Safety Council of Zimbabwe's efforts to reduce road traffic accidents in Zimbabwe. The study's central question is what can be done from an organisation development perspective, for sustained road traffic accidents reduction to be achieved in Zimbabwe? Central questions and associated sub questions determine the underlying problem, and expose the causes of the problem and how the problem can potentially be solved (Creswell, 2013).

#### 3.5.4.2 Case study research design

The study followed a case study research design in which the one issue of concern—road traffic accidents, is studied from people with diverse backgrounds to illustrate the multiple perspectives of the problem. According to Yin (2014), a case study design is appropriate when there is a clearly identifiable case within boundaries and the objective of the study is to come up with in-depth understanding of the case. In-depth interviews with road traffic safety

experts as well as a cross sectional survey of road users in Zimbabwe (using open-ended questionnaires) who experienced the interventions implemented by the TSCZ—the case study, will form the boundary of the study.

#### 3.5.4.3 Qualitative inquiry: Research instruments

Structured face-to-face interviews were chosen to be the primary research instrument for the qualitative phase of the inquiry because semi-structured interviews can extract in-depth information about the phenomena under study. Interviews also have an added advantage that the researcher can ask follow-through questions to extract more insightful information (Caravello, 2011). The interview schedule was a guide to the interviewer but participants were allowed time to express their opinions freely on the subject matter under study (Al-Sari & Al-Khatib, 2012)

Additionally, some qualitative data had been collected through questionnaires concurrently with the quantitative data during Phase 1 of the inquiry in a design similar to the one used by Veele-Brice (2010). The questionnaire had close-ended and open-ended questions and enabled respondents to upload word-files to back up their explanations.

##### *a. Open-ended questionnaire questions*

Phase 1 was a concurrent mixed methods inquiry in that the questionnaire had 19 questions of which eight were open-ended, to extract qualitative data and included the option to upload documents and write-ups to back up the respondent's facts. QSR NVivo software for qualitative research was used to sort the open ended questionnaire responses for analysis and interpretation. The concurrent design using the questionnaire to extract both quantitative and qualitative data simultaneously followed a parallel study on workplace safety by Veele-Brice's (2010) study which relied on a single questionnaire to conduct a mixed methods study. In addition to the questionnaire, an interview schedule was drawn up after analysing

the results of the questionnaire responses as a follow-up to gain in-depth information and to obtain clarity on issues raised in the questionnaire responses.

*b. Face-to-face semi-structured interviews*

Interviews were chosen as a research instrument (Appendix C) because the interview allows the voice, the emotions, the feelings and the expressions to be captured in a study and give a deeper appreciation of the problem under study (Caravello, 2011; Creswell, 2013). Semi-structured interviews were more suited to the study as they enabled repeat interviews to clarify facts and interpretations, and the semi-structured interview schedule provided a general guide for the researcher to discuss key topics and themes whilst allowing the participant's free expression and discussion (Couto, Tillgren & Söderbäck, 2011). I followed the multiple interactive interview approach by calling upon the same participants several times during the research to seek clarifications on issues that they would have raised in the interview transcripts (Creswell, 2013; Ollenrenshaw & Creswell, 2002).

3.5.4.4 Fieldwork

An online survey management system, Survey Console (2013) was used to distribute the questionnaires during the concurrent phase of qualitative and quantitative data gathering using questionnaires. The qualitative data was captured directly into the *NVivo* software package for storage, sorting, editing and analysis. All other questions addressing the road-traffic safety management and cultures were entered directly into the *NVivo* data editor and analysed by inspection, theme-recurrence, and word-clouding (QSR International, 2014).

The face-to-face interviews were conducted with 20 managers and supervisors of TSCZ and senior police officers in the Zimbabwe Republic Police traffic enforcement department, based on the maximum variation sampling technique. In the maximum variation qualitative sampling technique, participants who possess diverse views on the subject were selected

for interviews (Creswell, 2013). The selection of managers/supervisors and senior police officers for interviewing was based on the belief that they possessed the pertinent insights on road traffic safety and recruitment was through the chain-referral technique (Couto, Tillgren, & Söderbäck, 2011). The criteria for selecting participants considered expert knowledge on road-traffic safety.

The data collection process involved face-to-face semi-structured interviews. The semi-structured interview approach provided direction to the discussion, while allowing participants open expression of their viewpoints (Al-Sari & Al-Khatib, 2012). The interview sessions were manually recorded. The researcher also kept a journal of the interview process.

Permission to study the TSCZ's road traffic safety initiatives, was sought and obtained in writing. For the semi-structured interviews, appointments were made over the telephone to secure convenient dates, times, and places to meet with the participants. The risks and benefits of participating in the study were explained to the participants. Participants were also advised that they had the liberty to participate or to withdraw from the study at any time. Participants also had the freedom not to answer any question they did not feel like to answer.

### 3.5.5 Data analysis and interpretation

Qualitative data was captured into NVivo software package, which aids in performing various qualitative data analytics such as content analyses, thematic analyses, and word cloud among other analytics (QSR International, 2014). The following codes (See table 3.4) were developed for analysing the data in the transcripts. In the body of the transcripts,

colouring and lettering were used to identify recurring themes and key concepts. The manual analysis was compared to the NVivo software output for accuracy and completeness of analysis.

**Table 3.4. Colour coding scheme for thematic data analysis**

Code Symbol	Code Description	Colour Code
I	Action Initiators	Green
A	Action Types	Yellow
B	Attitudes and behaviours	Red
C	Change Inhibitors	Light Green
L	Learning Impact	Light Orange

#### 3.5.5.1 The code generation process

Repeated reading of the interview transcripts influenced the thinking process leading to the codes generation (Lee, 2012). Repeated reading and critical thinking gave the researcher an understanding of the participants' views on the subject under research (Silverman, 2011). The researcher developed own codes, deemed suitable and comprehensive enough to capture what was recorded of the interviews. In some cases, the researcher used the names ascribed by the participants---in vivo codes (Creswell, 2013). The thinking process that influenced the selection of the codes was based on the need to isolate processes, actions, reactions, interactions, collaborations, interventions, lessons learned and culture development which were prefigured themes arising from the central research question but modified by what the participants actually said as recorded in the interview transcripts (Yin, 2014).

The interview data was coded into six themes of commonality or domains of road traffic safety directly from the NVivo data editor, as follows; (a) Action initiators, (b) action types, (c) learning practices, (d) attitudes and behaviours, (e) change inhibitors, and (f) learning impact. The data analysis and interpretation process was a participatory process involving both the researcher and participants (Lee, 2012). According to Creswell (2013), participatory analysis and interpretation is an interactive form of feedback and reflection that moves back and forth between the understanding of the researcher and the reality of participants. The process followed a multi-step procedure for qualitative analysis and interpretation.

The process started with the researcher thoroughly reviewing the transcribed interviews, open-ended question responses and journal notes of the researcher to gain an initial understanding of the responses (Lee, 2012). The next step entailed organising and coding the data, while extracting key words and meaningful statements (Caravello, 2011). The third step was the clustering of themes and meanings from the data (Yin, 2014). The fourth step was the formulation of preliminary interpretations by the researcher (Lee, 2012). Discussions between the researcher and participants followed the researcher's preliminary interpretation (Creswell, 2013). These discussions ensured the credibility and authenticity of the researcher's interpretations (Silverman, 2011). During this stage, the researcher made modifications or expansion of the initial interpretations where necessary.

Next, the researcher used the themes and meanings to form a holistic interpretation of the data. The researcher, returned to participants for further authentication of the interpretations. According to Creswell (2013), the data analysis can stretch from holistic analysis of the entire case, to an embedded analysis of a specific aspect of one case or the



entire case or even just focus on a few key issues or analysis of themes within a case—*within-case analysis* or across cases—*cross-case analysis*.

Johnson and Johnson (2010) stated that participant feedback brings validity, reliability and credibility to the interpretation process of qualitative data. Johnson and Johnson (2010) and Creswell (2013) identified the following benefits of participant feedback:

1. Enables participants to correct and challenge misrepresentations and misinterpretations.
2. Reduces the possibility of participants' claims that the researcher misunderstood their information.
3. Provides opportunities for the researcher to clarify what certain information means.
4. Allows for further information gathering.
5. Provides participants with the opportunity to confirm the accuracy of data.
6. Enables participants to help shape research summary and conclusions.

While there are benefits to participant feedback, there were also drawbacks for example some participants may attempt to please the researcher by agreeing with the researcher's flawed interpretations (Yin 2014). Creswell and Plano Clark (2011) and Johnson and Johnson (2010) posited that cross-case validation of findings with the inquiry group mitigates against participants who attempt to please the researcher by agreeing with the conclusions of the researchers. Furthermore, continued feedback and data triangulation and cross-case validation would produce new data that would be integrated into conclusions, which would further enhance the authenticity and credibility of the research findings (Lee, 2012).

The researcher related findings and conclusions from the research to other theories and scholarly literature to discuss the applicability of findings to other research. The findings section of the research include a descriptive analysis detailing the conclusions. The findings write-up also includes figures and tables of analysis. According to Creswell (2013), the qualitative stage of the research design includes a consideration of procedures and processes necessary for the Institutional Review Board approval, including:

- Ensuring participants are clear as to the intent of the study, which was covered during the research introduction to the participants.
- Ensuring data collection tools were appropriate through pilot testing of the instruments and obtaining the opinion of experienced researchers.
- Ensuring criteria for inclusion/exclusion were just by avoiding racial, sex, and ethnic discrimination.
- Addressing confidentiality issues by reporting results in the aggregate and allocating codes and pseudo-names to respondents.
- Managing potential conflicts of interest by clearly demarcating the researcher's role in the study.
- Ensuring recruitment procedures promote voluntary and non-coerced participation by requesting respondents to sign voluntary consent agreements.
- Putting in place appropriate procedures for obtaining informed consent from participants by ensuring that any respondent who has not signed the voluntary consent agreement is locked out of the online survey.

The following general ethical considerations were also addressed in the qualitative research design:

- Ensuring that the researcher respects participants as autonomous agents, by obtaining both the employer and the individual's consent to participate in the study.
- Minimizing risks to subjects, by ensuring that the risks are confined to minimum and comparable to risks which the participant would take anyway with or without participating in the study.
- Protecting the human rights of participants by being objective in reporting and respecting the diversity of humankind.
- Ensuring that those researched benefit from the research by articulating the benefits of the study to participants.
- Avoiding bias and discrimination in the research by strictly adhering to the University of South Africa standards for conducting research involving human subject.

According to Yin (2014), qualitative research provides a number of benefits to a research study. A qualitative approach benefited this research by allowing participants to share their own viewpoints and meaning on the subject of road traffic safety (Lee, 2012). Creswell (2013) maintained that qualitative research focuses on the experiences of human beings as it is constructed and understood by them. The qualitative approach used in this research aligns with a social constructivist view that individuals construct and give meaning to their own reality (Eisenhardt, 1989; Shaik, 2012). The use of open-ended questions and interactive interview processes also suited social constructivist and pragmatic worldviews (Creswell, 2009). The search for solutions to the road traffic safety challenge drew on the pragmatic worldview and some elements of postpositivism can be traced due to the need to link cause and effect and Mouton (2011) argued in support of multiple worldviews in shaping research studies.

Additionally, a qualitative approach was also chosen because it provided an economic and convenient, yet effective tool for exploring the phenomenon in this study (Leedy & Ormrod, 2014). Whilst a quantitative study could easily decipher the cause and effect relationships, the approach would struggle to explain in-depth, the behaviours of drivers and government agencies in certain situations, which is where the qualitative inquiry becomes useful. Therefore, a qualitative study, using open ended questionnaire questions and face-to-face semi-structured interviews, allowed the researcher to gather direct insights in a manner that was comprehensive, affordable and convenient.

#### 3.5.6 Role of the researcher

Creswell (2009) maintained that all research contain embedded philosophical worldviews, even when those worldviews were not explicitly stated. According to Mouton (2011), worldviews were the basic beliefs and principles that guided the researcher's actions. Yin (2014) claimed that worldviews influenced the research strategies, research design, and research methods for all research projects. Therefore, identifying the worldview of the researcher was critical for helping the researcher understand what drives his/her approach to the research.

In this qualitative phase of the inquiry, the researcher believed in a social constructivist view that individuals construct and make sense of their own reality (Creswell, 2009). Creswell (2013) further posited that in qualitative research, the researcher is in a way part of the research instruments in that the researcher decides the questions to ask, how to ask them, chooses the sample and has underlying beliefs, interests and ideas about the subject under study. In this study, the researcher comes from an insurance and risk management background where he has worked as an underwriter, manager and director over the past

20 years. Road-traffic accidents have been the researcher's intriguing nightmare as the phenomenon changes at any time and appears to be dependent on each person-driver on the road.

From a social constructivist viewpoint, research is participatory, involving a dialogue between the researcher and participants (Creswell, 2009). Additionally, a critical role of the researcher is to engage research in a way that allows participants to define and interpret their own reality (Finlay, 2014). Therefore, this researcher assumed the role of a co-researcher along with the participants. As a co-researcher, this writer is participating in a study, analysis, and interpretation with the participants of the study. The role of the researcher in this study is to allow themes and meanings to emerge from the dialogue, and participants to validate that the interpretations and meanings formulated reflect their viewpoints.

### 3.5.7 Issues of rigour, authenticity and trustworthiness in qualitative research

With respect to the qualitative stage of the research design, the focus was more on rigour, authenticity and trustworthiness.

#### 3.5.7.1 Rigour

The data collection tools were checked to assess if they maximised the chance of identifying the full range of the phenomenon under study. By full range of the phenomenon under study, an attempt was made to evaluate the popular views and the minority views on the subject under study. An evaluation of the extent to which the data collection tools generated the level of detail needed for answering the research questions was also conducted (Silverman, 2011). Finally, an assessment of the ability of the data collection

tools to produce data with discernible patterns completed the quality control process (Creswell, 2013).

Once the data was collected, the analytical techniques need also to be interrogated to assess their ability to discover the full range of relevant and salient themes and topics (Yin, 2014). The analysis also needed to be interrogated to expose relationships between themes and topics, the checks in place to ensure that the trends discovered were not superfluous and to ascertain the standards of evidence available to ensure readers that the results were supported by the evidence (Silverman, 2011). Rigour was demonstrated by clearly outlining to the readers, faculty and colleagues how the research was done in plain language.

#### 3.5.7.2 Authenticity

Authenticity seeks to guarantee that the respondents' views, understandings, and meanings were correctly captured in the study through the use of open-ended questions, recordings or transcription of interviews and the reporting of disconfirming evidence or divergent views (Yin, 2014). The truth of the findings, were guaranteed through the research design, voluntary consent of respondents and the cross-case validation of findings (Creswell, 2013). The quantitative responses collected using the questionnaires were validated against qualitative responses collected through interviews, and qualitative responses from the police officers were also validated against qualitative responses from the TSCZ officers thereby providing both methods and data triangulation as a quality control measure (Yin, 2014).

Supporting the authenticity of the research were such procedures as auditing the research process whereby another researcher can follow the steps used by the researcher in the study to arrive at his or her findings and evaluate if the same conclusions can be reached (Silverman, 2011; Singh, 2008). Whilst the research methods were not audited, sufficient

detail and the step by step approach adopted in preparing the methods section of this research would enable other readers to replicate the research process. Another method of testing the authenticity of evidence was to use disconfirming evidence. Disconfirming evidence is a qualitative validation technique whereby, information that presents a perspective that is contrary to the one indicated by the established evidence is also reported (Creswell & Plano Clark, 2011). The researcher used participant validation by consulting the participants to confirm the meanings, interpretations, and descriptions of phenomena ascribed by the researcher.

#### 3.5.7.3 Trustworthiness

Trustworthiness assesses the researcher's degree of familiarity with the phenomenon and the research setting (sampling, methodology, data analysis techniques chosen etc.); the researcher's conceptual and theoretical grounding on the subject; the ability to approach the subject under study from a multi-dimensional perspective and finally the researcher's investigative, critical reading, and thinking skills. These assessments were important in establishing the truth-value of the findings (Silverman, 2011).

#### 3.5.7.4 Triangulation of data

Triangulation is a qualitative validation technique in which the researcher builds evidence for a code or theme from several sources or individuals (Creswell & Plano Clark, 2011). In this study, the researcher validated participant submissions against other participant responses to establish the truth-value. Quantitative responses were validated against the responses from the qualitative inquiry. Cross-case validation of qualitative responses from the police officers was done by validating the responses against responses from the TSCZ officers (Shaik, 2012).

### **3.6 VOLUNTARY CONSENT, ANONYMITY AND ETHICS IN RESEARCH**

Issues about respondent voluntary consent, protection of privacy or anonymity and ethics in research were addressed at research design stage.

#### **3.6.1 Voluntary consent**

The questionnaire demanded the voluntary consent of the respondents before one could take the survey and this was achieved by inserting an active consent field on the online questionnaire which if not ticked as accepted would prevent the respondent from taking any further part in the research. Participants to the semi-structured interviews were asked to sign the voluntary consent agreement, after being given a background to the study, as well as the risks and benefits of the study.

#### **3.6.2 Protection of privacy**

Research findings would be presented in the aggregate, with no individual identification marks. The identification marks in the data would be removed before storage to ensure that the participants' privacy is protected. The research data would be stored under password-protected files in the electronic format and the hard copies of the transcription forms would be locked under key at the researcher's place of permanent residency for a period of five years. At the end of the five year storage period, the electronic records would be erased and the hard copies would be shredded to destroy all the evidence.

#### **3.6.3 Research ethics**

The questionnaire had age validations and as soon as someone enters an age category that was below 18 or over 65 years, the online questionnaire's active validation would automatically prevent the respondent from taking any further part in the study. The study follows the highest standards of academic writing including the respect of respondents and



participants, non-discriminatory language and reporting facts objectively, whilst acknowledging the contribution of previous researchers in shaping this research. The study was approved by the University of South Africa's Institutional Review Board for academic standards and ethics in research.

### **3.7 SHORTCOMINGS AND SOURCES OF ERROR**

The main drawback of this study was the reliance on online contacts for the sampling of respondents. It was observed that whilst 1,400 000 Zimbabweans used the internet, the majority used their mobile phones to access the internet and the cost of internet connectivity using the mobile phone was a barrier to many people participating in the study as evidenced by the drop-out rate after starting the survey. Out of the 396 respondents that received and attempted the questionnaires 109 partially completed the questionnaire and dropped out after starting the survey whilst 88 fully completed all sections of the questionnaire. Follow-up contacts with the respondents indicated that they did not have the money to spend responding to the questionnaire online. The small sample size for the quantitative inquiry could also be a source for errors. According to Saunders, *et al.*, (2009), bigger samples were better than smaller samples when it comes to reliability. However, the random sampling technique used reduced the sampling errors (Madan, *et al.*, 2011).

Another weakness of the study is that whilst Zimbabwe has a population composition favouring women, with 51.9% and 48.1% being men, the survey participant statistics revealed that 70% of the respondents were men and 30% were women. However the results were consistent with the economically active population of Zimbabwe as 70% were men and 30% were women and therefore, the research findings be inferred on the whole population (Zimstat, 2012). The next chapter will present the research findings and the

results of the tests done on the data to assess reliability, validity and whether or not the data follows a normal distribution.

## **CHAPTER 4**

### **4 RESULTS PRESENTATION AND DISCUSSIONS**

#### **4.1 INTRODUCTION**

In this chapter, the researcher presents the results of the empirical study. The overall research approach was a descriptive-explanatory mixed methods research approach. The research was done in two phases. Phase 1, was a quantitative inquiry and phase 2, was a qualitative inquiry. The research findings will therefore be presented in phases with an overarching summary that brings the results of the two phases into perspective. The researcher sought answers to the following research questions:

- 1) Which road traffic safety interventions did the Traffic Safety Council of Zimbabwe implement from 2009 to 2012?
- 2) How were the road traffic safety programs implemented?
- 3) How effective were the interventions in bringing about sustained road traffic accident reduction in Zimbabwe?
- 4) What recommendations can be offered to achieve sustained road traffic accidents reduction in Zimbabwe?

The quantitative research results are presented first because they provide background information to the problem under study. It was necessary to establish the causes of road traffic accidents, and the road traffic safety interventions that were implemented (quantitative phase 1) before conducting an in-depth evaluation of the interventions (qualitative phase 2). Different samples constituted the two phases of the research. The quantitative phase relied on a stratified random sample of 500 respondents for the case

study research using questionnaires and the qualitative phase relied on face to face semi-structured interviews and the sample size was 20 chain referral selected participants.

## **4.2 SAMPLE PROFILES**

Out of the 500 questionnaires that were sent out, 396 people received the online questionnaire, 109 partially completed the questionnaire and 88 fully completed the questionnaire thereby making 197 respondents who responded to the questionnaire. The partially completed questionnaires were included in the analysis of results as they captured some vital insights on the study, an approach that was corroborated by Veele-Brice (2010). Veele-Brice (2010) conducted a mixed methods study using questionnaires with both close-ended and open-ended questions. Some of the respondents did not attempt all questions but attempted some of the interview questions and Veele-Brice included in the results analysis all the fully completed individual question responses as they provided the evidence, which fulfilled the purpose of the research.

The response rate was therefore 49.75% (See table 4.1). According to Saunders, *et al.*, (2009), a response rate of at least 30% for questionnaire survey was considered acceptable. The other 104 e-mails that could not be delivered had error messages indicating that the e-mail addresses were no longer active. According to the WHO (2010), a road user is anybody who uses the road for purposes of travelling whether as a driver, passenger, or pedestrian, therefore the e-mail user sample captured road users as anybody can be a road user. The definition of road user provided by the WHO (2010) is one of the assumptions underpinning this research that anybody can be a road user.

**Table 4.1: Questionnaire Response Analysis**

SAMPLE SIZE	E-MAIL INVITATIONS SENT	E-MAIL INVITATIONS DELIVERED	E-MAIL INVITATIONS NOT DELIVERED	E-MAIL INVITATIONS RECEIVED AND RESPONDED TO	RESPONSE RATE
500	500	396	104	197	49.75%

Zimbabwe has a population composed of 51, 9% women, and 48, 1% men. However, the survey participant statistics show that 70% of the respondents were men and 30% were women. This result was consistent with the economically active population of Zimbabwe, which shows that 70% were men and 30% were women and the use of the internet mediated questionnaire could have imported this apparent bias into the study as access to internet is closely related to economic activity (Zimstat, 2012).

The study followed a sequential descriptive-explanatory mixed methods research approach. The quantitative inquiry or phase 1 of the study, focused on what caused road traffic accidents and evaluated the effectiveness/ineffectiveness of some road-traffic safety interventions. The qualitative inquiry or phase 2 of the study focused on the in-depth descriptions of the phenomena of road traffic accidents and road traffic safety leadership, and the understanding of road traffic safety behaviours from multiple perspectives. It is a consequence of the research design that the research findings are presented in phases.

The results of the quantitative phase of the research will be presented first in order to expose the main causes of road traffic accidents in Zimbabwe upon which the interventions

were aimed at. The quantitative phase will additionally evaluate the interventions effectiveness in improving road traffic safety. Furthermore, the quantitative research diagnosed road-traffic safety behavior by gender and other demographic variables. The qualitative phase of the research results follows immediately after the quantitative research results presentation to answer the how and why questions of the research phenomenon by providing in-depth information on why certain interventions worked, whilst other interventions failed to work. Furthermore, the qualitative inquiry explains in-depth, how the road-traffic safety interventions were carried out in order to create a complete understanding of the phenomenon of road traffic safety in Zimbabwe. The study therefore begins with an exploration of the causes of road traffic accidents, the key stakeholders involved in road traffic safety, the interventions to control road traffic accidents and provides an evaluation of the current effectiveness of the road traffic safety interventions.

It was therefore important to triangulate the results of the different phases of the inquiry in order to link the understanding of the different respondents and participants on the subject of road traffic safety. Research findings from the quantitative phase of the inquiry were therefore validated against the research findings from the qualitative inquiry and in some cases, the responses from different inquiry groups such as police officers and the Traffic Safety Council of Zimbabwe officers were validated against each other in order to come up with a holistic understanding of the phenomenon of road traffic safety in Zimbabwe.

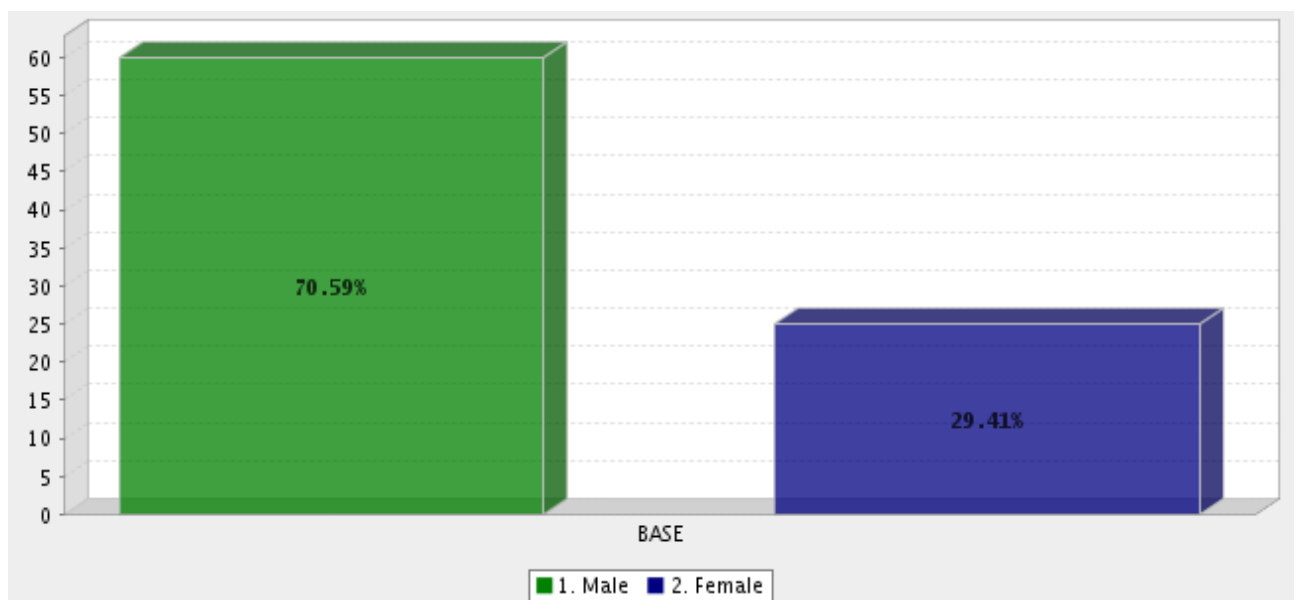
## **4.2 PRESENTATION OF RESULTS**

The results presentation derives from individual question response-analysis. A response analysis approach enabled the data to reveal trends, patterns, or deviations and to shed new light on phenomena based on research results. However, before the results

presentation, a discussion of the reliability tests of the questionnaire informs the care and diligence taken by the researcher to ensure the validity of the research results. Furthermore, academic rigour and authenticity were demonstrated by the triangulation of data from various sources and cross-case validation of findings under the qualitative results discussion section.

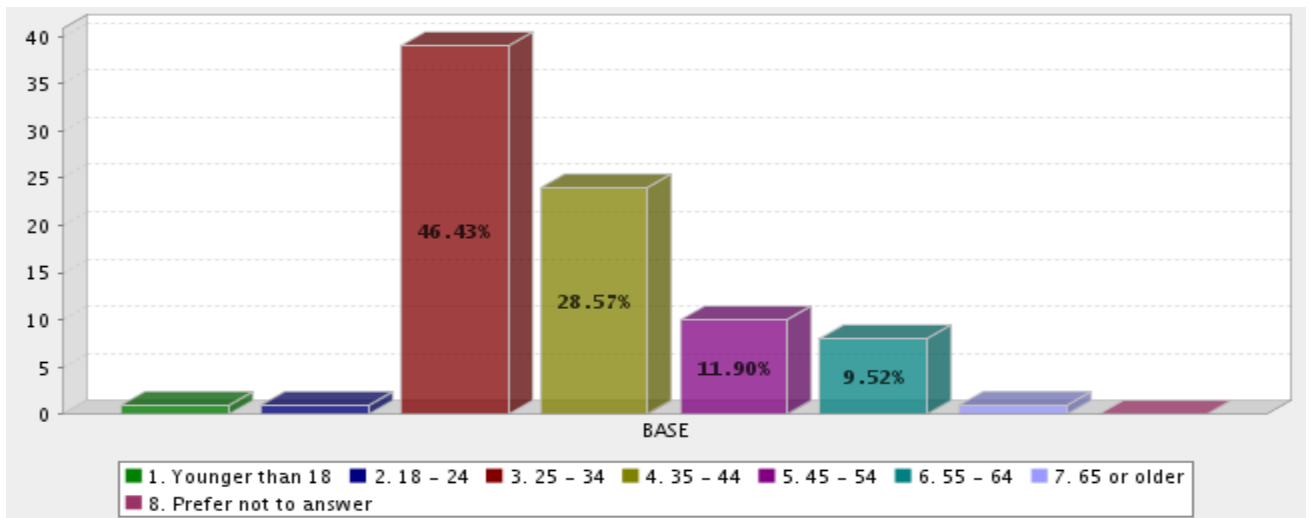
#### 4.2.1 Phase1: Biographical/Demographic profile of respondents

In this section, the gender of the respondents, the geographical distribution of the participants, the participants' economic activities, and road-traffic safety consciousness by gender are presented together with an evaluation of whether gender had an effect in the responses that were given. Figure 4.1 indicates the distribution of responses by gender.



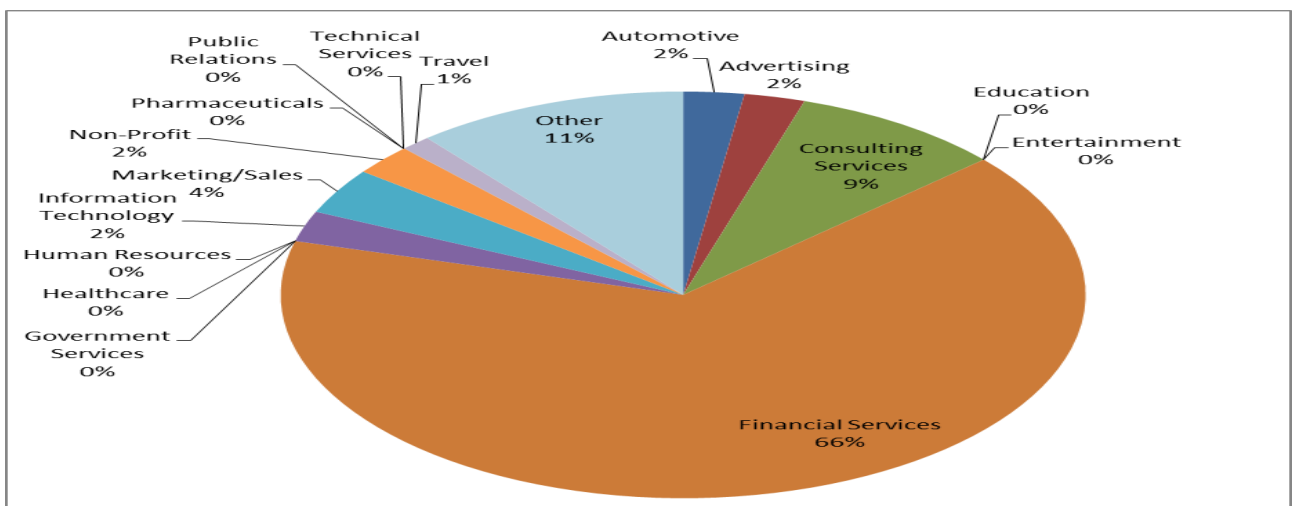
**Figure 4.1: Results Presentation: Respondents distribution by gender**

Of the respondents, 70.59% were men and 29.41% were women. The outcome is a near mirror of the working population composition of Zimbabwe. The outcome is a derivation of the internet-user sample that was used for the purposes of the research as Zimbabwe has historical imbalances favouring men in terms of economic activity (Zimstat, 2012).



**Figure 4.2: Results presentation: Respondents distribution by age-group**

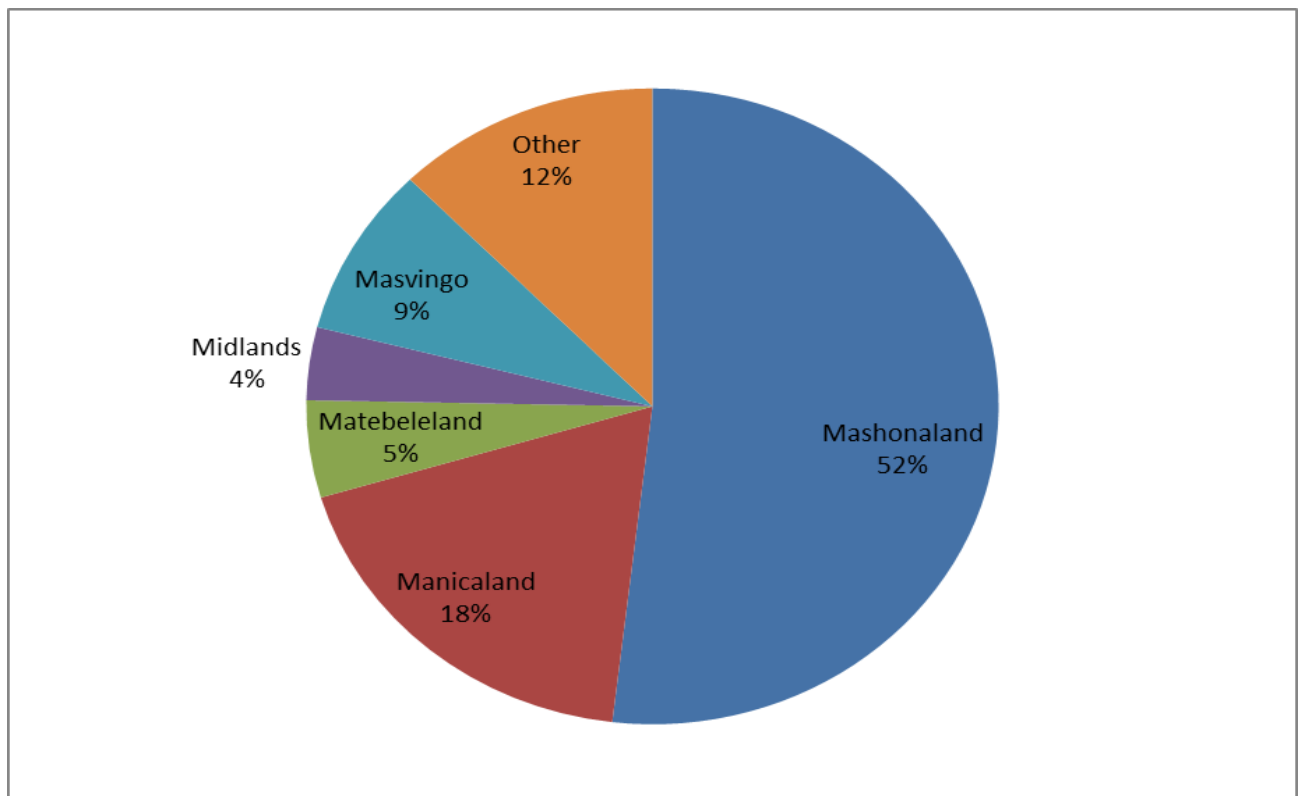
Figure 4.2 indicates that, 46.43% of the respondents were in the 25-34 age group; 28.57% in the 35-44 age group, 11.90% in the 45-54 age group, and 9.52% were in the 55-64 age group. It is evident that 96.42% of the respondents were aged between 25 years and 64 years. This is the most productive age group of any nation (World Health Organisation, 2010).



**Figure 4.3: Results presentation: Respondents distribution by occupation**



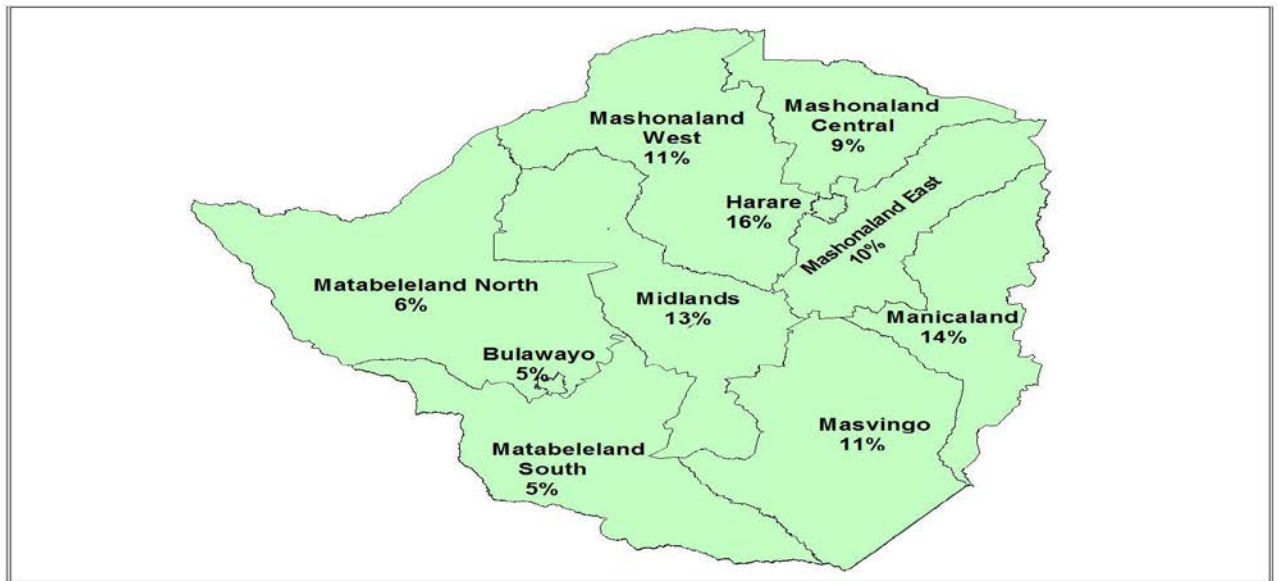
Figure 4.3 presents the distribution of the respondents by economic activity. Sixty-six percent of the respondents were from the financial services sector and 34% were from other sectors of the economy. The dominance of the financial sector in ICT technology usage is evident (Zimstat, 2012). A follow through question on the response pattern also revealed that free internet access is a challenge to most other sectors of the economy but in the financial services, people have free access to the internet particularly at work.



**Figure 4.4: Results presentation: Respondent distribution by provinces of Zimbabwe.**

Figure 4.4 shows the sample distribution by provinces in Zimbabwe, and indicates that 52% of the respondents were from the Mashonaland provinces and 48% from the other provinces. The national census carried out in 2012 by the Zimbabwean government supports the observations as the Mashonaland province is made up of Mashonaland West (includes Harare), Mashonaland East and Mashonaland Central and these provinces were

home to 46% of the Zimbabwean population (Zimstat, 2012). Figure 4.5, shows a population distribution map of Zimbabwe by province and indicates the dominance of the Mashonaland provinces in terms of having the most people in the country.



**Figure 4.5: Population distribution map by province of Zimbabwe. Source: (Zimstats, 2012:9).**

#### 4.2.2 Phase 1: Quantitative research results

This section presents the empirical results of the questionnaire survey.

##### 4.2.2.1 Tests of reliability

The researcher tested the questionnaire for reliability to assess if it produced consistent results with repeated measurements (Green & Salkind, 2014; Singh, 2008). The researcher sought to improve reliability of the questionnaire by standardising the conditions under which the measurements took place and carefully designed directions or instructions of measurement with no variations from subject to subject (Levin & Rubin, 2008). A representative sample of the population was selected using the stratified random sampling technique, in order to eliminate sampling biases (Madan, *et al.*, 2011). The stratum was gender. The Cronbach's alpha test was conducted to test the internal consistency of the

questionnaire with multiple Likert questions that formed a scale (Green & Salkind, 2014). A cut-off point of 0.7 and above is considered an acceptable indicator of reliability (Laerd Statistics, 2012). The Cronbach's alpha test result was 0.872 (see Table 4.2). Therefore, the results of the survey were judged reliable and the analysis continued.

**Table 4.2: Cronbach's Alpha analysis**

Test of instrument reliability	Cronbach's Alpha
	0.872

The item inter-correlations were significantly high except for questions 5, 6, and 7 (see Table 4.3). Cronbach's alpha generally increases as the inter-correlations among test items increase (Laerd statistics, 2012). Questions 5, 6, and 7 were not deleted because their deletion would not result in a material change in the Cronbach's alpha (see Table 4.4). The Cronbach's Alpha remained above 0.70 with or without questions 5, 6, and 7, therefore no items were deleted.

**Table 4.3: Cronbach's Alpha- Inter item correlation matrix**

	Qu1	Qu2	Qu3	Qu4	Qu5	Qu6	Qu7	Qu8	Qu9
Qu1	1.000	.706	.753	.819	.228	.237	.252	1.000	.706
Qu2	.706	1.000	.510	.614	.269	.270	.101	.706	1.000
Qu3	.753	.510	1.000	.622	.263	.242	.019	.753	.510
Qu4	.819	.614	.622	1.000	.204	.086	.212	.819	.614
Qu5	.228	.269	.263	.204	1.000	.024	-.142	.228	.269
Qu6	.237	.270	.242	.086	.024	1.000	-.145	.237	.270
Qu7	.252	.101	.019	.212	-.142	-.145	1.000	.252	.101
Qu8	1.000	.706	.753	.819	.228	.237	.252	1.000	.706
Qu9	.706	1.000	.510	.614	.269	.270	.10	.706	1.000

Further reliability was established by conducting a pilot test of the questionnaire whereby the researcher collected data from 20 subjects not included in the sample (Singh, 2008).

Data collected from the pilot test was analysed using the Statistical Package for Social Sciences (SPSS, 2012).

The SPSS package was used to assess the correlation matrix and view alpha if item deleted (Green & Salkind, 2014). The researcher ensured that items that had 0s, 1s, and negatives were eliminated, then viewed the *alpha if item deleted column* to determine if alpha was raised by deletion of items. The researcher continued to delete additional items to test if reliability improved substantially whilst preserving the content, and in any case, not more than 20% of the items would be deleted (Green & Salkind, 2014). The items with negative values, zeros or ones would distort the alpha reading hence their exclusion from the analysis. The reliability coefficient (alpha) ranges from 0 to 1, with 0 representing an instrument full of errors and 1 representing total absence of error (Green & Salkind, 2014). A reliability coefficient (alpha) of 0.70 or higher is acceptable (Laerd Statistics, 2012). Table 4.4 shows the Cronbach's alpha if item is deleted matrix.

**Table 4.4: View Alpha if item is deleted**

Items	Scale Mean if Item Deleted	Scale variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Qu1	4.7841	6.378	.907	.828
Qu2	4.7500	6.626	.793	.840
Qu3	4.8409	6.894	.687	.850
Qu4	4.7614	6.713	.754	.844
Qu5	4.5341	8.114	.242	.88
Qu6	4.4545	8.274	.219	.7
Qu7	4.4318	8.524	.119	.89
Qu8	4.7841	6.378	.907	.828
Qu9	4.7500	6.626	.793	.840

The minimum reliability co-efficient if item is deleted is 0.7 and the maximum is 0.85 which is within the acceptable range (Laerd Statistics, 2012). Item content analysis of questions 5,6, and 7 revealed that the items measured different perspectives to the other test items

and it was worthwhile to capture that data hence, no question item was deleted from the questionnaire as the instrument's reliability co-efficient remained high and above 0.70 with or without the deletion of questions (Green & Salkind, 2014). Therefore, the questionnaire was judged to be a reliable instrument for the research.

#### 4.2.2.2 Distribution of the time taken to complete the questionnaire

The Kolmogorov-Smirnov (K-S) test was performed to check if the time taken to complete the survey followed a normal distribution (Green & Salkind, 2014). The K-S-test was more ideal as compared to other non-parametric tests as all the data required for the test was retrievable from the sample data stored on the SPSS software package hence provided an easy and convenient way of assessing normalcy of the distribution of the data variables. The null hypothesis was that the data was normally distributed and the alternative hypothesis was that the data was not normally distributed. The K-S outputs after applying a log transformation are given below:

**Table 4.5. One-Sample Kolmogorov-Smirnov Test**

		Trans
N		197
Normal Parameters <sup>a,b</sup>	Mean	3.1178
	Std. Deviation	.37467
Most Extreme Differences	Absolute	.103
	Positive	.103
	Negative	-.059
Kolmogorov-Smirnov Z		.969
Asymp. Sig. (2-tailed)		.305

a. Test distribution is Normal.

b. Calculated from data.

One test for normality was run, the Kolmogorov-Smirnov Test. The  $p$  value was 0.305 which is greater than 0.05, therefore the researcher failed to reject the null hypothesis

(Green & Salkind, 2014). The analysis leads to the failure to reject the null hypothesis and leads to the conclusion that the data comes from a normal distribution. The time taken to complete the survey therefore followed a normal distribution.

In order to answer the research questions, the results were categorised based on the research questions they answered. The research questions therefore formed the sub-headings under which the results were presented. The following section is a discussion of what was done by the TSCZ to improve road traffic safety in Zimbabwe. This section answers the research question; what type of interventions were implemented by the TSCZ from 2009 to 2012?

#### 4.2.2.3 Types of road traffic safety interventions implemented by the TSCZ

This section discusses the interventions implemented by the TSCZ and provides an evaluation of how the respondents perceive the effectiveness of each intervention.

##### a). Descriptive statistics

It was of interest to investigate whether men differed from women on how they viewed the way in which the Traffic Safety Council of Zimbabwe carried out the road-traffic safety initiatives. The researcher employed the cross-tabulation technique to carry out the assessment. The cross-tabulation technique examined relationships among categorical variables. A cross-tabulation table is a co-frequency table of counts, where each row or column is a frequency table of one variable for observations falling within the same category of the other variable. When one of the variables identifies groups of interest (for example, a demographic variable) cross-tabulation tables permit comparisons between

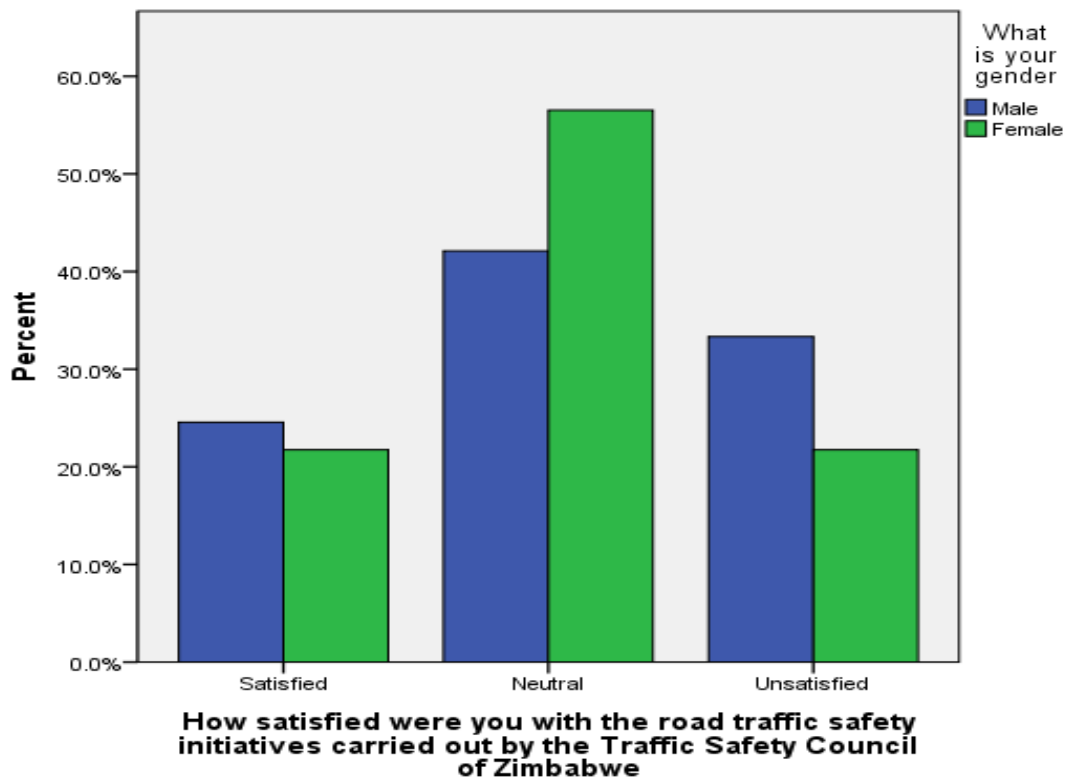
groups (Laerd Statistics, 2012). In Table 4.6, two variables, satisfaction and gender were displayed in a cross-tabulation to assess their interrelationship (Green & Salkind, 2014).

**Table 4.6. Cross tabulation of gender variable with level of satisfaction with road safety interventions**

<b>How satisfied were you with the road traffic safety initiatives carried out by the Traffic Safety Council of Zimbabwe? * What is your gender? Cross-tabulation</b>					
			What is your gender?		Total
			Male	Female	
How satisfied were you with the road traffic safety initiatives carried out by the Traffic Safety Council of Zimbabwe?	Satisfied	Count	14	5	19
		% within What is your gender	24.6%	21.7%	23.8%
	Neutral	Count	24	13	37
		% within What is your gender	42.1%	56.5%	46.3%
	Unsatisfied	Count	19	5	24
		% within What is your gender	33.3%	21.7%	30.0%
Total		Count	57	23	80
		% within What is your gender	100.0%	100.0%	100.0%

The statistics labels appear in the row dimension of the table. The two numbers in each cell are counts and column percentages. It is evident that 24.6% of the men and 21.7% of the women were satisfied with the manner in which the Traffic Safety Council of Zimbabwe carried out road-traffic safety programs, and 42.1% of the men and 56.5% of the women were neutral. In addition, 33.3% of the men and 21.7% of the women were not satisfied with the manner in which the Traffic Safety Council of Zimbabwe carried out road-traffic safety programs. Figure 4.6, presents a visual comparison of the behaviour of men and women concerning road traffic safety.

The significance of this analytic is to expose behavioural variances between men and women regarding perceptions of road traffic safety. Of the women, 56.5% were neutral compared to only 42.1% of the men in evaluating road-traffic safety intervention effectiveness. Thirty-three percent of the men were not satisfied yet 21.7% of the women were not satisfied.



**Figure 4.6. Cross-tabulation of women's responses versus men's responses**

Table 4.7 indicates the respondents' evaluation of twenty five road traffic safety intervention variables carried out by the Traffic Safety Council of Zimbabwe. Respondents evaluated the impact of each road traffic safety intervention on a scale of 1 to 5, with a 1 indicating low impact and a 5 indicating high impact in reducing road traffic accidents.



**Table 4.7. Research results analysis: The rating of the effectiveness of road-traffic safety interventions.**

Variable	Intervention Description	Rating out of 5
1.	Effect of road re-surfacing (tarred roads) on road traffic safety	4.09
2.	Effect of road re-surfacing (gravel roads) on road traffic safety	3.79
3.	Effect of road dualisation on road traffic safety	4.52
4.	Effect of road markings on road traffic safety	4.45
5.	Effect of road signages on road traffic safety	4.30
6.	Effect of side-road barricading to exclude pedestrians and animals on road traffic safety	4.06
7.	Influence of educational campaigns on road traffic safety	4.02
8.	Impact of driver training, testing and re-training on road traffic safety	4.20
9.	Effect of traffic law enforcement on road traffic safety	3.99
10.	Influence of availability of road accident statistics on road traffic safety	3.81
11.	Impact of vehicle inspection to enforce road worthiness laws on road traffic safety	4.04
12.	Impact of adequacy of road traffic safety initiatives funding on road traffic safety	3.78
13.	Impact of road traffic safety programs evaluation on road traffic safety	3.63
14.	Effect of advocacy by non-governmental and other community groups on road traffic safety	3.63
15.	Impact of increase in volume of vehicles on the national road network as compared to the capacity for which the road network was designed	4.40
16.	Influence of the general state of the road network on road traffic safety	4.42
17.	Impact of state of maintenance of national vehicle fleet on road traffic safety	4.12
18.	Impact of cultural influences on road traffic safety	3.55
19.	Influence of cellphone usage when driving on road traffic safety	4.48
20.	Impact of right hand drive vehicle usage	3.75
21.	Influence of drunken driving on road traffic safety	4.72
22.	Impact of using celebrities as road traffic safety ambassador	3.54
23.	The likelihood of current interventions being implemented resulting in reduction in road traffic accidents	3.77

24.	The adequacy of traffic fines imposed by the Zimbabwe Republic Police on traffic offences	3.76
25.	The adequacy of public consultation	3.19

The detailed analysis of the question on what intervention has the most impact on road traffic safety revealed that reducing drunk-driving had the most impact on road traffic safety in Zimbabwe with a score of 4,72 out of 5 (see Table 4.7). However, there were other closely related high impact interventions as depicted in Table 4.8. Table 4.8 is a derivation from Table 4.7, by extracting only those road-traffic safety variables that had high ratings of 4.40 out of 5 and above and provides further analysis of question 1, on which interventions were implemented to reduce road traffic accidents..

**Table 4.8: Other high impact road traffic safety interventions observed (Further analysis)**

<b>Intervention</b>	<b>Impact rating out of 5</b>
• Road dualisation	4.52
• Road markings	4.45
• Road repairs and maintenance	4.42
• Eliminating the use of cellphones when driving	4.42
• Reducing volume of traffic on the road	4.40

The significance of this analysis is that it informs policy by prioritising the interventions targeting drunk-driving, road dualisation, road markings, use of cellphones when driving, road repairs, road maintenance, and finally controlling the volume of traffic on the roads. Respondents considered the interventions in Table 4.8 as having the greatest impact on road traffic safety in Zimbabwe.

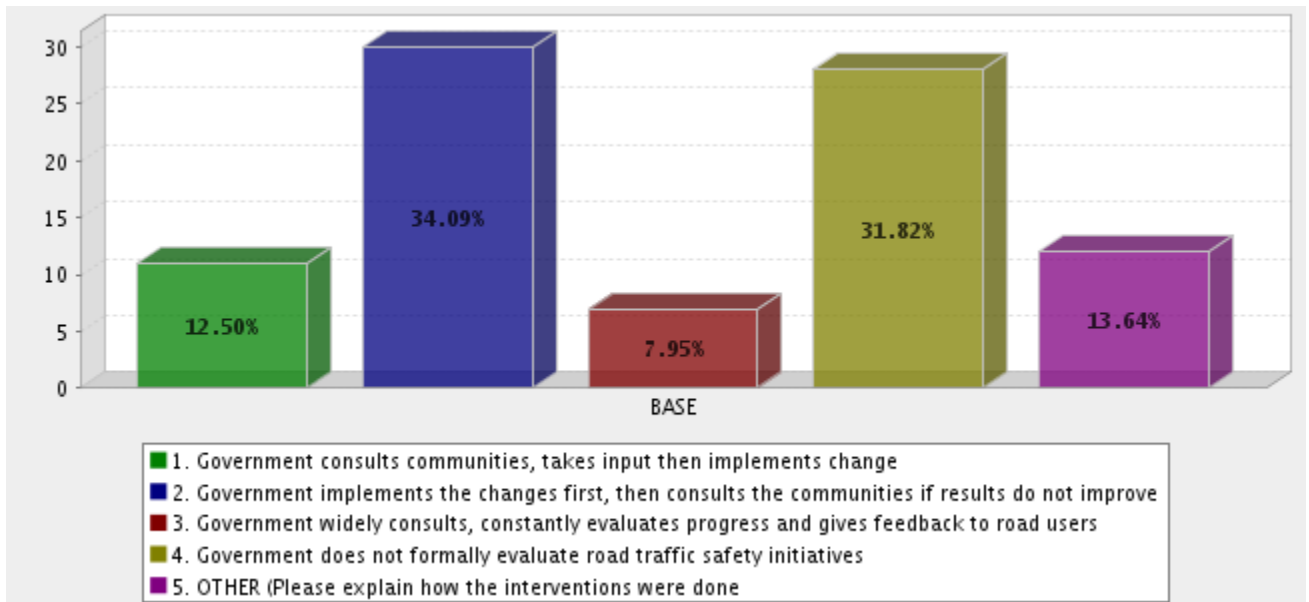
**Table 4.9: Results analysis: Effectiveness of the current road-traffic safety interventions in achieving a sustained reduction in road traffic accidents in Zimbabwe**

<b>PROMOTER DETAILS</b>	<b>PERCENTAGE RESPONSES</b>
<b>Promoter</b>	<b>8.82%</b>
<b>Passive</b>	<b>24.51%</b>
<b>Detractor</b>	<b>66.67%</b>

Table 4.9 indicates that 66.67% of the respondents did not believe that the current road traffic safety measures implemented by the TSCZ resulted in sustained reduction in road traffic accidents in Zimbabwe. However, 8.82% of the respondents felt that the interventions could achieve sustained road traffic safety, which implies that whilst the majority of the respondents were not satisfied with the effectiveness of the current interventions, other respondents believed that the same interventions could yield positive results.

#### 4.2.2.4 How the road traffic safety programs were implemented

This section answers the research question on how the interventions were implemented and discusses implementation methodology and the inclusiveness of the road-traffic safety initiatives.

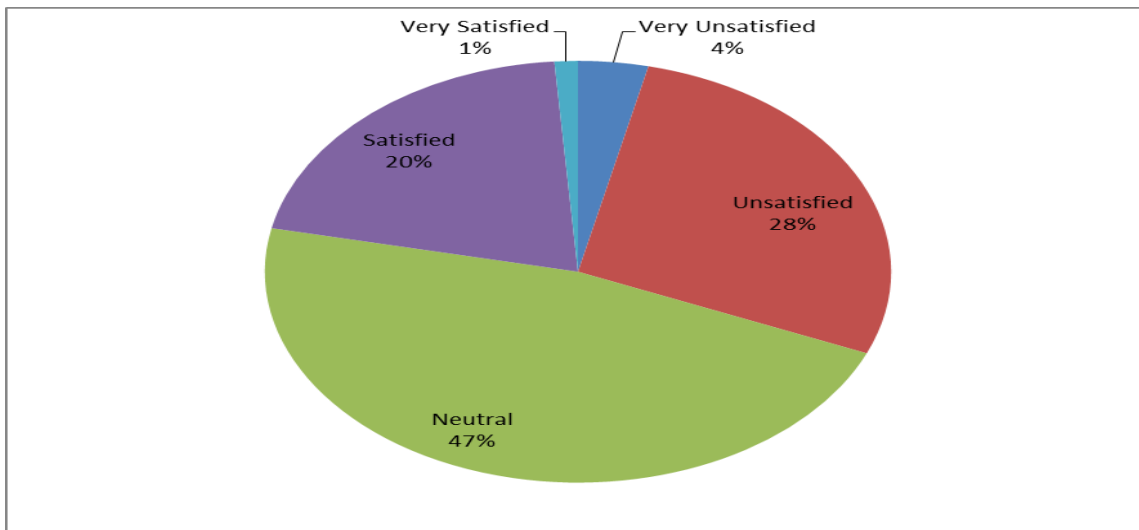


**Figure 4.7: Presentation of results: Interventions implementation approach**

Figure 4.7 indicates that 34.09% of the respondents believed that government implemented road traffic safety interventions without consulting other stakeholders and only consulted when results did not show improvement. A further 31.82% were concerned that government did not formally evaluate the road-traffic safety initiatives. However, there was a minority group, 12.50% that believed government consulted communities, took their input and then implemented change.

**4.2.2.5 Effectiveness of the interventions in bringing about sustained road-traffic accident reduction in Zimbabwe**

In this section, the researcher evaluates the perceived effectiveness of the interventions implemented by the TSCZ. The respondents rated the interventions on a satisfaction scale ranging from: Very satisfied, very unsatisfied, satisfied and neutral (neither satisfied nor dissatisfied).



**Figure 4.8: Presentation of results. Satisfaction with road traffic safety initiatives**

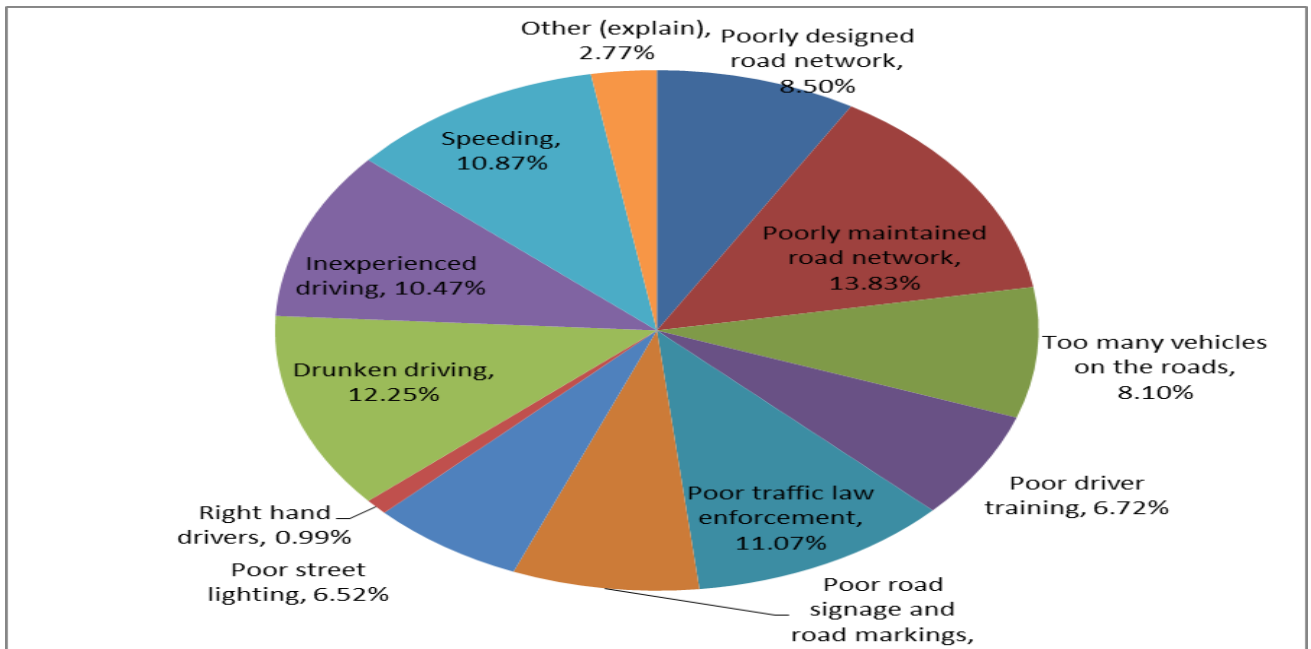
Figure 4.8 indicates that 47% of the respondents were neither satisfied nor dissatisfied, 28% were dissatisfied, 20% were satisfied, 4% were very dissatisfied and only 1% were very satisfied. The results are of concern because the neutral were neither satisfied nor dissatisfied and the neutral result if added to the 28% who were dissatisfied and the 4% who are very dissatisfied total 79% who do not approve of the interventions being implemented. The results of the study also confirm the fact that there were some good initiatives undertaken by the TSCZ, as 1% of the respondents were very satisfied with the interventions implemented to improve road traffic safety. This observation reinforces the outcome under Figure 4.7, where 12.50% of the respondents confirmed satisfaction with the manner in which the traffic-safety improvement initiatives were implemented and Table 4.9, where 8.82% of the respondents believe that the interventions being implemented ensured sustainable road traffic accident reduction in Zimbabwe. A closely related question to that of the level of satisfaction with the interventions implemented was an assessment of whether the interventions were targeted at the right causes. The following question sought answers on whether the TSCZ was addressing the right problems.

**Table 4.10: Research result analysis. Alignment of interventions to underlying traffic safety problems**

	<b>Number of Net Promoters</b>	<b>Net Promoter Percentage Count</b>
1. Promoter	0	0.00%
2. Passive	6	7.06%
3. Detractor	79	92.94%

Table 4.10 indicates that 92.94% of the respondents believed that the TSCZ was focusing on the wrong problems. This outcome highlighted the importance of conducting research to aid in problem diagnostics, and also highlighted the need to use theoretical models such as the OD cube to guide problem diagnostics and implementation (see Figure 1.2).

4.2.2.6 Strategies to achieve sustained road traffic accidents reduction in Zimbabwe  
This section provides alternative strategies to achieve sustained road traffic safety in Zimbabwe in answer to the research question on what needs to be done for sustained road traffic safety to be achieved in Zimbabwe. However, before the presentation of the solutions to the problems, a discussion of the main causes of road traffic accidents will not only provide the background to the problem but will provide insights into what needs to be addressed.



**Figure 4.9: Results Presentation: Causes of road traffic accidents in Zimbabwe**

The leading causes of road traffic accidents were the poor state of road maintenance with 13.83% of the responses (see Figure 4.9). Following closely behind was drunk driving with 12.25% of the responses, poor traffic law enforcement was not too far behind with 11.07% of the responses, and speeding was next in line with 10.87% of the responses. The analysis of the main causes of road traffic accidents informs the intervention prioritisation planning and provides a useful guide for the TSCZ. Follow-up questioning using the interview method revealed additional insights into the causes of road traffic accidents in Zimbabwe.

b). Inferential statistics

Correlation analysis of the response data from the questionnaires yielded corroborative evidence that supported the views of 8.82% (see Table 4.9) of the respondents who believed that the road traffic safety interventions implemented by the Traffic Safety Council of Zimbabwe could reduce road traffic accidents (see Table 4.11).

**Table 4.11: Correlation Analysis of the road dualisation intervention and road traffic safety**

**Correlations**

			Road dualisation	Impact Assessment of road dualisation on road traffic accidents
Spearman's rho	Road dualisation on road traffic safety	Correlation Coefficient	1.000	-.796**
		Sig. (2-tailed)	.	.000
		N	80	80
	Impact of road accidents due to poor road network	Correlation Coefficient	-.796**	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

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

From Table 4.11, the significance (2-Tailed) value is -0.796, and we can deduce that there is a strong negative correlation between road dualisation and road traffic accidents. The significance (2-Tailed) value is -0.796. According to Fraenkel, Wallen and Hyun (1993), a relationship is statistically strong if the correlation coefficient is greater than .750. There is a statistically significant negative correlation between road dualisation and road traffic accidents. Increased road dualisation should influence a marked reduction in road accidents as deduced from the strength of the association between the two variables. A further correlation test was conducted to assess the strength of the relationship between road markings and road traffic accidents and the results are displayed in Table 4.12.



**Table 4.12: Correlation analysis of road markings intervention and road traffic accidents**

**Correlations**

			Road markings	Impact of road markings on road traffic accidents
Spearman's rho	Road markings	Correlation Coefficient	1.000	-.865**
		Sig. (2-tailed)	.	.000
		N	80	80
	Impact of markings on road traffic safety	Correlation Coefficient	-.865**	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

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

Table 4.12 reveals that the significance (2-Tailed) value is -0.865, and we can deduce that there is a strong negative correlation between road markings and road traffic accidents. There is a statistically significant correlation between the two variables. The greater use of road markings will significantly influence a reduction in road traffic accidents. The strong negative relationship does not imply causation but measures the strength of the association between the two variables (Green & Salkind, 2014). Correlation analysis of the interventions and the road traffic accidents impact assessment also revealed that there was a strong correlation between select interventions such as road dualisation, and road markings with the incidence of accidents as both measures' correlation coefficient scores were negative and above 0.750.

**Table 4.13: Correlation analysis of road maintenance intervention and road traffic accidents**

**Correlations**

			Road maintenance	Impact of road maintenance on road traffic accidents
Spearman's rho	Road maintenance	Correlation Coefficient	1.000	-.924**
		Sig. (2-tailed)	.	.000
		N	80	80
Impact of maintenance on road traffic accidents		Correlation Coefficient	-.924**	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

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

Table 4.13 reveals that the significance (2-Tailed) value is -0.924, and we can deduce that there is a strong negative correlation between road maintenance and road traffic accidents. There is a statistically significant correlation between the two variables. The strong negative relationship does not imply causation but measures the strength of the association between the two variables (Green & Salkind, 2014). Maintaining the road network in a sound state will significantly influence a reduction in road traffic accidents.

**Table 4.14: Correlation Analysis of Cellphone Use when Driving and Road Traffic Accidents**

**Correlations**

			Cellphone usage when driving	Impact of cellphone use when driving on road traffic accidents
Spearman's rho	Cellphone use when driving	Correlation Coefficient	1.000	-.565**
		Sig. (2-tailed)	.	.000
		N	80	80
	Impact of cellphone usage when driving on road traffic safety	Correlation Coefficient	-.565**	1.000
		Sig. (2-tailed)	.000	.
		N	80	80

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

Table 4.14 reveals that the significance (2-Tailed) value is -0.565, and we can deduce that there is a moderately strong negative correlation between cellphone usage when driving and road traffic accidents (Fraenkel, Wallen & Hyun, 1993). There is a moderate significant correlation between the two variables. The cellphone usage impact on road traffic accidents is not sufficiently significant and may require further investigation in a specific study focusing just on the impact of the use of cellphones when driving. The moderate negative relationship does not imply causation but measures the strength of the association between the two variables (Green & Salkind, 2014). It can be argued that the advent of hands free cellphone tools could be making cellphone usage when driving less of a menace than the impact of road maintenance, road markings, and road dualisations, which had high

significant correlations with road traffic accidents. However, more research into cellphone usage could be done to explore the phenomenon further, particularly the effect of text messaging or web-browsing whilst driving.

No analysis of the impact of demographic variables such as gender and age was conducted in this study. The demographic variables' impact on road traffic accidents were outside the scope of the current study, which focused on the organisation development approaches to improving road traffic safety in Zimbabwe. However, a limited evaluation of the influence of gender in road traffic safety assessment was conducted and Table 4.6 presents the different evaluations of satisfaction levels with road traffic safety interventions by gender.

### **4.3 SUMMARY OF QUANTITATIVE RESEARCH FINDINGS**

The quantitative phase of the research yielded some important findings, which are summarised as follows:

There were mixed views on the causes of road traffic accidents. Twenty five potential causes of road traffic accidents were discussed which all had a mean score above 2.50 out of 5 (see Table 4.7). However, road dualisation, road markings, road repairs and maintenance, cellphone use when driving, and traffic volume on the roads had the highest rating scores of over 4.40 out of 5 and potentially require priority attention in order to reduce road traffic accidents (see Table 4.8).

Respondents also had mixed views on whether the current road traffic safety interventions being implemented by the Traffic Safety Council of Zimbabwe could result in sustained

reduction in road traffic accidents in Zimbabwe. The majority of the respondents (66.67%) however, believed that the current interventions would not achieve sustained reduction in road traffic accidents in Zimbabwe. A minority of the respondents (8.82%) however, believed the current interventions were effective and could reduce road traffic accidents in Zimbabwe (see Table 4.9). Further analysis of the data revealed that there was a strong and negative correlation between road traffic interventions currently being implemented by the Traffic Safety Council of Zimbabwe and the incidence of road traffic accidents (see Tables 4.11, 4.12, 4.13 and 4.14).

However, there appears to be a problem with the matching of interventions to causes of road traffic accidents as 92.94% of the respondents believed that the current road traffic safety interventions being carried out by the Traffic Safety Council of Zimbabwe (TSCZ) were not addressing the correct problems. Furthermore, the majority of respondents (65.91%) concurred that the TSCZ was not adequately consulting other key stakeholders and that there was inadequate measurement of the intervention results (see Figure 4.7).

In the qualitative phase of the inquiry, the results of a detailed investigation of the causes of the ineffectiveness of road traffic safety interventions, and the style of the interventions will be discussed in order to understand what can potentially be done to achieve sustained road traffic accidents reduction in Zimbabwe.

#### 4.2.3 Phase 2: Qualitative inquiry

This section presents the results of the interviews conducted with participants to gain in-depth knowledge of how to improve road traffic safety in Zimbabwe. Interviews were more suited to the study as they enabled repeat interviews to clarify facts and interpretations

(Couto, Tillgren & Söderbäck, 2011). I conducted multiple interactive semi-structured interviews by calling upon the same participants several times during the research to seek clarifications on issues that were raised in the interview transcripts (Creswell, 2013; Ollenrenshaw & Creswell, 2002).

The face-to-face interviews were conducted with 20 managers and supervisors of TSCZ and senior police officers in the Zimbabwe Republic Police traffic enforcement department. The selection of managers and supervisors and senior police officers for interviewing was based on the belief that they possessed the pertinent insights on road traffic safety and recruitment was through the chain-referral technique (Couto, Tillgren, & Söderbäck, 2011). The criteria for selecting participants considered expert knowledge on road-traffic safety (Creswell, 2013).

The data collection process involved face-to-face semi-structured interviews. The semi-structured interview approach provided direction to the discussion, while allowing participants open expression of their viewpoints (Al-Sari & Al-Khatib, 2012). The interview sessions were audio taped and manually transcribed. The researcher took notes during the interviews and kept a journal of the interviews.

Permission to conduct the study was obtained in writing from the TSCZ and the Zimbabwe Republic Police. Additionally, individual participants were asked to consent to their participation in the study. Appointments were made over the telephone to secure convenient dates, place, and times to meet with the participants. The risks and benefits of participating in the study were explained to the participants. Participants were also advised

that they had the liberty to participate or to withdraw from the study at any time. Participants also had the freedom not to answer any question they did not feel like to answer.

The researcher took a cue from Ashton (2014), who posited that researchers who conduct semi-structured interviews must plan the research to take into account the moral complexities of research relationships and be sensitive to the needs of the participants from the start of the interview to the report writing stage. The researcher must balance empathy with neutrality. Neutrality requires that researchers desist from being judgmental (Ashton, 2014). Participants' interviews must be done at the participant's convenience in terms of both time and place (Creswell, 2013). In addition to obtaining voluntary consent to conduct the interview, express approval must be obtained to record the interview (Yin, 2014). The researcher's role entailed listening, observing, taking notes, and recording the interview without being too involved in the talking (Ashton, 2014). It was therefore important to know when to pause the interview, allow it to flow, and how to remain calm in the face of tensions or distress of the participant. The researcher constantly read the body language, tone, and expressions, and checked if the participant was comfortable to continue with the interview.

#### 4.2.3.1 Sampling

A semi-structured interview was conducted with 20 participants selected using the chain referral sampling method based on the participants perceived knowledge of road traffic safety. The chain referral sampling technique involved identifying a first contact, perceived to have knowledge of road traffic safety, and this initial contact referred the researcher to other participants who were knowledgeable on the subject under study and each next person did the same to create a chain of referrals (Creswell, 2013). The choice of sample size followed the advice of Marshall, Cardon, Poddar and Fontenot (2013), who argued that

qualitative research sample sizes were guided by previous research on similar phenomena, the recommendations of qualitative research methodologists, and the need to achieve data saturation. According to both Yin (2014) and Creswell (2013), a sample size of between 20 to 30 participants was considered adequate for qualitative interviews. I also assessed the recurrence of themes coming out of the data as I conducted repeated analyses and interviews with each additional participant. Themes started recurring with greater frequency when I interviewed the 15<sup>th</sup> participant and each additional participant thereafter added very few new insights with the majority of the themes recurring from previous interviews until I got to the 20<sup>th</sup> participant and I realized that I had reached the data saturation point because the same issues were being repeated with no new insights coming out.

#### 4.2.3.2 Data collection

Semi-structured interview questions were chosen to create the interview schedule (Appendix C) because the semi-structured interview allows the voice, the emotions, the feelings, and the expressions to be captured in a study and give a deeper appreciation of the problem under study (Caravello, 2011; Creswell, 2013). Semi-structured interview questions were more suited to the study as they enabled repeat and follow-up questioning to clarify facts and interpretations (Couto, Tillgren & Söderbäck, 2011). I used the multiple interactive interview approach by calling upon the same participants several times during the research to seek clarifications on issues that they would have raised in the interview transcripts (Creswell, 2013; Ollenrenshaw & Creswell, 2002).

Semi-structured interviews comprise of sets of questions grouped according to themes but offering flexibility to participants to express their views and experiences openly (Yin, 2014). The questions guide the discussion. The research design anchors on a central question. Yin



(2014) posited that, the central question is a broad question that asks for an exploration of the central phenomenon or concept in a study and reflects the actual line of inquiry. The study's central research question is; what should be done for sustained road traffic accidents reduction to be achieved in Zimbabwe? The central question explores the main problem under investigation, the behaviors towards the observed phenomenon, and reveal how the study participants responded to the challenge of achieving sustainable road traffic safety in Zimbabwe.

#### **1.2.3.2.1 Interview Questions**

Lee (2012), posited that asking questions was a method of collecting data on people's lived experiences, but cautioned that conducting question-asking demands the prior specification of the range of variables and attributes to be investigated before any application of question-asking. The following questions form the semi-structured interview schedule.

#### **4.2.3.2.2 Interview Guide**

The interview guide consisted of the following questions:

1. Describe what you do on a day to day basis with respect to traffic safety management.
2. How were the road traffic safety strategies formulated and implemented by the Traffic Safety Council of Zimbabwe/Zimbabwe Republic Police?
3. What other ways do you suggest for developing traffic safety strategies given the national significance of the actions that are taken by the Traffic Safety Council of Zimbabwe/ Zimbabwe Republic Police?

4. What do you recommend to be done for traffic safety interventions to achieve sustained road traffic accident reduction in Zimbabwe?
5. Which key factor do you think is responsible for the success or failure of road traffic safety intervention programmes by the Traffic Safety Council of Zimbabwe/Zimbabwe Republic Police?
6. What do you suggest should be done to harness input and ideas from the general public in addressing road traffic safety in Zimbabwe?
7. In your opinion, what is the main contributor to road carnage in Zimbabwe?

#### 4.2.3.3 Data analysis

##### (a). Recording of data

I conducted face to face interviews with the participants by making appointments with them. I visited each participant at their offices to conduct the interviews at the participant's own convenience in terms of time. After explaining the purpose of the academic study and how the research findings might help in improving road traffic safety in Zimbabwe, I further obtained permission from each participant to record the interviews. I used my ipad tablet phone to record the interviews. I also took field notes during the interviews to back up my recordings (Moustakas, 1994). I transcribed each interview comparing the recorded evidence and my journal notes to ensure completeness of data capturing.

##### (b) Analysis of data

The data analysis and interpretation process was a participatory process involving both the researcher and participants (Lee, 2012). According to Creswell (2013), participatory analysis

and interpretation is an interactive form of feedback and reflection that moves back and forth between the understanding of the researcher and the reality of participants and improves the quality of the data collected. Some participants were interviewed more than once to gain clarity of their responses and for them to confirm if the interpretation by the researcher was a correct depiction of their lived experiences.

I developed a codebook to categorise the notes into general themes for analysis (Creswell & Plano Clark, 2011). The researcher used thematic analysis, which entails the identification of concepts in the text as opposed to content analysis, which relies on identifying specific words in the scripts. Thematic analysis enabled the researcher to search for groups of words as they relate to a specific meaning or concept and this approach helped to overcome the main shortcoming of content analysis in that the meaning of a particular concept or word could be expressed in a number of different ways or words (Yin 2014). Thematic analysis enabled the researcher to check all the content for related themes, and organize the data in terms of recurring themes, then drew meaning from that analysis.

#### **4.2.3.5 Findings**

The following codes were developed for analysing the data in the transcripts. In the body of the transcripts, colouring and lettering were used to identify recurring themes and key concepts. The manual analysis was compared to the NVivo software output for accuracy and completeness of analysis.

**Table 4.13. Colour coding scheme for thematic data analysis**

Code Symbol	Code Description	Colour Code
I	Action Initiators	Green
A	Action Types	Yellow
B	Attitudes and behaviours	Red
C	Change Inhibitors	Light Green
L	Learning Impact	Light Orange

The interview data was coded into six themes of commonality or domains of road traffic safety directly from the NVivo data editor, as follows;

- Action initiators
- Action types
- Learning practices
- Attitudes and behaviours
- Change inhibitors
- Learning impact

The results of the qualitative inquiry are presented under recurring themes of commonality. Whilst the researcher’s evaluation and analysis is given, the analysis is based on the actual lived experiences and examples cited by the participants and hence direct quotations will be used as evidence. In order to maintain the participant anonymity, direct quotations will be reported using a participant’s general job category either as police officer or Traffic Safety Council of Zimbabwe officer or manager. Five themes emerged from the analysis of interview transcripts and these themes are discussed in the following sections.

#### 4.2.3.4 Action Initiators

The results of the study revealed that government, non-governmental organisations, corporate organisations, and communities were identified as action initiators. Action

initiators were stakeholders who could cause action to happen or forestall action in respect of road traffic safety initiatives. Ignoring any one of the action initiators weakened the effectiveness of the intervention process.

a) Government as a change initiator

The government provided a policy framework, legislation, law enforcement, budgetary allocations, evaluation and monitoring support to road-traffic safety interventions. According to a Traffic Safety Council of Zimbabwe official, *“government sets the tone for any intervention programmes by availing the resources and the policy enforcement framework. Without express government support, road traffic safety programs may not achieve desired results”*.

In a follow-through question on why government’s role is so significant in road-traffic safety initiatives, a Senior Police officer reiterated the issue of funding, and argued that, *“many road traffic safety programs were stillbirths because of lack of funding. It costs a lot of money to deploy traffic police officers to man the national highways as they require high performance cars, motorbikes and fuel to track and arrest traffic offenders”*. Participants gave examples of road-traffic safety projects that did not take-off the ground such as, the robots camera and traffic-intersection camera projects, that collapsed at trial stage due to inadequate funding by government and the highway-barricading project, which did not commence because of budgetary constraints. A senior police officer reiterated that,

*“We have visited a number of countries to study their traffic safety programmes, but when we come home, it ends at the budget allocation stage as the national cake is still too small. You can imagine that the country has not had good rainfall in the past five years or so, and the country has been importing maize to feed the people so when it comes to budget allocations, it comes back to prioritizing food security. We have not given up and we are still searching for home grown solutions that do not require a lot of money”*.

The government finances all social security projects to improve the living standards of the population and to foster economic and social development. Funding of national development projects such as road network expansion comes in the form of treasury bills, taxation, government bonds and joint ventures and partnerships with the private sector. However, government resources were limited and prioritisation of funding was conducted through the annual national budget.

b) Non-governmental organisations as change initiators

Non-governmental organisations (NGOs) provided advocacy, support, and community education in support of road traffic safety. A senior Traffic Safety Council of Zimbabwe official lamented the budget cuts by the non-governmental organisations from the Eurozone in the past decade and argued that, *“The non-governmental organisations drastically cut their support to traffic safety awareness campaigns due to the prevailing economic sanctions against the country”*. Follow-up questions on the kind of support the Traffic Safety Council of Zimbabwe used to receive from the non-governmental organisations from the Eurozone indicated that, radio programs and television advertisements were sponsored by non-governmental organisations and to some extent fieldworkers allowances were paid by the non-governmental organisations. Another Traffic Safety Council of Zimbabwe Inspector recollected that, *“when, the NGOs relocated their offices from Zimbabwe to neighbouring countries from 2000-2008, we drastically cut on most of the road traffic safety programs. It was just unsustainable for us to carry on without funding”*.

In a follow-up question on why the NGOs relocated their offices from Zimbabwe to neighbouring countries, a senior Traffic Safety Inspector posited that he was not privy to the exact reasons but blamed the economic sanctions imposed on Zimbabwe by the

European union and the United States of America, in the remarks, *“I guess it’s to do with the sanctions imposed on our country by the major funders of the NGOs, the European Union and the US, but the politicians may have more appropriate answers to that question”*.

A senior police officer posited that, whilst they focused on road-traffic law enforcement, the NGOs were their strategic partner as they provided the advocacy and community education to inform and encourage the communities to support safe road use behaviour. He went on to add that,

*“Whilst we can be tough with traffic law offenders, NGOs have the softer appeal and use more persuasive means to get people to follow the law through educational programs. Recently, the NGOs were sponsoring local celebrities to appear on radio and television encouraging people to use designated pedestrian crossing points and avoid jay-walking”*.

It appears from the evidence that road traffic safety is a multi-stakeholder challenge, which requires a collaborative approach. It is also commendable that the Traffic Safety Council of Zimbabwe officials and the Zimbabwe Republic Police officers acknowledge the importance of multi-stakeholder collaboration as they both are calling for support from NGOs and the general public to improve road traffic safety.

c) Corporate organisations as change initiators

The corporate world provided training, road safety education, and financing options for infrastructure projects. Companies also fund the purchase of vehicles and employ a number of drivers so they are a major player in the road-traffic safety discussions. One Traffic Safety Council of Zimbabwe manager posited that, *“Companies should be at the forefront in fighting the road traffic accidents scourge, as they were losing not only their vehicles but skilled manpower. It is in their interest to reduce road traffic accidents”*. A senior police officer lamented the lack of funding from the corporate world in the fight against road traffic accidents. He argued that,

*“Companies pay lip service to the road traffic accident challenge, instead of putting aside resources to capacitate the police to effectively monitor the roads they just sponsor safety awareness campaigns but nothing happens on the ground. We have extended the begging bowl to corporates but the level of financial support has been poor. Government alone cannot win this war and we need everyone to chip-in with resources to equip the Zimbabwe Republic police to monitor the road network”.*

A Traffic Safety Council of Zimbabwe official explained that as the Traffic Safety Council of Zimbabwe, they did presentations to corporate organisations on various topics such as effective fleet management to reduce accidents, accident reporting, driver selection and monitoring, and conduct defensive driver courses to enhance accident prevention skills to corporate drivers. His views were contradictory to those of the senior police officer who argued that companies paid lip service to road-traffic accident prevention. He argued that,

*“Companies were a vital cog in the whole road traffic safety initiative and provided us with support and funding for some of our safety initiatives by paying for the courses we run, which gives us revenue to fund other non-revenue generating road safety activities”.*

The difference in opinion between the Zimbabwe Republic police and the Traffic Safety Council of Zimbabwe officials on the level of support the corporate world gives to the road traffic safety campaigns is a matter of how the support was given. The corporate organisations were not in favour of paying out money for which the accountability was outside their control but were paying for services actually rendered, that further promoted road traffic safety, and the Zimbabwe Republic police favours cash donations from the corporate world but acknowledging that corporate organisations provided publicity support to road traffic safety programmes. The implications of this conflict in expectations between the corporate organisations and the traffic law enforcement agents, is that frustration may result. Frustrated Police Officers may ignore the corporate organizations in their road traffic safety projects, which further weakens the effectiveness of the road traffic safety campaigns. Additionally, the conflict in expectations, calls for dialogue and engagement between the donor communities and the government agencies for the purposes of clarifying



the sustainable methods of co-operation and how joint programmes on road safety could be collaboratively implemented.

d) Communities as a change initiators

According to Josephine and Kinyanjui (2012), a community is a group of people who share geography, religion, culture, values, habits, and identify with each other. Communities were the road users, whose daily lives were affected by what happened on the roads and provided feedback and participated in road traffic safety through compliance or non-compliance with road-traffic safety initiatives (World Health Organisation, 2010). The study participants were of the view that if communities embraced and supported the safe road use behaviour that government, the police, the Traffic Safety Council of Zimbabwe, and NGOs were advocating for, the road traffic challenge would have been partially solved. A senior police officer posited that communities were the focus of all the attention. He went further and argued that, *“All we want is safety on the roads for everybody. However, the problem is how do you achieve consensus of the national population?”* The road traffic safety challenge required the support of everybody, and one manager from the Traffic Safety Council of Zimbabwe added that, *“We spend 60-70% of our budgetary allocation on educating the population on how to safely use the road network”*. A senior traffic police officer corroborated that, *“Our mandate as the ZRP, is not just to arrest and fine people, but to get everyone to respect the law and practice safe road use. We even just warn and caution people as part of educating them as opposed to arresting them”*. From the interviews, it came out that communities played a central role in the fight against road traffic accidents and their active contribution through strict adherence to road traffic laws and traffic safety education, could provide the missing link to the success of the Traffic Safety

Council of Zimbabwe's efforts to achieve sustained road traffic safety in Zimbabwe. A Traffic Safety Council of Zimbabwe officer observed and remarked that,

*“The problem is not that the people do not want safety on the roads, but the challenge is how do we get the 13 million Zimbabweans to behave in a safe manner on the roads? That is where the traffic law enforcement comes in. The Zimbabwe Republic police should be on the roads enforcing the law and here comes the challenge of inadequate resources where you will find that in a province with 2-3 million people there will be one or two highway patrol cars which is inadequate to tightly monitor and supervise the roads”.*

The issue of inadequate resourcing of the Zimbabwe Republic police traffic law enforcement unit had been earlier echoed by a senior police officer who corroborated with the Traffic Safety Council of Zimbabwe officer that,

*“Even in the developed world, it is not possible to monitor every driver and every other person using the road. That's why we have been partnering with the NGOs who pursue a behavior change approach. To win this war against road carnages, we cannot rely on traffic law enforcement alone, but everyone must be their own police officer and monitor what they do on the roads”.*

The evidence from the interviews indicated the magnitude of the road traffic safety challenge. Whilst not giving up on traffic law enforcement, government could prioritise the non-financial measures such as education and safety awareness to achieve behavior change at an early childhood age, whilst resourcing options were pursued, to achieve high technology traffic law enforcement as is the case in the developed world (World Health Organisation, 2010). In the following section, I will discuss the action types that were recommended by the participants.

#### 4.3.2.5 Action Types

The participants proposed interventions that must be carried out to improve road traffic safety in Zimbabwe and these recommendations were classified as action types and are discussed in the following sections.

a) *Fines and penalties*

The results of the study exposed numerous interventions that the TSCZ implemented from 2009 to 2012. Participants confirmed that there was room for improvement in the intervention processes to achieve sustained road traffic accidents reduction. A senior traffic police officer voiced concern on the low penalties imposed by the government on traffic offenders and argued that, *“Road traffic law violation fines were too low and were not deterrent enough to would be offenders. Stiffer penalties must be imposed including the cancellation of the driver’s license”*. The concern over the current level of traffic law fines was echoed by other police officers and Traffic Safety Council of Zimbabwe Staff. Another police officer commented that, *“The accidents menace has reached alarming proportions and all traffic offences must be referred to courts of law who can assess and impose deterrent penalties to protect the population”*. On being asked why the fines for traffic law violations have remained low despite increasing incidences of road traffic accidents, a senior police officer said,

*“As the ZRP, we do not set the fines but this is the jurisdiction of the courts. We implement what is there. The real problem was that the fines were not reviewed on a regular basis so in many instances they were out dated and a system must be put in place to review the fines on a regular basis which is why we advocate for all traffic offenders to be sent to court as judges can use their discretion to set a realistic fine for a particular offence”*.

In a follow-up interview, another senior police officer mentioned the British traffic law enforcement system, which he had studied and argued that,

*“Take for instance in the United Kingdom, driver details are computerized and available to an officer on the click of a button, and their penalty system includes driver’s license cancellations and suspensions, camera monitoring of all major roads and parking spaces, which gives a sense to both pedestrians and drivers that someone is always watching and that improves road behavior. Unfortunately for us, we do not have the luxury of technology and we should increase fines to be the main deterrent”*.

The participants corroborated that there was room for improvement in the fines and penalties imposed on traffic law offenders to make them a deterrent to would be offenders. The participants also concurred that technology usage such as the use of digital cameras on the highways, could help improve monitoring coverage and encourage compliance behavior by road users. Road traffic safety law enforcement required greater investment than is currently obtaining. Furthermore, greater co-operation and collaboration of stakeholders to achieve the required financing levels and behavior change was required.

b) *Education and safety awareness*

Traffic Safety Council of Zimbabwe officers advocated for greater funding for education and awareness campaigns citing several examples of pre-holiday safety awareness campaigns that yielded good results for example the Pedestrian Safety Day which was held in 2012, reduced December 2012 pedestrian deaths by 20% (Traffic Safety Council of Zimbabwe, 2012). One manager at the TSCZ argued that, *“When we talk about training, it should not be a once-off thing, but training should be sustained and preferably be incorporated into the schools’ curricula so that students were examined on road traffic safety”*. In a follow-up interview, the manager at TSCZ reiterated that, *“ongoing training served as a reminder even to those who think they know it all, and help to embed the message in people’s minds”*. Another Traffic Safety Council of Zimbabwe official added that safety ambassadors be appointed in various communities to spread the safety messages. He argued that, *“People tend to listen to one of their own, so we need individuals of good standing in every community who will talk about road traffic safety at community based meetings and gatherings”*. In a follow-up interview on how safety ambassadors could lead the road safety behavior change programs, a TSCZ official said,

*“Look at the success of the anti-cholera campaign, local celebrities were encouraging people to wash hands before eating, and repeated these messages at their musical shows which reinforced the message and the cholera outbreak was contained. This is what we want to see happening with road traffic safety, but someone must fund these celebrities because they won’t do it for free”.*

The TSCZ is working with church leaders, sports persons, and musicians as road traffic safety ambassadors. The initiatives seeks to achieve behavior change by getting people to take the advice of their role models. A review of the Traffic Safety Council of Zimbabwe website also confirms the criteria for social collaboration and the various campaigns being undertaken. The use of role models is gathering momentum and already some local celebrities were working with the TSCZ (Traffic Safety Council of Zimbabwe, 2012).

c) *Providing adequate resources and road maintenance*

The study participants shared the view that road traffic safety interventions were resource based. A senior police officer commented that, *“We need adequate manpower and resources to fight traffic law offenders. More recruits must join the police force traffic department to increase presence of law enforcement agents on the highways”*. Another police officer requested for top of the range vehicles such as BMWs and Mercedes Benz cars to keep pace with traffic law violators. Traffic Safety Council of Zimbabwe officials were content with their internal staffing and resourcing but voiced concerned on the funding of road-traffic safety intervention programs such as road dualisation, road maintenance, and the inadequate breathalyzer machines available to the police traffic department. A Traffic Safety Council of Zimbabwe manager argued that, *“Most of the accidents were caused by drunk-driving but the police does not have adequate breathalyzer machines to test drivers on the spot”*.

Road maintenance was another intervention type that was identified by participants to be pivotal in enhancing road traffic safety. Participants identified, road dualisation, road maintenance, road barricading, speed humps, crash barriers, and road signs as vital in creating a user-friendly road environment. A manager at the TSCZ argued that, *“We can advertise and campaign every year about road traffic safety awareness, but also crucially important is ensuring that the roads are safe to drive on”*. Another Traffic Safety Council of Zimbabwe official pointed to the number of accidents involving livestock or wild animals and suggested that these were avoidable with barricading of roads and fencing of game parks and farm boundaries. Corroborating similar evidence was a senior police officer who argued that, some accidents were unavoidable because of the nature of the roads. He went further to explain that,

*“Our national road system was designed during the colonial era for a limited volume and type of traffic and now that everything has changed in terms volumes of traffic and types of vehicles, we must revamp the road system. The current initiative by the ZINARA to dualise all the major highways is a good strategy but needs to be accelerated by availing more resources to constructing new road that are wider and safer”*.

The results of the study indicate that in addition to providing adequate resources to police and educate the population on road traffic safety, there was need to focus on the engineering interventions such as road re-designs, road markings, road dualisation, street lighting, and speed humps (SafetyNet, 2009). In other words, the literature is supported by the empirical evidence.

d) Vehicle maintenance

Participants also were of the view that the government should enforce compulsory testing of all road vehicles on an annual basis to ensure that they were road worthy. A police officer posited that, *“Most of the vehicles on our roads are bought second-hand from*

*overseas markets such as Japan, and are not suitable for our climate and geography”.*

Another police officer observed that the second hand vehicles were expensive to maintain so the people who bought these cars just drove them for as long as they still move, but they were unroadworthy. The TSCZ officials corroborated the evidence by the police by advocating for the ban of second hand car imports as they were flooding the roads and were of inadequate state of repair and maintenance. Another TSCZ official posited that,

*“Every vehicle should be subjected to a mandatory annual inspection by designated vehicle service inspectors to assess road worthiness as a pre-condition for insurance and vehicle licensing. The Vehicle inspection Department must be empowered to inspect all vehicles not just the public service vehicles which they currently do, and authorize vehicles to use the road network failure which they must be impounded until repaired to a road worthy state”.*

In a follow-up interview, a senior police officer reiterated that,

*“the current scenario is that government agencies only check vehicle imports for correct declaration of duty and taxes, and to clear the vehicle as having been procured procedurally and that the vehicle is not listed by Interpol as a stolen vehicle. We do not currently test the vehicles for road worthiness, so condemned vehicles in other countries can still easily make it onto our roads, that’s why there are echoes to ban these grey imports”.*

The government already has a Vehicle Inspectorate Department (VID), whose mandate is to ensure that all vehicles on the roads were road worthy through spot checks and mandatory testing of passenger service vehicles (Vehicle Inspectorate Department, 2014). Capacitation of the VID to inspect all vehicles on the roads on an annual basis could be a starting point towards achieving road traffic safety by reducing the contribution of vehicle defects to road accidents.

#### 4.2.3.5 Learning practices

The following section discusses the learning practices that emerged from the interviews on behaviours that foster or derail road-traffic safety. A common thread tying the results of the interviews was the issue of developing a learning culture. According to a Traffic Safety of Zimbabwe official, *“Road traffic legislation should be available in local languages to*

*enhance understanding by everybody*". Embracing all local languages in disseminating traffic safety messages is an approach to achieve inclusivity in communication and also takes into account the fact that the literacy rate in Zimbabwe is 90.70% (The African Economist, 2013). An officer with the Zimbabwe Republic police, argued that, "*the training programmes offered by the TSCZ should emphasize avoidance of night driving because most accidents were occurring at night*". SafetyNet (2009) corroborated the evidence of the Zimbabwe Republic police officer that the accident prevalence at night was far greater than during daytime due to diminished vision, the glare of other vehicle lights, and general driver fatigue after a day's work. In reinforcement of the concept of learning to improve road traffic safety in Zimbabwe, a senior official at the TSCZ posited that,

*"Road traffic safety education should be an integral part of school curriculum from early childhood learning right up to tertiary education. We need an integral education system that equips people with lifelong skills such as road safety. It is easier to shape behaviour at an early age than to do it with adults, it will take a lot of money and effort"*.

In a follow-up question on why the current efforts by the TSCZ in reducing road traffic accidents were not achieving the desired results, a senior TSCZ official explained that,

*"Management of the road network should be decentralized to allow private sector players to be involved. The private sector is more innovative than the government sector. We must make use of the private sector ideas in order to improve performance on road traffic safety. Take for example the comparison between the state run National Railways of Zimbabwe and the privately run Bulawayo Beitbridge railway line, and you will see the differences in efficiencies and if the same concept is implemented on road networks we will make good progress. Bulawayo Beitbridge Railway line is very efficient and well maintained as compared to the National Railways of Zimbabwe"*.

On being asked what strategies could be implemented to improve road traffic safety in Zimbabwe which were not being currently implemented, a TSCZ official pointed out that,

*"Road traffic safety consultative fora must be decentralized to the local communities to enable specific input to be given based on local culture and local environmental considerations. Take for example the Chivake Bridge disasters, the local community has been requesting for a traditional cleansing ceremony at the bridge to appease the spirits in accordance with their traditions, but at government level the focus has been to widen the bridge which will take longer to implement due to unavailability of resources. Localising action could help to get the buy-in from the local communities and when the national programmes of road dualisation come that will be a bonus"*.



The evidence from the participants highlight the potential leading role that local communities could play as change agents who use local traditions and beliefs to rally community support to the road traffic safety initiatives. The cleansing ceremonies example could be a starting point to get an entire community to focus on a road safety project and efforts can be built around such initiatives to enhance community education and awareness of traffic safety. In a follow up question on whether the appointment of road traffic safety ambassadors was a good strategy to improve road traffic safety, another TSCZ official argued that,

*“Road traffic safety ambassadors should be local community icons and not people from the capital city only. People listen and tend to follow their local heroes and heroines, so the search for icons should be at community level in terms of who has the most influence on the community to carry the road traffic safety message”.*

On being asked why accidents continued to increase yet all drivers got tested for competency in driving, a TSCZ official explained that,

*“Driver testing is conducted by a separate arm of government, the Central Vehicle Registry, and we have been engaging with them to include a day test and a night test for drivers as we have observed marked differences in driving behaviours at day time and at night. Driver testing should include stress testing to fully understand the driver’s reactions to difficult situations on the roads. Currently our driver testing approach is too simplistic and needs to be revamped but again the issue of funding is always cited as the stumbling block”.*

The evidence indicates that there is room for improvement in the driver testing standards to enhance driver competency on the roads. The following section discusses themes relating to attitudes of road users and regulatory agencies in Zimbabwe.

#### 4.2.3.4. Behaviour and attitude issues

Common attitudes that were detrimental to road traffic safety included; drunk driving, speeding, not maintaining vehicles, corruption by the law enforcement agents, using cell phones whilst driving, using fake driver’s licenses, and driving without a valid driver’s license. A manager at the Traffic Safety Council of Zimbabwe posited that fighting road

traffic accidents was comparable to fighting general bad behaviour. He further explained that, *“According to statistics, over 70% of road accidents were caused by human error. Improving driver competencies and behaviours was therefore a corner stone in improving road traffic safety”*. Another TSCZ co-worker explained that the temptation to cheat on acquiring a driver’s licence was high because corrupt public officers make it appear impossible to get the license formally. A senior police officer further corroborated that stopping the crime of counterfeit driver licenses was difficult as corrupt public officers’ work in syndicates that involve members of the public and the officials. He further went on to suggest that,

*“All human interventions in the licensing system must be removed and make the learner’s license an online test and once one passes the online test, the driving competency test must be done in a public place where more than one assessor makes a decision on the competency of the driver”*.

A senior police officer mentioned that corruption was a social evil which worries both government and the public but the difficulty was that no one owns up to corruption. He further posited that, *“two people or more are involved in a corrupt transaction or practice. It therefore requires society to have morale values that condemn corruption as we have tried to set up an anti-corruption taskforce in the police force which in turn was accused of corruption”*. The discussion on attitude and behaviours necessary to promote road traffic safety pointed to the need to address the societal value system, to encourage the population to shun and report corruption and get the government to punish corruption as a way to promoting moral uprightness. Other bad behaviours on the roads were cited as aggressive driving by the youth, competition for customers, driving whilst talking or texting on the cell phone and drunk-driving. A senior police officer remarked that,

*“It is impossible for the police to monitor every road user as it is just practically impossible. What we need is behaviour change so that everybody cares for the other road users and we accept that it is a shared responsibility to promote safety. At the moment people expect to see police officers on the road first, then slow down their*

*driving speed, or stop using the cellular phone when driving, but in actual fact who are you cheating? Yourself! It is your own life you are putting in danger, so we need a paradigm shift and begin to respect each other's life on the road by practising good road behaviour”.*

The evidence corroborated indicates that road safety is a shared responsibility and everybody must play a part to achieving road safety. According to the evidence, road traffic safety begins in the mind of the road user, and demands that actions are thought through in terms of assessing the implications before taking them. For instance, on the issue of corruption, the evidence indicates that it takes two people to commit a corrupt practice, and the remedy to corruption is having people with ethical values and these are not police enforcement issues, but behavioural change issues. Generally, participants called for behavioural change approaches to achieving road traffic safety.

#### 4.2.3.5. Change inhibitors

Change inhibitors were challenges that limited the successful implementation or sustainability of a change program (Kee & Newcomer, 2008). A senior police officer remarked that,

*“as the Zimbabwe Republic Police, we do not condone corruption but let's accept it, we are dealing with human beings who can be tempted to receiving a bribe that is why we are approaching corruption from a national level by educating the public to use the ZRP hotlines to report corruption. Corruption is a behavioural issue and not only prevalent in the police force but let's consider the entire chain of regulatory agencies involved with road traffic safety of which we have Zimbabwe National Roads Authority, Central Vehicle Registry, Zimbabwe Revenue Authority, and Vehicle Inspection Department. The person who offers the bribe is not a government official but a road user so we could easily say the churches, families and ourselves as individuals too have a role to play to fight corruption”.*

A senior TSCZ official mentioned the issue of lack of consultation with communities in implementing road traffic safety policies as an inhibitor to successful project implementation and posited that, *“inadequate funding has often meant that we consult and involve only a small section of the communities before implementing road traffic safety programs although, ideally we would have preferred to consult widely and involve everybody.”* There

was consensus by the study participants that the following change inhibitors were affecting the successful implementation of road traffic safety programmes; Lack of consultation of communities, limited involvement of communities, lack of evaluation of interventions, lack of adequate funding of projects, and corruption by public officials. The effectiveness of road-traffic safety interventions was limited unless these inhibitors were addressed. A senior officer with the Zimbabwe Republic police explained that,

*“It is easier to blame all the challenges on corruption but we need to objectively look at the real issues. Owners of passenger service vehicles were employing young drivers who get carried away on the wheel and in most of the speeding cases, we observed that a young driver was involved or it would be a case of driving under the influence of alcohol, or someone was sending a text message or reading a phone message whilst driving. We must find solutions to these social vices”.*

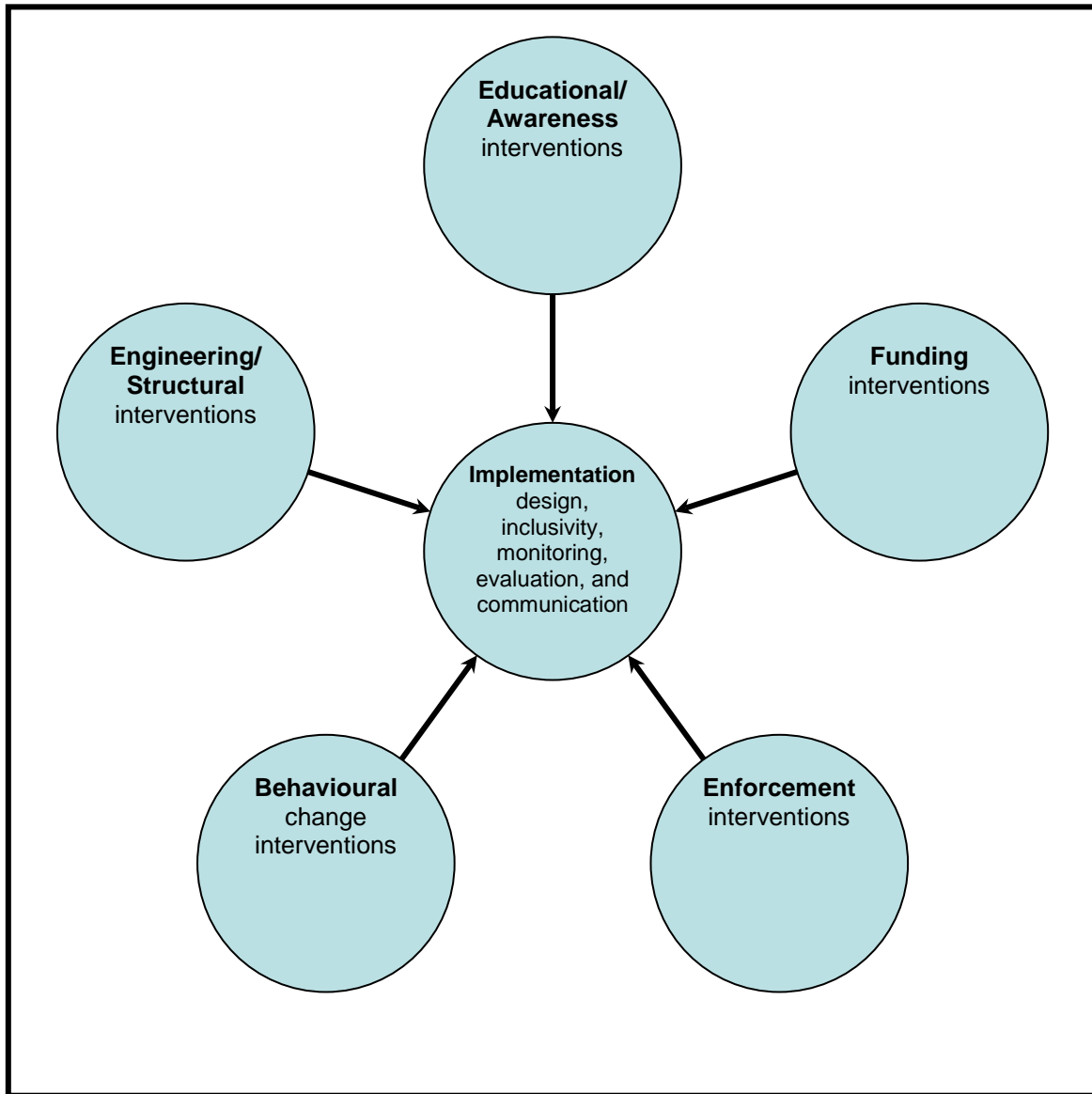
The evidence corroborated indicates the central role of communities as change agents and the need for government to design road safety intervention programmes that recognize and involve communities as the main drivers in order to achieve programme effectiveness.

A TSCZ official remarked that,

*“We cannot ignore the issue of avenging spirits as a traditional and outdated belief, because during interviews with survivors of road accidents that were declared national disasters by the President of Zimbabwe, we noted that most people talk of mysterious circumstances having caused the accident and this issue needs to be further investigated”.*

While the issues of corruption and vehicle maintenance were discussed earlier, other hindrances were the use of cellphones whilst driving, which is a behavioural and law enforcement problem, employment of young drivers to drive public service vehicles, overloading of vehicles, avenging spirits, which is a religious or cultural issue and aggressive driving behavior. The findings from the interviews indicate that there were six major categories of challenges affecting road traffic safety in Zimbabwe. Firstly, there are the structural or engineering challenges to the road-traffic safety challenge, and in this category, road network quality and maintenance were major issues. The structural or engineering challenges to road traffic safety, according to the study findings, can be rectified through investment in road dualisation, road re-design, pothole patching and re-

surfacing, and road signages. Secondly, there were educational, awareness and enforcement challenges to road traffic safety. Educational, and awareness challenges can be addressed through intensified educational and awareness campaigns in multiple languages including the local dialects, amending the schools' curriculum to make road traffic safety an examinable subject, and the appointment of safety ambassadors. Third, were the enforcement challenges, which can be overcome by amending the level of fines and penalties to make them a deterrent, and equipping the police force supported by technology to monitor the roads. Fourth, were the behavioural challenges which include road traffic behaviours such as drunk-driving, speeding, texting while driving, corruption and bribes. The behavioural challenges require changes to the value system and calls for everybody to take an introspection and begin to act empathetically and ethically. The fifth category of challenges affecting road traffic safety, concerned with funding road traffic safety initiatives. Funding constraints were observed as inhibiting the engineering or structural projects, limiting the education and awareness projects and hampering police efforts in supervising the road network. Finally, the sixth category of challenges affecting road traffic safety in Zimbabwe concerned with how road traffic safety interventions were being implemented. Participants corroborated evidence that a wide consultative and inclusive intervention design and implementation process backed by continuous evaluation, monitoring and feedback was required. In summary the qualitative research results can be depicted as follows:



**Figure 4.10: Conceptual presentation of the results of the qualitative inquiry**

Figure 4.10 indicates the central role of intervention planning to the road-traffic safety challenges experienced in Zimbabwe. It is evident that the effectiveness of the other intervention types depended on how they were implemented. Implementation involves problem diagnostics, inclusivity or collaboration in approach, results monitoring, evaluation, and communication (French & Bell, 1990).

#### **4.4 SUMMARY OF QUALITATIVE RESEARCH FINDINGS**

The qualitative phase of the research yielded some important findings, which include the causes of road traffic accidents, causes of failure of road traffic safety interventions, and possible remedies to make road traffic safety interventions successful. The research participants were in agreement that road traffic safety interventions required adequate funding, planning, and support from all stakeholders.

There were a number of improvement action plans that derive from the qualitative phase of the research results. For instance, the education curriculum requires amendment to incorporate road traffic safety into the schools curricula. Furthermore, road traffic safety legislation could be published in vernacular languages to foster understanding at the local community level. Additionally, research participants recommended that, road traffic safety intervention planning be decentralized so that local community input is captured for example road traffic safety ambassadors could be local distinguished people or local celebrities who will champion the message of road safety.

The qualitative inquiry findings provided detailed explanations of how the road traffic safety improvements could be carried out. The recommendations have policy implications for government, business community and the ordinary citizen. Behaviour change ideas on how to improve road traffic safety were cited as a key pillar to the success of road traffic safety interventions. Behaviour change is anchored on individual and community values, and these need to embrace empathy and ethics. According to Cummings and Worley (2009), organisation development techniques promote behavior change by highlighting the need to change the status quo, outlining the new desired changes, and collectively developing a

strategy to achieve the new desired behaviours. Families, community leaders, schools, church leaders, and the law enforcement agents, all have a role to play in shaping the societal value system. On the part of government, there is a need to review legislation to include printing in local languages, reviewing the driver testing rules and procedures, resourcing, and capacitating the regulatory agencies and adopting inclusive and collaborative problem diagnostic and solution finding. On the part of the business communities, the research findings inform a need to review the support mechanisms for road traffic safety projects. Whilst there were divided voices on the extent of the business community support to road traffic safety initiatives, more could be done and the business community was lauded as being innovative and such innovation could help the government in improving road traffic safety.

#### **4.5 CONCLUDING INTERPRETATIONS**

In this section, the research findings from the qualitative and quantitative stages of the inquiry were brought together in order to gain a complete picture of the study findings. Triangulation of methods involved validating the evidence from the quantitative inquiry with the evidence from the qualitative inquiry (Creswell, 2013). I also conducted data triangulation by comparing and contrasting findings by different participant categories. The evidence corroborated by members of the Zimbabwe Republic Police was for example checked against evidence from participants drawn from the Traffic Safety Council of Zimbabwe (Lee, 2012). The research results exposed the main causes of road traffic accidents in Zimbabwe as drunk driving, speeding, poor road design and maintenance, inexperienced drivers and poor traffic law enforcement. The study also evaluated the effectiveness of the current road traffic safety interventions and the results of the quantitative stage of the inquiry indicated that the current interventions were not effective in



achieving sustained road accident reduction with 66.67% of the respondents arguing that the current interventions were not achieving desired results.

The qualitative inquiry further reinforced the observation from the quantitative stage of the inquiry that current road traffic safety interventions were not effective and proffered a number of reasons why the interventions were not effective. During the qualitative inquiry, the research findings indicated that change inhibitors such as underfunding of projects, corruption, and inadequate consultation were limiting change effectiveness. The results of the qualitative inquiry further provided recommendations on what could be done to improve road traffic safety intervention effectiveness in Zimbabwe, for example by improving community involvement and multiple stakeholder collaboration in safety projects.

The quantitative phase of the study also exposed the fact that the current interventions were not addressing the correct problems with 92.94% of the respondents supporting the view that interventions were not correctly matched to the root causes of road traffic accidents. The qualitative research results further corroborated this evidence by providing explanations why there was a mismatch of interventions to causes. In the qualitative research results, it emerged that consultations and intervention planning were not extensive and were underfunded, and suggestions from local communities were often not captured in national policy on road traffic safety, for example the issue of cleansing ceremonies at accident black spots in terms of the African traditional customs was not being implemented.

The study also discussed recommended solutions to the road traffic safety challenges in Zimbabwe and the following recommendations were made:

- Adoption of organisation development type approaches to problem solving, particularly action research approaches, which rely on people finding solutions to their own problems and implementing the solutions, the PDCA approaches particularly continuous evaluation and action planning based on research and inclusive implementation.
- Road user education, and incorporating traffic safety education in school curricula. Furthermore, it was proposed that road traffic safety campaigns and legislation be made available in local vernacular languages to facilitate understanding by all road users.
- Improvement in road infrastructure for example road dualisation, road re-design, pothole patching and road barricading to prevent livestock and wildlife from free roaming on the roads.
- Enforcement of motor vehicle maintenance and traffic laws, that include scheduled vehicle check-ups at designated service centres as pre-conditions for vehicle licensing and insurance.
- Adequate funding of road traffic safety programs from government, non-governmental organisations, and the business community.
- Harnessing community support through consultation and collaborative implementation of mutually agreed solutions.

In conclusion, the process of triangulation showed that phase 1 and phase 2 research results were in alignment and complimentary. Phase 1 research results were more exploratory and descriptive and indicated where the problems in improving road traffic safety in Zimbabwe lay. Phase 2 research results gave in-depth understanding and interpretations on the observations from phase 1, by critically exploring why road traffic safety remained a challenge in Zimbabwe despite the various activities conducted by the

Traffic Safety Council of Zimbabwe to improve road safety. Triangulation of the phase 1 and phase 2 research results provided insights into what were the problems, why the problems have remained a challenge, and how the problems could be potentially resolved.

## **CHAPTER 5**

### **5 CONCLUSIONS AND RECOMMENDATIONS**

In this chapter, the researcher discusses the implications of the research findings on the TSCZ strategic focus and explore national policy implications. The following section presents the research summary, recommendations, and the salient points. The purpose of the study was to answer the following research questions:

- 1) Which road traffic safety interventions did the Traffic Safety Council of Zimbabwe implement from 2009 to 2012?
- 2) How were the road traffic safety programs implemented?
- 3) How effective were the interventions in bringing about sustained road traffic accident reduction in Zimbabwe?
- 4) What recommendations can be offered to achieve sustained road traffic accidents reduction in Zimbabwe?

In the following sections, the researcher presents the answers to the research questions.

#### **5.1 SUMMARY AND DISCUSSION OF SALIENT POINTS**

The research revealed the diversity of the main causes of road traffic accidents in Zimbabwe. The research findings align with the views of Cummings and Worley (2009) on OD implementation, that interventions in human systems should take a system-wide approach as the behavior outcomes were influenced by various factors including the interaction effect of those variables. Before answering the first research question on which road traffic safety interventions were implemented by the Traffic Safety Council of Zimbabwe from 2009 to 2012, it was necessary to understand the causes of road traffic accidents in Zimbabwe so that the interventions address the correct causes (Schmuck & Miles, 1971). The main causes of road traffic accidents were:

- Drunk-driving or driving under the influence of alcohol and drugs, which impairs judgment and control of the vehicle.
- Speeding and aggressive driving behavior, which affects the driver reaction time and increase propensity for accidents.
- Poorly designed roads and inadequate road maintenance, which negatively affects the driving conditions on the roads.
- Inexperienced and unlicensed drivers cause accident because they have inadequate skills and exposure to road driving.
- Poor traffic law enforcement increases accidents as reckless behavior is not punished by law.
- Inadequate vehicle maintenance implies that unroadworthy vehicles ply the roads thereby exposing road users to harm.
- Corruption in the public service impacts road accidents in that unsuitable people end up acquiring licenses which exposes other road users to harm.

The study also proffered recommended interventions to tame the road-traffic accident scourge. In answering the research question on which road traffic safety interventions were implemented by the Traffic Safety Council of Zimbabwe implement from 2009 to 2012, the following interventions were rated as having the highest effectiveness in reducing road traffic accidents in Zimbabwe:

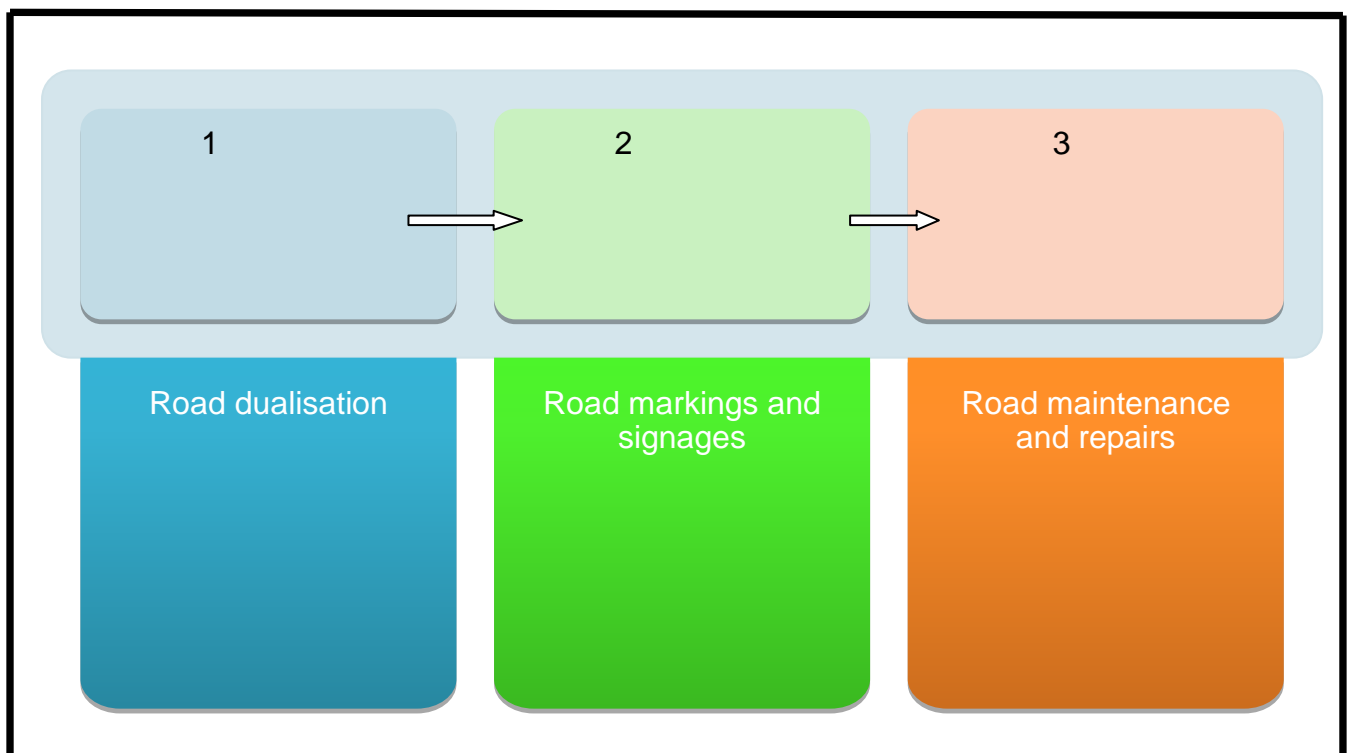
- Carrying out road dualisations, which involve the expansion of the road width into multiple carriageways to allow easy passage of vehicles without encroaching into each other's lane.
- Implementing road markings and signs to give clear directions and signs that demarcate road boundaries and road section instructions that guide drivers on the appropriate actions to take.

- Carrying out road repairs and maintenance, which are the engineering works involved in designing new roads and improving the quality of existing road infrastructure.
- Eliminating the use of cellphones when driving is a regulatory intervention which outlaws using the cellphone whilst driving as an effort to keep the driver focused on the task of managing the vehicle driving experience.
- Reducing the volume of traffic on the road is an intervention approach that manages vehicle density on the road by imposing penalties and charges for using certain stretches of road during prescribed times.

The above recommendations inform prioritisation of interventions for policy planning and resource budgeting. The results of the study indicated that dualisation of the national road network was more effective in reducing road traffic accidents in Zimbabwe than any other measure currently being implemented. Clear road signs and road markings was ranked second in terms effectiveness in reducing road traffic accidents in Zimbabwe and in third place was road maintenance and repairs. The TSCZ must engage the relevant other stakeholders responsible for road dualisation, road markings and road repairs and maintenance to collaborate in implementing these measures. A prioritisation framework therefore provides policy direction and channels scarce economic resources towards priority projects, which have high impact in achieving desired goals.

Figure 5.1 illustrates the intervention prioritisation resulting from the research findings where the dualisation of roads, road markings, and signages, and road maintenance, in that order, had the highest priority rankings ahead of all other interventions. However, according French and Bell (1990), interventions can be implemented sequentially or

simultaneously taking into account budget constraints. In the Zimbabwean case where resource budgets according to the research findings are constrained, the sequential approach could yield quicker results than prolonging the interventions whilst resources were mobilised. Given the resource constraints exposed in the research findings, the priority interventions could work in the following order; Carry out the road dualisations as a priority intervention, put up the road markings and road signages, and then maintain and repair the roads.



**Figure 5.1: Intervention Prioritisation Framework Based on Research Findings**

In addition to the intervention prioritisation, the study also identified priority stakeholders in the fight against road traffic accidents as follows:

- **Government** provided policy framework, legislation, budgetary allocations, evaluation and monitoring support to road traffic safety interventions.
- **Non-governmental organisations** provided advocacy, support and community education in support of road traffic safety.

- **Corporate world** provided training, road traffic safety education and financing options for infrastructure projects.
- **Communities** were the road users and provided feedback and participation through compliance or non-compliance with road traffic safety initiatives.

Priority stakeholders were stakeholders who could cause action to happen or not to happen in respect of road traffic safety. Ignoring any one of the action initiators would weaken the effectiveness of the intervention process. The priority stakeholders could therefore act as change agents, people who advocate for change and help to sustain change by mobilizing support for the change efforts (French & Bell, 1990).

In answering the research question on how the road traffic safety programmes were implemented, the study exposed action inhibitors or what makes the TSCZ interventions ineffective. Corruption by law enforcement agents, excluding some stakeholders in project implementation, underfunding of projects, and not measuring the effectiveness of interventions characterized the implementation approach and these were observed as critical inhibitors to effective road traffic safety interventions implementation.

## **5.2 INTERPRETATION OF RESULTS IN TERMS OF ORGANISATION DEVELOPMENT THEORY**

Organisation development theory recommends that change interventions premise on planning, consultative problem diagnostics, extensive collaboration, inclusive implementation, evaluation, and communication (Cummings & Worley, 2009). In other words, change interventions were systematic and system-wide (Warrick, 2014). This OD framework for change management provided a vital yardstick against which the empirical



findings were compared to identify any gaps in practice and the resultant effects of those deviations on the road traffic safety performance outcomes in Zimbabwe.

The results of the study were in agreement with the recommendations made by the World Health Organisation (2004) which posited that there should be partnerships between stakeholders to fight road traffic accidents. The Swedish's "vision zero" (World Health Organisation, 2004:19) is an example of a traffic safety policy with zero tolerance towards road accidents and accepts the fallibility of human beings by recommending road designs and road user education that takes into account the possibility of error by users of the roads.

The research results revealed that road traffic safety interventions should target specific causes and this result ties in with the recommendations by SafetyNet (2009), World Health Organisation (2004), World Health Organisation (2010) and Chen (2010), who argued for targeted interventions. The study proffered a cause-action-actor mapping framework (see Figure 3.3), and this framework reinforces the proposition by Schmuck and Miles (1971) who presented the OD cube (see Figure 1.2), as a framework for classifying OD interventions. Figure 1.2 and Figure 3.3 share a common thread, which is the use of systems theory to link interventions to causes in order to enhance the effectiveness of the interventions.

In answering the research question on how effective the interventions were in bringing about sustained road traffic accident reduction in Zimbabwe, the research findings indicated that the current traffic safety interventions implemented by the Traffic Safety Council of Zimbabwe exhibited limited coherence, focus and were ineffective. There was an

apparent loose connection between cause, intervention, and intervener, because 92% of the research respondents indicated that current interventions were not addressing the correct problems, and research participants indicated that there was limited consultation of stakeholder groups in the implementation of interventions.

The study also exposed human factors as the leading causes of accidents particularly drunk driving, using cell phone whilst driving and agree with the World Health Organisation (2004) which placed alcohol among the leading causes of road traffic accidents. According to the World Health Organisation (2004), alcohol impairs judgment and control and affects both drivers and pedestrians alike. Abagale, *et al.*, (2013) also echoed the same sentiments in a study of road traffic accidents in Ghana, that alcohol increased road traffic accidents. Diedericks (2014), concurred that human factors were the leading causes of road traffic accidents based on a study of the impact of road traffic accidents on employees in South Africa and Guruva (2009) shared the same sentiments based on a road traffic safety study on Zimbabwe.

The study also exposed that road infrastructure development particularly road dualisation and road maintenance had the highest potential to reduce road traffic accidents. This observation is supported in the literature by Albate, *et al.*, (2013), Bax, *et al.*, (2010) and Bliss and Jeanne (2012). According to the World Health Organisation (2010), the combination of poor road infrastructure, and bad driving habits such as speeding and drunk-driving can be a cocktail for disaster in terms of road safety.

Furthermore, the TSCZ had its own peculiar challenges in addressing the road traffic safety problems, and these were limited funding of road safety programs, corruption by public

officers, fake drivers' licenses, inadequate vehicle maintenance, inadequate traffic law enforcement, avenging spirits (cultural practices), and outdated road designs and traffic offense penalties. Furthermore, there were challenges on matching remedial action to causes of the road traffic accidents and the implementation of road safety programs was not collaborative and inclusive which leaves room for improvement.

### **5.3 DISCUSSION OF GAPS, ANOMALIES AND/OR DEVIATIONS IN THE DATA**

The research outcomes were that the major causes of road traffic accidents in Zimbabwe were drunk-driving, speeding, poor road design and maintenance, and poor traffic-law enforcement. The research outcomes tie-in with the statistical analysis carried out by the TSCZ, which ranks human error as the major cause of road traffic accidents in Zimbabwe (Traffic Safety Council of Zimbabwe, 2013). Drunk driving impairs judgment and increases chances of human error (World Health Organisation, 2010).

The significant gap exposed by the research is on implementation of the road-traffic safety interventions in terms of the OD practice. The study revealed that the extent of consultation and inclusivity in implementation required improvement. According to French and Bell (1990) organisation development interventions should be system-wide and all-inclusive for them to be effective. An evaluation of the TSCZ implementation of the road-traffic safety interventions revealed that 87.50% of the respondents felt that government did not consult other stakeholders and only 12.50% believed there were adequate consultations (Figure 4.7). The potential implications of the lack of consultation based on the empirical findings, were the ineffective problem diagnostics and ineffective implementation of the road traffic safety interventions.

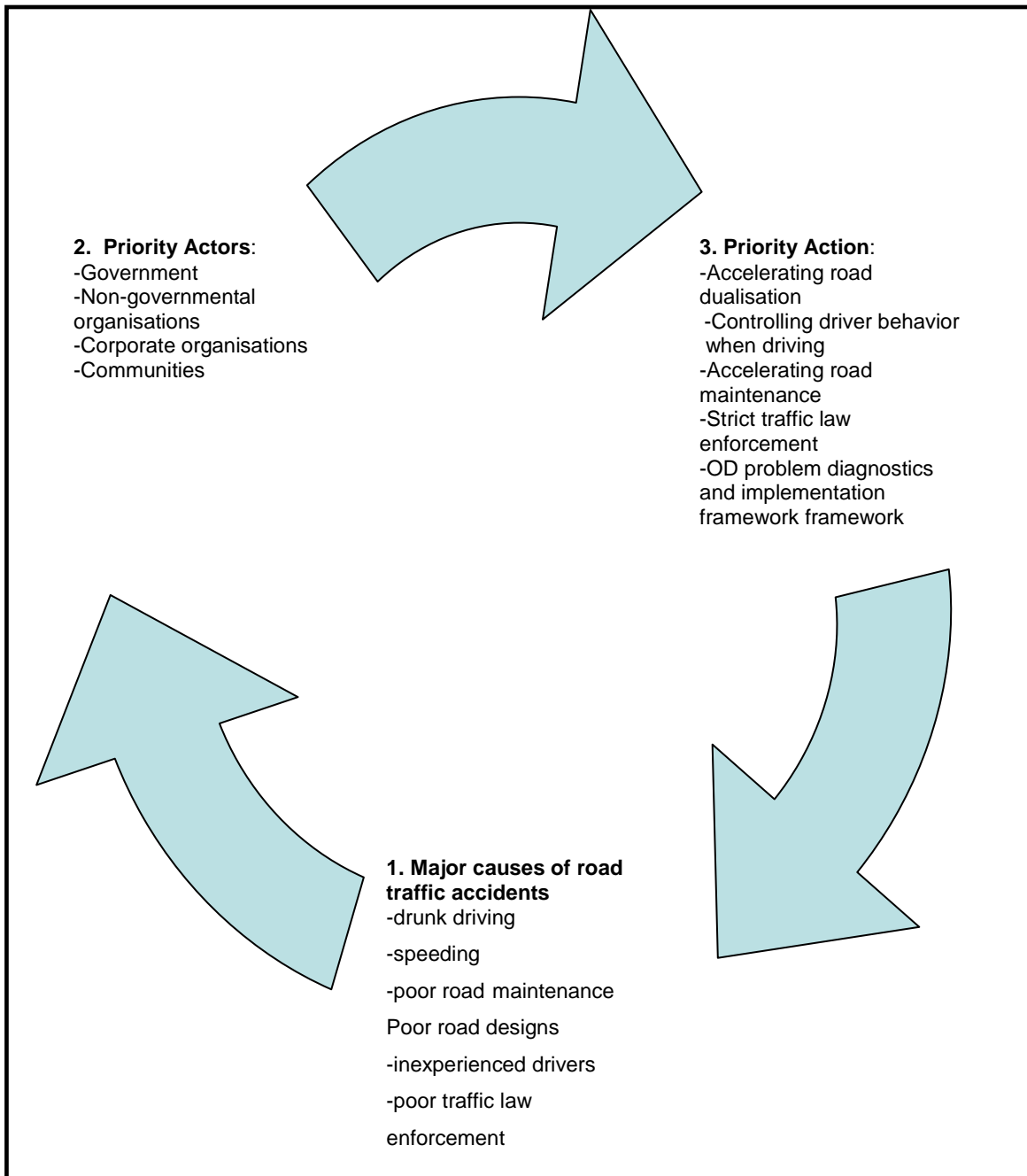
A deviation from established data emerging from the research is on the participant statistics. Whilst Zimbabwe has a population composition favouring women with 51.9% of the total population and 48.10% being men (Zimstats, 2012), the participant statistics however, show that 70% of the respondents were men and 30% were women which ties in with the Zimbabwe population distribution by economic activity (Zimstats, 2012:87). The study relied on an internet mediated questionnaire hence the sample statistics mirrored the national population distribution by economic activity, which may have favoured male participants as they may be more economically active.

#### **5.4 SIGNIFICANCE OF THE STUDY AND PROPOSED FUTURE RESEARCH**

The study brings clarity to the road-traffic safety challenge in Zimbabwe by exposing new insights in terms of major causes of road traffic accidents, inhibitors to successful implementation of change strategies, and gaps in problem diagnostics and intervention planning and execution. The study findings indicated that the TSCZ is focusing on the wrong problems hence the ineffectiveness of their interventions. The study further exposed shortcomings on implementation of the interventions. 87.50% of the respondents believed the TSCZ does not consult all stakeholders although a minority 12.50% believed there was adequate consultation. It is evident from the analysis of disconfirming data that it is possible that government is consulting stakeholders but not widely enough. This creates an opportunity for improvement on the part of the TSCZ when implementing future interventions, by holding extensive consultative meetings to harness input and ideas from the public on road-traffic safety problem diagnostic, solution finding, and strategy implementation.

Additionally, the study brought to the fore, the underlying shortcomings in government change implementation initiatives. An intervention prioritisation framework was proposed as a result of the empirical evidence which should guide government's resource allocation efforts. The societal value system was challenged as a result of the empirical findings, by exposing the extent of the rot in moral values underpinning society in general, which are promoting social vices such as corruption and bribery. The study, further contributes potential remedial solutions that can address shortcomings such as moral decay through mainstreaming road traffic safety studies and ethics in schools curricula in order to engender the value system in children from an early age.

The study informs intervention prioritisation and highlights recommended action against specified major causes of accidents. The prioritisation of action matched against the priority causes and the identification of priority stakeholders who should be an integral part of the implementation team offers a new alternative approach to addressing the road-traffic safety challenge. Figure 5.2 illustrates the prioritisation grid mapping causes, to action, and to the action initiators.



**Figure 5.2: Cause, Action, Actor Mapping Framework**

Finally, the study further significantly contributes to scholarship generating a sense of hope and insight that it is possible to achieve sustained road traffic safety based on the notable achievements of countries such as the United Kingdom, Netherlands and Sweden. The study was however not exhaustive, as it did not compare the road traffic safety interventions carried out in Zimbabwe against any other country particularly those in the developed world such as Sweden, Netherlands and Great Britain which have recorded

notable successes in taming the road accident menace. Future studies could focus on comparative analyses of action taken against results achieved between Zimbabwe and the benchmark countries. This comparative analysis could potentially expose any variations in results given a particular intervention and isolate influences such as culture, religion, education background, and many other variables that can influence effectiveness of interventions when the implementation style is carried out the same way.

## 5.5 POLICY AND OTHER IMPLICATIONS

In answering the research question on what recommendations can be offered to achieve sustained road traffic accidents reduction in Zimbabwe, the following policy issues were raised:

- Creation of a national road traffic safety policy, which entails coming up with a blueprint that specifies how interventions to improve road traffic safety in Zimbabwe will be carried out.
- Introducing a code of ethics for traffic law enforcement agencies that governs the behavior of law enforcement agents and how the law enforcement agents were managed and incentivized to shun corruption and other social vices.
- Establishing a national road network funding scheme, which outlines how funding for road infrastructure projects will be mobilised.
- Establishing a national policy on road traffic safety stakeholder consultative framework, which takes into account the priority stakeholders and identify at which stages consultation will take place and in what format.
- Establishing a road traffic safety evaluation framework, will be another blueprint that specifies at which intervals evaluation of road traffic safety

projects will take place and the relevant stakeholders who shall be informed of the results.

- Introducing road traffic safety education in the schools curricula as an examinable subject to increase early childhood learning and awareness on road traffic safety.

The above policy issues embody the inhibitors noted in the study as; lack of consultation of communities, limited involvement of communities, lack of evaluation of interventions, lack of adequate funding of projects, and corruption by law enforcement agents. Clear policies addressing the change inhibitors will foster transparency and teamwork in the implementation and evaluation of road traffic safety initiatives.

The national road traffic safety policy addresses the responsibilities of various stakeholders involved in the road traffic safety initiatives and defines tasks and how they should be implemented. The code of ethics for traffic law enforcement agents outlaws corruption, investigates, and punishes corruption. The national road network funding scheme addresses the funding challenges in road infrastructure projects and articulates how funds for each project will be raised. The stakeholder consultative framework deals with the identification of stakeholders for each road safety project and how the engagement with the stakeholders will take place. Finally, the road-traffic safety evaluation framework addresses issues on how the measurement of success or the lack of it in road-traffic safety projects will be measured.

Furthermore, from the literature, other notable interventions that can help reduce road traffic accidents included (Morrison, Petticrew & Thomson, 2003; Chen, 2010; Raina &



Mushtaq, 2011; Datta, Sharma & Schattler, 2003; Elvik & Veisten, 2005; Malaysia Institute of Road Safety Research, 2012; SafetyNet, 2009):

- Involvement of entire communities or the nation at large: in order to win the support of the communities, people must be informed why certain actions are being taken.
- Setting road traffic safety targets (specific, measurable, realistic, and time-bound): for the targets to be shared and for collective effort to be harnessed towards the attainment of the targets.
- Development of a public sector transport system which can effectively reduce the number of private vehicles on the road and will help the weaker section of the society to easily and respectfully manage their transport needs.
- Developing a centralised transport database for all vehicles on the road, which help in maintaining law and order, help in accidents probing and restricts traffic offenders.
- Reducing the need to travel by adopting virtual workgroups, and teleworking schemes; this will also reduce the number of vehicles on the roads and the potential road accidents.
- Increase in cycling and walking through creation of safe walking and cycling routes and cycling facilities: this measure also reduces the number of vehicles on the roads, which reduce the traffic accident burden.
- Reducing vehicle speeds, which reduces crash impact, and lessens injury severity and road accident mortality.
- Promoting car sharing through voluntary planning of trips and discouraging sole ridding; which also decongests the roads and reduces the incidence of road accidents.

- Improving road safety skills and behavior, in order to enhance pro-activeness, reactiveness and consequently reduces crash incidence and to some extent crash severity.
- Child road safety education promoting the teaching of safe road usage and traffic rules as part of the education curriculum.
- Introducing school and work travel plans with the aim of cutting congestion caused by school-run or work-run.
- Introducing traffic calming measures that discourage non-local traffic from using residential streets and reducing the speed of the remaining traffic.
- Modifying risk factors for child pedestrian injuries: (for example; in order of effect size are: age, behaviour, race, and sex. Social and cultural risk factors increasing likelihood of child pedestrian injuries are income, crowding, mother's working status and history of hospitalisation, illness in the family, and mother's education. Physical environment risk factors are, in descending order, volume of traffic, speed limit, predominant type of dwelling, absence of play area, location on road, protection of play area, proportion of curb side parking, street mean vehicle speed, shared driveway, type of road, time of day, weather, and street-lighting.
- Installing guardrails to reduce both the number of accidents, and their severity.
- Installing crash cushions to reduce both number and severity of accidents.
- A review of traffic laws and penalties to serve as a deterrent to would be traffic offenders.
- Promoting road safety campaigns and mass education.

The literature review however, revealed that the setting up of data management systems that maintain all the necessary data elements will be a challenge for developing nations

such as Zimbabwe due to inadequate financial, human and material resources with which to achieve this kind of infrastructure (Chen, 2010; World Health Organisation, 2010). However, the intervention prioritisation framework proposed in this study mitigates against this challenge, as the government of Zimbabwe can implement those high impact interventions one after the other until the overall objective of reducing road traffic accidents is achieved.

## **5.6 CONCLUSION**

The study provided answers to all the research questions and therefore satisfied the objectives of the study. The causes of road traffic accidents in Zimbabwe were identified and the priority interventions and stakeholders were also matched. Furthermore, the research findings indicated that all stakeholders must be consulted in problem diagnostics and solution finding processes. Additionally, organisation development approaches to intervening in human systems were recommended. The attraction of the organisation development approaches was the need to achieve system-wide behavioural changes, collaborative problem diagnostics and problem solving, and carrying out systematic interventions in order to accomplish the change objectives.

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## Annexures

### Annexure A: Questionnaire



### PARTICIPANT INFORMATION SHEET

15 March 2013

Title: An organisation development approach to the improvement of road traffic safety in Zimbabwe

Dear prospective participant

*Student research project*

My name is Nathan Chikono and I am doing research under the supervision of Prof Adèle Bezuidenhout, a professor in the Department of Human Resources Management towards a Master of Commerce degree in Business Management at the University of South Africa. We are inviting you to participate in a study entitled "An organisation approach to the improvement of road traffic safety in Zimbabwe".

The aim of this study is to establish what needs to be done by the Traffic Safety Council of Zimbabwe for sustained road traffic safety to be achieved in Zimbabwe. I am conducting this research to find out people's views and recommendations on how to improve road traffic safety in Zimbabwe.

Approximately 500 people are being invited to participate in this research. I used e-mail addresses with approval from public databases such as Bulls&Bears to come up with the sample. You have been selected at random to share your views and recommendations on how traffic safety can be improved in Zimbabwe. Road traffic safety affects every road user in Zimbabwe and I need input from as many Zimbabweans as possible in order to help in improving road traffic safety.

The study involves 500 internet mediated questionnaires and face to face interviews with 15 selected respondents. The kind of questions that will be asked are to do with what road traffic safety initiatives you have witnessed, your assessment of the worthiness of these initiatives in improving road traffic safety and what you think needs to be done for traffic safety to improve in Zimbabwe. The questionnaire will take approximately 10-15 minutes to complete. The interviews will take approximately 15-30 minutes to complete.

Participation in this study is voluntary and there is no penalty or loss of benefit for non-participation. Being in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason. Your withdrawal will not affect you in any way. However once you submit a questionnaire, it will be difficult to withdraw as the questionnaires do not have identification names and once submitted even the researcher cannot tell which one belongs to who.

The benefits for participating in this study are that your views together with others will be used to influence how road traffic safety is managed in Zimbabwe. If the recommendations that will come out of this study are implemented, the Zimbabwean roads will be safer for all road users which will reduce loss of life and damage to property. Road carnage is robbing Zimbabwe of its scarce educated and skilled people thereby limiting the country's growth potential.

There are no foreseeable risks involved from participating in this research. Your sacrifice will be the time you will spend helping a student researcher and nothing more. There is no sensitive information or personal information that will be required in this research and the kind of information sought is generally helpful to any road user.

Your responses will only be reported in the aggregate and all respondents will be assigned anonymity codes (random numbers) and all data analytics will be based on the codes and no identification marks or links will be left in the data so as to be able to trace any response to its author. The online survey software, Questionpro, has an active respondent anonymity assurance module which when activated ensures that even the researcher does not know who is responding but will only receive coded respondent identities.

The researcher, supervisor and members of the UNISA academic community can access the data but only in its coded state with no individual identification marks. Your answers may be reviewed by people responsible for making sure that research is done properly, such as members of the Research Ethics Committee.

Your anonymous responses may be used for other purposes, e.g. research report, journal article, conference presentation, etc. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Password protected electronic copies of your answers will be stored by the researcher for a period of 5 years in an external expandable hard drive locked in a filing cabinet at the researcher's permanent place of private residency for future research or academic purposes. Future use of the stored data will be subject to further Research Ethics Review and approval. At the expiry of the 5 year period the data will be permanently erased from the hard drive.

Apart from the time that you will spend participating in the study, no other costs are expected to be incurred and as a result on reimbursement of costs or payments will be done in connection with this study. This study is subject of ethical approval from the Research Ethics Committee of the College of Economic and Management Sciences at Unisa. A copy of the approval letter can be obtained from the researcher.

If you would like to be informed of the final research findings, please contact Nathan Chikono on mobile phone number +263778683381 or fax number +2634776935 or email [nathan.chikono@gmail.com](mailto:nathan.chikono@gmail.com) .The findings are accessible once the research is approved by the university for a period of 5 years from the date of approval.



Should you require any further information or want to contact the researcher about any aspect of this study, please contact Nathan Chikono on mobile phone number +263778683381 or fax number +2634776935 or email [nathan.chikono@gmail.com](mailto:nathan.chikono@gmail.com). Should you have concerns about the way in which the research has been conducted, you may contact Prof Adéle Bezuidenhout, Department of Human Resource Management, on +27 12 429-3941 (tel) or +27 12 429-6081 (fax) or [bezuia@unisa.ac.za](mailto:bezuia@unisa.ac.za).

Thank you for taking time to read this information sheet and for participating in this study.

Thank you

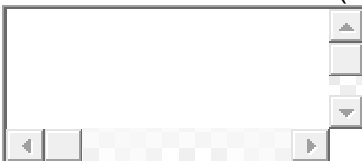
Nathan Chikono

If you are agree to participate in the study please start with the survey now by clicking on the **Continue** button below.

I Agree

2. Which of the following road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe did you witness from 2009-2012?

3. Can you give brief details as to how any of the road traffic safety interventions you witnessed above were carried out (TYPE IN THE FREE TYPING SPACE):



4. Please rank the road traffic safety interventions carried out by the Traffic Safety Council of Zimbabwe in terms of their effectiveness in reducing road traffic accidents on a scale of (1-3) with a 1 being the least effective and a 3 being the most effective (INDICATE WITH 1,2 OR 3) :

Road re-surfacing	<input type="checkbox"/>
Road dualisation	<input type="checkbox"/>
Road markings	<input type="checkbox"/>
Upgrading and renewal of road signages	<input type="checkbox"/>
Road barricading to protect pedestrians and animals	<input type="checkbox"/>
Educational campaigns on road safety awareness and road safety tips	<input type="checkbox"/>
Driver training, testing and re-training	<input type="checkbox"/>
Traffic law enforcement	<input type="checkbox"/>
Road accident statistics releases to deter people from unsafe road behaviour	<input type="checkbox"/>
Vehicle inspection to enforce safety on the roads	<input type="checkbox"/>

5. How satisfied were you with the manner in which the following road traffic safety interventions were implemented (TICK CIRCLE THAT BEST DESCRIBES YOUR SATISFACTION LEVEL WITH THE INTERVENTION):

	Very Unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
Road re-surfacing and pot hole patching	●	●	●	●	●
Road dualisation	●	●	●	●	●
Road markings	●	●	●	●	●
Upgrading and renewal of road signages	●	●	●	●	●
Road barricading to protect pedestrians and animals	●	●	●	●	●
Educational campaigns on road safety awareness and road safety tips	●	●	●	●	●
Licensing of drivers	●	●	●	●	●
Traffic law enforcement	●	●	●	●	●

Road accident statistics releases to deter people from unsafe road behaviour

- 

Vehicle inspection to enforce safety on the roads

- 
- 

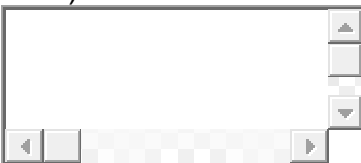
6. What do you suggest should be done to improve the effectiveness of road traffic safety interventions by the Traffic Safety Council of Zimbabwe? (TYPE YOUR RESPONSE IN THE FREE TYPING SPACE)

A rectangular text input field with a light gray border and a vertical scrollbar on the right side.

7. How often do you hear awareness campaigns from the Traffic Safety Council of Zimbabwe? (TICK THE CIRCLE WITH THE APPROPRIATE RESPONSE)

- Weekly
- Monthly
- Quarterly
- Annually

8. Given that the Zimbabwe Republic Police (ZRP), Zimbabwe National Roads Administration (ZINARA), and Traffic Safety Council of Zimbabwe (TSCZ), are all involved with promoting road traffic safety in one way or the other, explain what you think could be the best structure to effectively promote road traffic safety in Zimbabwe (TYPE RESPONSE IN FREE TYPING TEXT BOX)

A rectangular text input field with a light gray border and a vertical scrollbar on the right side.

9. How often does the Traffic Safety Council of Zimbabwe conduct evaluation surveys of the effectiveness of their road traffic safety initiatives? (TICK THE CIRCLE THAT BEST

DESCRIBES YOUR RESPONSE)

- Before the campaign is launched
- Before, during and after each campaign is launched
- At the end of each campaign
- They never evaluate, but continue to launch new initiatives

10. In your opinion what could be the reason why road traffic accidents continue to increase despite the efforts of the Traffic Safety Council of Zimbabwe? (TICK CIRCLE THAT BEST DESCRIBES YOUR RESPONSE)

- Inadequate funding of road traffic safety initiatives
- Poor evaluation of interventions implemented
- Poor advocacy by non-governmental and other community groups
- Poor driver training or inadequate driver training and re-training
- Poor traffic law enforcement
- Too many vehicles on the national road network as compared to the capacity for which the road network was designed
- Poorly maintained roads increase incidences of accidents
- Poorly designed roads increase accidents
- Poor vehicle maintenance
- Cultural and attitude problems on the part of the driver (drivers not wanting to abide with road rules e.g. overspeeding, drunken driving, driving whilst talking on cellphone etc)
- Other (explain)

11. Rate the following road traffic safety interventions in terms of ability to reduce road traffic accidents on a scale from 0-100 (DRAG THE POINTER ALONG THE SCALE TO YOUR DESIRED RATING POINT)

0

100

Road re-surfacing -

Road dualisation -

- Road markings -
- Upgrading and renewal of road signages -
- Road barricading to protect pedestrians and animals -
- Educational campaigns on road safety awareness and road safety tips -
- Licensing of drivers -
- Traffic law enforcement -
- Road accident statistics releases to deter people from unsafe road behaviour -
- Vehicle inspection to enforce safety on the roads -

12. How likely is it that the interventions being pursued by the Traffic Safety Council of Zimbabwe will result in sustained reduction in road traffic accidents in Zimbabwe? (TICK THE CIRCLE THAT BEST DESCRIBES YOUR RESPONSE)



13. Would you like to provide additional details on any question already discussed in this questionnaire ( A voluntary facility to upload a file with additional details is provided in the next section)

I Agree

14. Upload a file below to attach with any of your responses should you want to give more details on any question in this questionnaire

15. Thank you for your feedback. Would you answer the following demographic questions

I Agree

16. What is your gender?

- Male
- Female

17. What is your age?

- Younger than 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 or older
- Prefer not to answer

18. Which of the following categories best describes the industry you work in?

- Automotive
- Advertising
- Consulting Services
- Education
- Entertainment
- Financial Services
- Government Services
- Healthcare
- Human Resources

- Information Technology
- Marketing/Sales
- Non-Profit
- Pharmaceuticals
- Public Relations
- Technical Services
- Travel
- Other

19. From which part of Zimbabwe do you come from?

- Mashonaland
- Manicaland
- Matebeleland
- Midlands
- Masvingo

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## Annexure C

### INTERVIEW SCHEDULE FOR ACADEMIC RESEARCH

#### 1. Opening

A. (**Establish Rapport**) [shake hands] My name is Nathan Chikono and I am doing research under the supervision of Prof Adèle Bezuidenhout, a professor in the Department of Human Resources towards a Master of Commerce degree in Business Management at

the University of South Africa. We are inviting you to participate in a study entitled “An organisation development approach to the improvement of road traffic safety in Zimbabwe”.

**B. (Purpose)** The aim of this study is to establish what needs to be done by the Traffic Safety Council of Zimbabwe for sustained road traffic safety to be achieved in Zimbabwe. I am conducting this research to find out people’s views and recommendations on how to improve road traffic safety in Zimbabwe. You have been selected as a subject expert to share your views and recommendations on how traffic safety can be improved in Zimbabwe. Road traffic safety affects every road user in Zimbabwe and I need input from as many Zimbabweans as possible in order to help in improving road traffic safety.

The study involves 500 internet mediated questionnaires and face to face interviews with 15 selected respondents. I will be asking you questions about what road traffic safety initiatives you have witnessed, your assessment of the worthiness of these initiatives in improving road traffic safety and what you think needs to be done for traffic safety to improve in Zimbabwe.

**C. (Motivation)** Participation in this study is voluntary and there is no penalty or loss of benefit for non-participation. Being in this study is voluntary and you are under no obligation to consent to participation. I will give you this information sheet to keep and I will again kindly ask you to sign a written consent form. You are free to withdraw at any time and without giving a reason. Your withdrawal will not affect you in any way. The benefits for participating in this study are that your views together with others will be used to influence how road traffic safety is managed in Zimbabwe. If the recommendations that will come out of this study are implemented, the Zimbabwean roads will be safer for all road users which will reduce loss of life and damage to property. Road carnage is robbing Zimbabwe of its scarce educated and skilled people thereby limiting the country’s growth potential.

**D. (Time Line)** The interview will take approximately 15-30 minutes to complete. There are no foreseeable risks involved from participating in this research. Your sacrifice will be the time you will spend helping a student researcher and nothing more. There is no sensitive information or personal information that will be required in this research and the kind of information sought is generally helpful to any road user.



Your responses will only be reported in the aggregate and all respondents will be assigned anonymity codes (random numbers) and all data analytics will be based on the codes and no identification marks or links will be left in the data so as to be able to trace any response to its author.

The researcher, supervisor and members of the UNISA academic community can access the data but only in its coded state with no individual identification marks. Your answers may be reviewed by people responsible for making sure that research is done properly, such as members of the Research Ethics Committee.

Your anonymous responses may be used for other purposes, e.g. research report, journal article, conference presentation, etc. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report. Password protected electronic copies of your answers will be stored by the researcher for a period of 5 years in an external expandable hard drive locked in a filing cabinet at the researcher's permanent place of private residency for future research or academic purposes. Future use of the stored data will be subject to further Research Ethics Review and approval. At the expiry of the 5 year period the data will be permanently erased from the hard drive.

Apart from the time that you will spend participating in the study, no other costs are expected to be incurred and as a result no reimbursement of costs or payments will be done in connection with this study. This study is subject of ethical approval from the Research Ethics Committee of the College of Economic and Management Sciences at Unisa. A copy of the approval letter can be obtained from the researcher.

If you would like to be informed of the final research findings, please contact Nathan Chikono on mobile phone number +263778683381 or fax number +2634776935 or email [nathan.chikono@gmail.com](mailto:nathan.chikono@gmail.com). The findings are accessible once the research is approved by the university for a period of 5 years from the date of approval.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Nathan Chikono on mobile phone number

+263778683381 or fax number +2634776935 or email [nathan.chikono@gmail.com](mailto:nathan.chikono@gmail.com). Should you have concerns about the way in which the research has been conducted, you may contact Prof Adèle Bezuidenhout, Department of Human Resource Management, on +27 12 429-3941 (tel) or +27 12 429-6081 (fax) or [bezuia@unisa.ac.za](mailto:bezuia@unisa.ac.za).

1. Describe what you do on a day to day basis with respect to traffic safety management.
2. How were the road traffic safety strategies formulated and implemented by the Traffic Safety Council of Zimbabwe/Zimbabwe Republic Police?
3. What other ways do you suggest for developing traffic safety strategies given the national significance of the actions that are taken by the Traffic Safety Council of Zimbabwe/ Zimbabwe Republic Police?
4. What do you recommend to be done for traffic safety interventions to achieve sustained road traffic accident reduction in Zimbabwe?
5. Which key factor do you think is responsible for the success or failure of road traffic safety intervention programmes by the Traffic Safety Council of Zimbabwe/Zimbabwe Republic Police?
6. What do you suggest should be done to harness input and ideas from the general public in addressing road traffic safety in Zimbabwe?
7. In your opinion, what is the main contributor to road carnage in Zimbabwe?

**B (Maintain Rapport)** I appreciate the time you took for this interview. Is there anything else you think would be helpful for me to know, even handouts on traffic safety in Zimbabwe, so that I can read during my spare time to fully understand the national mandate of ensuring safety on our roads?

**C. (Action to be taken)** I am convinced I should be able to come up with a comprehensive proposal on how to ensure sustainable road traffic safety in Zimbabwe. Would it be alright to call you if I have any more questions?

Thank you once again. I look forward to meeting you again.