An exploratory study of a law enforcement model for vehicle speed in Tshwane Metropolitan Municipality, South Africa

Makalo E. Taumang (a)  Paul O. Bello (b)  Adewale A. Olutola (c)*

(a) Doctor of Policing candidate, Faculty of Humanities, Department of Safety and Security Management, Tshwane University of Technology, South Africa
(b) Doctor of Policing, Postgraduate supervisor, Department of Safety and Security Management, Faculty of Humanities, Tshwane University of Technology, Pretoria, South Africa
(c) Associate Professor, Postgraduate supervisor, Faculty of Humanities, Department of Safety and Security Management, Tshwane University of Technology, Pretoria, South Africa

ARTICLE INFO

Article history:
Received 21 July 2022
Received in rev. form 23 August 2022
Accepted 28 August 2022

Keywords:
Illegal speeding, Road crashes, Qualitative models, Tshwane, Traffic law

JEL Classification:
K14, K42, K49

ABSTRACT

This study explores law enforcement model for vehicle speed in Tshwane municipality of South Africa. South Africa has comparatively high road traffic crashes and casualty rates. Most of these crashes are associated with illegal speeding. This study was designed against the backdrop of protracted road traffic crashes the triple causative factors as well as existing traffic law enforcement systems and processes aimed at managing illegal speeding. Data were collected from a sample of 28 senior law enforcement officials from the Tshwane Metropolitan Police Department (TMPD) traffic division, the Gauteng Traffic Police and the National Traffic Police. Qualitative data were analysed using thematic analysis’ open and axial coding processes on Atlas.ti.8. In its findings, the study developed a model that shows that illegal speeding and consequential road crashes were caused by an interaction of multiple factors. These were poor human behavioural elements, as the main factor, road-environment factors and vehicle-related factors in the presence of inadequate and uncoordinated traffic law enforcement, weak penal systems for offenders, corruption, poor driver training and low road safety education.

Introduction

South Africa tends to have comparatively high road traffic crashes and casualty rates (International Transport Forum, 2018). For example, South Africa’s Road fatality rate for 2017 (25.0 fatalities per 100 000 of the population) which was the highest among 41 countries in the world (International Transport Forum, 2018a). This is a particularly serious concern as human lives are lost, life-long injuries are sustained, and considerable economic cost is incurred. In 2015 the cost of road traffic crashes was estimated at ZAR 142.95 billion or 3.4% of the country’s gross domestic product (GDP) (International Transport Forum, 2017). There are indications that the occurrence of illegal vehicle speed and the lack of a research-based law enforcement model are key contributors to road traffic crashes in South Africa, as is the case abroad (Road Traffic Management Corporation, 2016). Considering this, the development of a law enforcement model for managing illegal vehicle speed on South African roads is essential.

Over the past two decades a concrete and conceptual foundation for instituting systemic efforts toward preventive management of illegal vehicle speed has been laid in South Africa (International Transport Forum, 2017). The Road Transport Management System (RTMS), a government-funded national agency responsible for facilitating the development and implementation of research-based and systemic road traffic safety measures, was established in terms of Act 20 of 1999. Moreover, various road traffic safety scholars have developed progressively more refined systemic models as conceptual guides for establishing and maintaining safe road...
transportation in the country such as Ratau, (2008); Röthe, (2008); Mynhardt, (2013). However, the models neglect to explicitly address the systemic management of illegal vehicle speed and related law enforcement. In summary, these models’ lack inclusion of illegal speeding and law enforcement. Law enforcement of vehicle speed legislation is a key element of road traffic safety measures (International Transport Forum, 2017).

Several scholars have positively linked the association between excessive vehicle speed and the road traffic accidents (Job & Brodie, 2022). Despite this acknowledgement that excessive speed is associated with the occurrence of road traffic accidents, a research-practice gap for law enforcement agencies still exists in the Tshwane Metropolitan municipality.

This paper aims to explore the law enforcement model for vehicle speed in Tshwane municipality of South Africa as it has comparatively high road traffic crashes and casualty rates. This study was designed against the background of prolonged traffic crashes the triple causative factors as well as existing traffic law enforcement systems and processes aimed at managing illegal speeding. Data were collected from a sample of 28 senior law enforcement officials from the Tshwane Metropolitan Police Department (TMPD) traffic division, the Gauteng Traffic Police and the National Traffic Police.

**Literature Review**

Illegal speeding and road crashes are related realities caused by several factors. Hirschi and Gottfredson (2018) highlight the key contributors to motor vehicle accidents as human factors, road factors and vehicle factors. Verster and Fourie (2018) divide human factors that contribute to motor vehicle accidents into two factors; these are the driver factors and occupants, and other road users can contribute to motor vehicle accidents. In addition, Verster and Fourie also note a difference in environmental factors and roadway factors. Like Hirschi and Gottfredson (2018), Verster and Fourie (2018) indicate that the factors leading to motor vehicle crashes are interrelated.

Vehicle contributors to road traffic crashes include issues such as unsafe vehicle design/manufacturing, and un-roadworthy or unfit vehicles. The RTMC (2021) in their study results on vehicle make and design and involvement in road traffic crashes found that the most common vehicle in South Africa involved in road traffic crashes was the Volkswagen Polo Vivo, the second was the Toyota Hilux and thirdly the Toyota Quantum. RTMC (2021) further elaborate that 43.2% of all fatal crashes in South Africa involved the Volkswagen Polo, Toyota Hilux or Toyota Quantum. Verster and Fourie (2018) also note that un-roadworthy or unfit vehicle issues also contribute to road traffic crashes, and this includes defective tyres, brakes, steering and lights and poor general maintenance of vehicles.

Environmental contributors to motor vehicle accidents include poor road infrastructure (Jayaraman et al., 2022). However, these same authors acknowledge that improving some issues of the road infrastructure such as the road surface does not result in the expected significant decrease in motor vehicle accidents. Similarly, Verster and Fourie (2018) attribute poor road surfacing as an environmental cause of road traffic accidents. The authors also highlight other issues such as sharp bends, road works and the presence of stray animals as a cause of motor vehicle accidents. Olayode et al. (2020) also highlight the issue of traffic congestion, they concluded that there is a positive correlation between traffic congestion and the occurrence of motor vehicle accidents. Road crash causes are also captured in models like the domino theory.

**Theoretical and Conceptual Background**

**The domino theory**

The domino theory is one of the most discussed accident theories. While the theory was initially designed for industrial safety, it is widely referred to in relation to road accidents (Sidek & Ibrahim, 2014; Mwamba et al., 2022). The Domino theory was first proposed by Herbert William Heinrich in 1929 (Sabet, Aadal, Jamshidi, & Rad, 2013). The theory states that an accident is not a single, unrelated event but a result of a sequential and linear series of connected aspects and activities (Saxena, 2018). For every accident, there are five linked causes referred to as the dominos.

According to Heinrich, man’s flaws are the causes of all accidents. Human beings’ abilities and intuition are determined by two things, the environment from which they live and learn and their biologically inherited natures (Mwamba et al., 2022). Natural and socially inherited traits are the causes of faultiness in humans – the second domino (Sidek & Ibrahim, 2014; Saxena, 2018. In the road environment, this might include acts of illegal speeding and the breaking of other road safety laws. An accident is a result of such unsafe acts and at the point of occurrence is a function of skill, knowledge, attitude and one’s physical nature, and injury is the outcome of an accident (Sidek & Ibrahim, 2014). To correct accident situations, the theory’s recommendations target behaviour modification through education and enforcement of sanctions against accident-causing behaviour and designing the third domino to curb the likelihood of an accident through engineering. This is achieved via the removal of the third domino “unsafe acts/unsafe conditions” to break the domino effects (Sagir & Tacgin, 2020). While Henrich’s theory makes an important acknowledgement that accidents are not random events (even if they are still referred to as accidents), one of its flaws was its insistence of the view that they were caused by a single event that acted as a trigger of a sequence of events (Saxena, 2018). Later theories like the systems theories attempted to look at multiple rather than single factors contributing to road crashes.
Another theory that is discussed in relation to road or traffic accidents is the systems theory. The Systems Theory was originated by Kenneth E. Boulding in 1956 (Boulding, 1956). According to the systems approach, in relation to road safety, road crashes occur as a result of systems rather than individual component failure (Larsson 2007). The theory considers traffic as a system consisting of components and sub-components as well as subsystems (Cowlagi & Saleh, 2015). Common subsystems within the wider traffic management system are the regulatory system, the technical, social, physical systems (Cowlagi & Saleh, 2015). This gives inputs and gets outputs from the traffic management system, which at its core includes the three aspects (the driver, road and the vehicle) reiterated above. These components and sub-components do not exist at the same level but are often hierarchical in nature (Larsson 2007). For instance, traffic law strategic planning and coordination subsystems may exist at a higher organisational than traffic law operational enforcement. A systems approach is effective in linking these hierarchical differences through input-output chains (Larsson 2007).

Unlike the domino theory, the systems theory does not consider the driver as the key causal factor of accidents and it even considers him/her as a victim of the situation (Fitness et al, 2020). Theory notes that the relationship among these three elements is generally complex. When such complexities are beyond the driver’s management capacity the risk of road crashes increases. At the same time when the systems are designed to be less complex, road crash risks are lowered (Munuhwa, et al., 2020). In other words, the system must adapt to meet the nature and capabilities of the road users (Larsson 2007). The theory therefore mostly points at the road and traffic system design and how it interacts with individual drivers as the key rectification point in resolving road crash challenges (Munuhwa et al.,2020). Specifically coming to human error, the systems theory premises that the traffic system should acknowledge the existence of human error and put adequate safeguards to reduce it or its effects on road users. Human error is therefore controllable through preventative or proactive mechanisms in the system while reactive mechanisms must also exist to reduce crash impact.

Research and Methodology

The study took an exploratory qualitative research design. Purposive sampling was used in selecting research participants. It was also used alongside snowball sampling. A total of 28 participants were selected based on the saturation point concept. The sample was drawn from a population of traffic law enforcement senior officers from the Tshwane Metropolitan Police Department (TMPD), the Gauteng Traffic Police, the National Traffic Police and South African Police Services (SAPS) working from the City of Tshwane.

Data

Data were analysed using thematic analysis’ open and axial coding processes on Atlas.ti.8. A qualitative model is a theoretical or conceptual representation of relationships among variables (Hilpert, & Marchand, 2018). Unlike quantitative models that predict the numerical changes in variables subject to certain conditions, qualitative models are not predictive in nature (Hilpert, & Marchand, 2018). They have the advantages of simplifying relationships and bringing them closer to reality than quantitative models (Hilpert, & Marchand, 2018). In concurrence, Forbus (2011) asserts that qualitative models “formalize everyday notions of causality and provide accounts of how to ground symbolic, relational representations in perceptual processes”. Zambrano (2019) states that qualitative modelling is most reliable when data under use is from a sample of experts in a field of interest. Such experts have a better capacity of laying out how concepts and realities of interest are related. This study used a qualitative rather than a quantitative modelling approach because of the above reasons. The basis of the models produced was:

i. the review of relationships between and among road crash and speeding variables in the literature
ii. an analysis of such relationships using thematic analysis and axial coding using data collected from the open-ended interview guide.

To construct the model, the research first identified one-on-one relationships between factors. Once done the related factors were further connected to other factors based on the expressed views (semantic themes) and implied and logical relationships flowing from such views (latent themes).

Results

Synopsis of the themes

The analysis identified four key components associated with the continuation of illegal speeding and increasing road crashes in Tshwane. These were the law enforcement system, driver-related factors, motor vehicle-related factors and road and route factors. These guided the development of seven themes listed below:

Theme 1: The role of judicial and law enforcement systems in illegal speeding management
Theme 2: The role of traffic officers in illegal speeding management
Theme 3: Driver-related factors and causes of illegal speeding
Theme 4: Route and road factors and causes of illegal speeding
Theme 5: Vehicle factors and causes of illegal speeding and road crashes
Theme 6: The impact of illegal speeding and road crashes on society
Theme 7: Qualities of a good speed management system
Illegal speeding is associated with five caustive thematic elements (Themes 1 to 5). One of the themes (Themes 6) dwells on the impact of speeding whilst is highlighted as an outcome theme.

**Theme 1: The role of judicial and law enforcement systems in illegal speeding management**

The research probed the roles played by the traffic law enforcement systems in the avoidance, detection and prosecution of illegal speeding on Tshwane’s roads. The theme looks at the entire traffic law enforcement chain from the issuance of licences and registration of motor vehicles to the prosecution of offenders. Its subthemes are discussed.

**Judicial processes speed and effectiveness**

The judicial system had an important role to play in the quick prosecution of speeding offences perpetrators. There were several concerns among the interviewees that the judicial system was neither expeditious nor supportive when it came to road offences. Generally, the judicial, as argued by some interviewees did not take speeding offences as seriously as other crimes and offences brought to it. This view is exemplified in Interviewee 2’s statement below:

“...magistrate courts if also can flex their muscles by not dragging the drink and driving cases when comes to court rolls, they should speed up the process of charging the guilt part irrespectively of any offensive driving cases e.g. drink driving” (Interviewee 2)

Interviewees 13 and 29 also express a similar sentiment but adds that it was not only expeditiousness that was needed from the courts but effectiveness. This meant that due processes which deliver prompt justice were also needed. Thus, bringing offenders to supportive, quick-acting and effective courts is viewed as part of the solution to the speeding problem in Tshwane.

**The role of police visibility in illegal speeding management**

Police visibility was discussed as an important over-speeding preventative mechanism in Tshwane. Would-be offenders should be generally fearful of being arrested by traffic officers and this prevents them from speeding. Thus, almost all the interviews acknowledged police presence as an effective speeding deterrent that also reduces the probability of road crashes on patrolled roads:

“Highly visible policing and promptly taking necessary preventative action” (Interviewee 13)

As suggested in the above statement by ‘Interviewee 13’ and in the views of several other interviewees, heavy police visibility is not easy to attain owing to the need for a lot of officers on the ground. The other proponents of the importance of increased police speed in speed management were ‘Interviewee 7, Interviewee 23 and Interviewee 28’.

**Speeding law enforcement equipment**

Traffic officers relied on the use of technological devices and equipment in the detection and prosecution of speeding offences. This equipment included speed detectors which needed to be up-to-date with current technologies. The challenge that traffic law enforcement officers faced was that some of the equipment they used was outdated and old and therefore not able to effectively assist in speed control management. Interviewee 13, therefore, complained of “Outdated speed checking equipment” as well as incorrect equipment while Interviewee 3 recommended “Investing in modern equipment” as a solution to this challenge. In addition, some units did not even have the equipment to start with as outlined by Interviewee 4 who pointed out that the “Lack of equipment in the traffic departments” hampered speed management operations. Speed measurement equipment was also discussed as important in speed management in Tshwane by ‘Interviewee 4 and Interviewee 6’. These two participants also discussed the general shortage of policing vehicles as important resources in traffic law enforcement. This also reduced both preventative and reactive illegal speeding management in Tshwane.

**Penalty (fine) management systems**

In addition to the challenges in the preventative speed management systems, the interviewees spoke about the weaknesses in the penal systems. Once one was detected to have committed a speeding offence, there were no guarantees that the system would follow through in the administration of an appropriate penalty. As Interviewee 18 stated:

“Corruption most officers not arresting offenders but taking bribes. Failure of the management system, no proper system to ensure that all drivers who have committed an offence are brought to book” (Interviewee 18)

This poor management system, as noted above, created opportunities for corrupt traffic officials who then ensure that those who paid bribes never faced the full wrath of the law. While there were mechanisms that recorded offenders for fining purposes, there was no system that guaranteed that such fines are paid. This weakened the speed management process that among other penalty measures relied on fines to deter speeding. Thus ‘Interviewee 3’ commented on the need for a system that effectively “Follows up on fines and compliance”. Even when fines are paid, there are views that these are not deterrent enough first because one can choose to pay them whenever they want and secondly because of their lack of harshness. Interviewee 3 talked of spot fines as a solution to this situation.
Abuses in the city's traffic penalty system

However, there were two broad views on whether the interviewees agreed that the speed management system is utilised to generate revenue in Tshwane in one view, the interviewees agreed that the penalty system was abused to raise revenue for the city as exemplified in the statement below:

“Yes, the speed management system is used to generate revenue for Tshwane” (Interviewee 18)

Interviewee 5 also asserted that the process might be losing its strength as a penalty for deterrent motorists and becoming an income-generation scheme for the city. ‘Interviewee 5, Interviewee 6, Interviewee 7, and Interviewee 12’ also agreed. On the other hand, some interviewees disagreed that the system was abused for revenue generation.

Coordination of operations’

There were popular views that the three policing entities lacked coordination, and each worked within its scope albeit they all operated in the same locality.

“No there is no cooperation between the three spheres of traffic enforcement. Each and every sphere do its own law enforcement. If these spheres can coordinate with each other there can be a tremendous reduction in road crashes” (Interviewee 4)

These operations were not planned or held in tandem even when they occurred in the same locations. They thus attempted to achieve a common goal albeit without working interactively as highlighted by Interviewee 24. The entities did not try to synergise their strategies for improved efficiency and effectiveness. Worse still, each had a poor planning regime and through a lack of synergy, they could not coordinate to produce improved strategies. From the interviewees’ views, the above lack of coordination robbed the city of the potential benefits of a more efficient, effective and synergised speeding management system that could reduce road crashes. It also facilitated competitive rather than cooperative behaviours among the units.

Theme 2: The role of traffic officers in illegal speeding management

From the interviews, an important component in the management of illegal speeding was the traffic enforcement officer. The behavioural, attitudinal and competencies of such officers played a role in the nature and extent to which traffic laws are applied and to which illegal speeding is managed. From the interviews, the morale, motivation, training and development of traffic law enforcement officers played an important role in the management of illegal speeding. Unlike Theme 1, Theme 2 focuses on the individual law enforcement officer and how their morale, training and performance contribute to illegal speeding.

Low employee morale reduced law enforcement effectiveness (Interviewees 2, 7, 13, 23 and 28). Law enforcement officers, as argued were also poorly trained and this adversely affected their effectiveness in facilitating the successful prosecution of road traffic and illegal speeding offenders. Another challenge discussed in the interviews was that of corruption among law enforcers. This created conditions where over speeding drivers were not arrested or prosecuted and in turn were no longer deterred by the threats of being arrested (Interviewees 2, 4, 6, 21 and 26).

Theme 3: Driver-related factors and causes of illegal speeding

As revealed in the analysis, illegal speeding and road crash in Tshwane were associated with the drivers, specifically their road-related training, habits and attitudes. Driver-related challenges also involved the issue of corruption whereby ‘illegal speedsters’ circumvented justice through bribery. Three subthemes accordingly emerged, and these were driver training and licensing, driver behaviour and attitudes and corruption as a driver behaviour influence.

Driver training and licensing

Several interviewees either mentioned or discussed “Poor driver training” (Interviewee 25, August 30, 202) as a major causative factor of both speeding and road crashes. One of the views relating to poor driver training was that the training system was not churning out fully qualified drivers. One of the reasons behind this was because of the existence of equally unqualified driver trainers and driver training institutions as highlighted by Interviewee 13 below:

“People training at recognised and accredited institutions by accredited personnel” (Interviewee 13)

Thus, even when drivers were deemed to have fully qualified and had legally acquired a driver’s licence, it did not mean they were fully qualified to drive on Tshwane’s roads. Another problem with driver training was that the driver training system had been corrupted to the extent that untested and unqualified drivers were getting licensed. This link between corruption and licensing that involved “Drivers without proper training buying of driving licenses” (Interviewee 26) created drivers who were not well-versed with speed and road regulations, who were also not very aware of motor vehicle control specifications.

Driver behaviour and attitudes

Driver attitude and behaviour were also widely discussed concepts. Driver attitude as generally defined by the interviewees referred to a general mindset towards the driving process and environment. Negative or “Don’t care attitudes” (Interview 6) were commonly
associated with speeding behaviours. One interviewee describes it as the major contributory factor behind road crashes. Common attitudinal and behavioural problems identified by the interviewees were:

i. Impatience (Interviewees 8, 10, 26 and 28)
ii. Intolerance towards other road users (Interviewee 27)
iii. Giving in to peer pressures (drag racing) (Interviewees 22 and 27)
iv. General lawlessness (ignoring road rules) (Interviewees 15, 17 and 28)
v. Drinking and taking intoxicating substances (Interviewees 23 and 27)
vi. Ignorance and unwillingness to learn/take advice (Interviewees 19 and 28)

Several interviewees, among them Interviewee 8, Interviewee 11, Interviewee 17 and Interviewee 28 believed that the starting point in charging drivers; for speeding and risky behaviours was through changing their attitudes. Some attitudes were also associated with specific driver groups and these also needed to be changed across these groups.

Corruption as a driver behaviour influence

As highlighted under the “Corruption and bribery in law enforcement” subtheme above corruption played an important role in driver behaviour. Drivers ignored speed signals and road regulations in general knowing that if arrested they could escape justice through bribery:

“Corruption traffic officer arrest the culprit and SAPS officers do take a cool drink and release the culprit” (Interviewee 2)

“Corruption motorists paying officers bribes and getting off freely” (Interview 3)

The drivers, therefore, completed the corruption circle being the ones who also benefitted from it alongside the corrupt traffic officials.

Theme 4: Route and road factors and causes of illegal speeding

The interviewees discussed the association between speeding, road crashes and route looking at local, provincial and national routes. Various views came out with some believing that some routes carried more illegal speeding and road crash risks than others. Local routes as high-risk areas for illegal speeding

As Interviewees 14, 18 and 29 opined, local roads were also noted to be high-crash risk areas because the police concentrate more on provincial and national roads leaving a visible policing gap in these roads:

“Illegal speed usually occurs on local roads because of lack of visible policing” (Interviewee 18)

Interviewee 26 also spoke about the role of impatience with a low-speed limit that some motorists had saying: “Illegal vehicle speed usually happens on the municipal roads because drivers are impatient and always drive faster even when it is not necessary” (Interviewee 26).

National routes and freeways a high-risk areas for illegal speeding

Freeways and national routes were described by some interviewees as carrying higher illegal speeding and road crash risks. Interviewee 23 also believed that freeways did not have “enough visible law enforcement” creating an environment for badly behaved, over-speeding drivers. Interviewee 21 believed that the view that there was less traffic on the freeways also tempted motorists to overspeed increasing the risks of road crashes: “roads are open and traffic is less” (Interviewee 21).

This view suggests that it was not only traffic congestion that increased the risk of road crashes but severe decongestion too as this gave motorists large stretches of road to overspeed on. This same risk also occurred on local roads in less congested suburban environments. Interviewee 3 also noted that freeways were also abused by motorists “driving bigger engines and testing them” on these routes.

Provincial routes as high-risk areas for illegal speeding

Provincial roads generally fell in between the local and national routes in terms of speeding and road crash risks. Like with local routes (as per Interviewee 26’s view) impatient drivers were tempted to go beyond speed limits they perceived as being very low. Interviewee 4 further stated that:

“On provincial routes, the speed limits are 100km/hr and drivers are driving over the speed limits so too many crashes occur and the roads are wide” (Interview 4)

In Interviewee 3’s view, it was the multi-lane nature of the provincial roads and the view of wide open spaces and low-speed limits that tempted drivers to test the performance of these vehicles on these routes.
All routes are high-risk areas for illegal speeding

Some interviewees believed that speeding and road crash risks were prevalent on all of Tshwane’s routes. According to this view, no specific route posed greater or lesser threats than another (Interviewee 7, 29)

From the above findings, while the sample did not outrightly agree on the routes with the highest speeding incidents and risks of crashing, they associated the incidents with various factors. These were the relationships between route and levels of visible policing, the number of vehicles driving during the same time, perceptions of the highness or lowness of speed limits, the existence of long road stretches that tempts one to speed, and vehicle and engine performance testing behaviours and the relationships between route, times of day and periods of the year or months.

- Number of vehicles travelling at the same time
- Perception of road freeness from interfering traffic
- The length of uninterrupted road stretch
- Visible policing
- Perceptions of the highness or lowness of speed limits
- Time of day
- Period of the month, year
- Road width/multiplicity of lanes
- Driver vehicle performance-testing temptation

Generally, many factors, therefore, determined which routes were the riskiest with some of the determining factors like high-risk areas for illegal speeding and road width/multiplicity of lanes being fixed. Others like the number of vehicles travelling at a given time changed from time to time meaning that the routes could have different road crashes and illegal speeding risks at different times. The data also shows that the interviewees believed that it was a multiplicity of factors that led to illegal speeding as well as the highly probable road crashes.

Theme 5: Vehicle factors and causes of illegal speeding and road crashes

Under this theme, the type and nature of vehicles were associated with both illegal speeding issues and road crash risks. On vehicle nature, much of the discussions centred on unroadworthy vehicles. These are motor vehicles that would not have met the safety and quality standards required of them. Unroadworthy vehicles found themselves on the road due to corruption in the qualification of such vehicles as started by Interviewee 24:

“Corruption activities such buying of driving licenses, registration of not road worthy vehicles” (Interviewee 24)

17 participants mentioned that some vehicles were simply too “Old” to be “roadworthy” and motorists simply insisted on keeping them on the road. Thus, in some instances, corruption facilitated the existence of “unroadworthy dangerous vehicles” (Interviewee 7) on the roads to endangerment of society.

In addition to the above challenge with the roadworthiness of motor vehicles, there were issues with vehicle specifications and performances that also enhanced road crashes in Tshwane. There were concerns over the production of high-powered engines whose speed ranges and performances were beyond the current road designs. Interviewee 10 was among the interviewees who expressed this concern (Interviewee 10).

Theme 6: The impact of illegal speeding and road crashes on society

From the study, road crashes had a severe impact on society. Theme 6 - The impact of illegal speeding and road crashes on society. Four sub-themes emerged under this theme, and these are Socioeconomic losses to households, Socio-psychological challenges in individuals, Economic challenges to society and social inequality.

Socio-economic losses to households

Road crashes result in the loss of lives affecting families and households who end up losing members. Some losses occur to breadwinners and such situations create economic desperation in the bereaved households.

“The causalities of vehicle crashes resulting from the occurrence of illegal speed always has a negative impact on the society especially loss of life has a negative impact on the defendants of breadwinners coupled with the corruption of Road Accident Fund” (Interviewee 8)

Several interviewees including Interviewee 11, Interviewee 14, Interviewee 24 and Interviewee 29 discussed relatable socio-economic challenges that are created by road crashes.

Socio-psychological challenges in individuals

Road crashes caused both physiological and psychological injuries to those affected. Many people were adversely harmed to the point that they failed to function physically. This also created negative psychological states like depression and suicidal thoughts.
Interviewee 7 described the adverse changes in one’s life due to injury often ended in equally adverse psychological reactions that included “lawlessness, depression, suicide, abuse, ill-health and disability” (Interviewee 7). Interviewee 10 also linked the disability associated with road accidents to increasing chances of one falling into poverty and psychological challenges. Thus, severe bodily harm that befalls most crash survivors often left them in undesired mental and physical health states.

**Economic challenges to society**

There were several ways in which road crashes constituted a huge economic cost to society. Through road crashes, society lost human resources critical for the country’s development as stated by Interviewee 3 below:

“professionals with scarce skills are being killed on our roads” (Interviewee 3)

As the RAF (road accident funds) money is derived from a fuel levy, the more crashes there are the more fuel prices are set to go up: “The more the accidents the more the petrol prices go up” (Interview 9). Money paid out by RAF was seen as the most direct cost that road crashes had on society while several other expenditures that included increased healthcare system funding, and repairs to damaged road infrastructure also added to this cost.

**Social inequality**

Unfortunately, the major victims of such crashes are the economically vulnerable groups, especially pedestrians:

“Too much or massive because according to RTMC 40% of road fatalities are from society or pedestrians” (Interviewee 2)

Combined with the view that such losses usually occur to pedestrians in low-income groups, this emphasised the already high levels of “inequality” (Interviewee 1) in South African societies. The above views highlight less thought-about consequences of road crashes. They, therefore, go beyond the losses of life and property and manifest themselves through increasing poverty among vulnerable groups as highlighted by Interviewee 1.

**Proposed law enforcement model for speed management**

The data analysis process produced a model that highlights the interaction of five factors in speeding and road crashes. The simultaneous interaction among driver factors, road and route factors, law enforcement factors, training and licensing affected speeding and its major consequential outcome of road crashes. Road crashes harm society and this is also captured as an outcome of the model.

---

**Figure 1**: The proposed model; Source: Authors

The above links are further summarised in tabular form below:
The diagram below presents the detailed version of the same model that includes the individual sub-factors that feed into each main node.

## Findings and Discussions

In the study, the law enforcement model highlighted the interaction between humans (Theme 4), motor vehicles (Theme 6) and the environment (Theme 5) in causing or preventing speeding and road crashes in the presence of law enforcement systems (Themes 1, 2 and 3) and engineering and education (Theme 8). All these factors are widely discussed by systems theory proponents specifically Fitness (2014) and (Cowlagi & Saleh, 2015). The latter classified the major systems components involved in road safety as regulatory, technical, social, and physical in nature (Cowlagi & Saleh, 2015). These are the same systems found by this study even though different classifications were applied. For instance, Cowlagi and Saleh, (2015) refer to human factors under a broader category of social factors and motor vehicle factors under technical factors. The sample acknowledged the significance of the human factor in road crashes but also stated that it was how this factor eventually interacted with other factors that resulted in road crashes.

From the empirical study, the final model produced had illegal speeding, road crashes and consequential socio-economic adversities as output components. The inputs that caused are enabled the occurrence of these were law enforcement, specifically its lack of coordination, corruption, morale and motivation issues, poor visibility, inadequate law enforcement systems, inappropriate penalty systems and lastly ineffective judicial reaction to illegal speeding offences. Vehicle factors, poor road environment and route factors and driver behavioural factors were discussed as key input components to the problem. Another important systems theory aspect that emerged from the study is the significance of evidence-based solutions (Fitness et al 2020). With adequate data and analytical approaches, it was possible to identify systems components that required attention in order to resolve road safety deficiencies (Fitness et al 2020).

In the study, the survey sample on average agreed that Data collection is essential for the development of targeted road safety measures by law enforcement in the manner prescribed by Fitness et al.

Looking at the systems theory approach, much emphasis was on human factors and law enforcement. There was a strong view that while other factors including vehicles and road or environmental factors were all contributory to road crashes, a weak, uncoordinated law enforcement response that was not capable of curbing illegal speeding was more to blame than the other factors. This finding runs contrary to Hughes, Anund, and Falkmer (2015) view that the systems approach often failed to identify and isolate key problem areas that were responsible for system weaknesses.

A study by Verster and Fourie (2018) highlighted five interrelated causes of road crashes using Bayam, Liebowitz and Agresti (2005) model. These were the driver, the roadway, the environment, the vehicle and other road users. The model assumed by Verster and Fourie (2018) shares all the factors that were replicated in this study’s model albeit with differences. This study’s model took the roadway as part of the general environment in which speeding, and road crashes occur. The model also referred to crashers as accidents in contrast to this study’s model that notes that crashes were not random events or occurrences and could therefore not be classified as accidents. More importantly, this study’s model found law enforcement systems are both contributory and preventative factors to speeding and road crashes. For instance, a corrupt law enforcement system causes speeding as drivers are motivated to break road rules knowing that they would not be prosecuted. Verster and Fourie (2018) also highlight the significance of demographic factors, specifically age and gender in influencing driver behaviour. This aspect is captured in the descriptive aspect of this study that revealed a perception that male drivers were considered a higher road crash risk group compared to female drivers.

The study’s finding that human factors are a major contributor to road crashes resonates with various views in the literature (Road Traffic Management Corporation, 2005:7-9). To reiterate, the identified behavioural issues were impatience, intolerance towards other road users, giving in to peer pressures (drag racing), general lawlessness (ignoring road rules), drinking and taking intoxicating substances and ignorance and unwillingness to learn.

---

**Figure 2:** Associations between model nodes

<table>
<thead>
<tr>
<th>Node A</th>
<th>Link</th>
<th>Node B</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training and licensing</td>
<td>Driver factors</td>
<td>Training and licensing affects driver factors</td>
<td></td>
</tr>
<tr>
<td>Training and licensing</td>
<td>Law enforcement</td>
<td>Training and licensing is part of law enforcement</td>
<td></td>
</tr>
<tr>
<td>Training and licensing</td>
<td>Speeding</td>
<td>Training and licensing affects speeding</td>
<td></td>
</tr>
<tr>
<td>Driver factors</td>
<td>Road and route factors</td>
<td>Driver factors are associated with road and route factors</td>
<td></td>
</tr>
<tr>
<td>Driver factors</td>
<td>Law enforcement</td>
<td>Driver factors are an effect of law enforcement factors</td>
<td></td>
</tr>
<tr>
<td>Driver factors</td>
<td>Speeding</td>
<td>Driver factors cause speeding</td>
<td></td>
</tr>
<tr>
<td>Law enforcement</td>
<td>Speeding</td>
<td>Law enforcement is a cause of speeding</td>
<td></td>
</tr>
<tr>
<td>Law enforcement</td>
<td>Road and route factors</td>
<td>Law enforcement is associated with road and route factors</td>
<td></td>
</tr>
<tr>
<td>Law enforcement</td>
<td>Road crashes</td>
<td>Law enforcement is a cause of road crashes</td>
<td></td>
</tr>
<tr>
<td>Law enforcement</td>
<td>Driver factors</td>
<td>Law enforcement is a cause of driver factors</td>
<td></td>
</tr>
<tr>
<td>Road and route factors</td>
<td>Speeding</td>
<td>Road and route factors are associated with speeding</td>
<td></td>
</tr>
<tr>
<td>Road and route factors</td>
<td>Law enforcement</td>
<td>Road and route factors are associated with law enforcement</td>
<td></td>
</tr>
<tr>
<td>Road and route factors</td>
<td>Road crashes</td>
<td>Road and route factors are associated with road crashes</td>
<td></td>
</tr>
<tr>
<td>Road and route factors</td>
<td>Driver factors</td>
<td>Road and route factors are associated with driver factors</td>
<td></td>
</tr>
<tr>
<td>Speeding</td>
<td>Road crashes</td>
<td>Speeding is a cause of road crashes</td>
<td></td>
</tr>
<tr>
<td>Road crashes</td>
<td>Impact of crashers</td>
<td>Road crashes is a cause of road crashes impact</td>
<td></td>
</tr>
</tbody>
</table>
Like this study, Verster and Fourie (2018) also discussed the view that road engineering and road maintenance were strongly associated with road crashes. Poorly engineered and maintained roads posed higher risks of illegal speeding-related road crashes. The study, like several conducted before, found a link between road crashes and vehicle type. This study discussed taxis as high crash risk vehicles. In the interviews, there were views that taxi drivers were generally non-compliant with speeding regulations and had little tolerance for other road users. In a study by Verster and Fourie (2018) In a study by Alonso, Esteban, Useche, and Colomer (2018), vehicle-related factors were widely discussed as a significant contributory factor to road crashes, like this study’s law enforcement model, Alonso, Esteban, Useche, and Colomer (2018) highlighted a causality link between legal law enforcement systems and vehicle-related factors. Effective law enforcement systems including the administrative aspects of such systems, among other things should be able to curb vehicle-related crash factors by identifying and deregistering unfit vehicles (Alonso, Esteban, Useche, and Colomer (2018).

While vehicle-related factors in the literature tended to focus on motor vehicle defects and uses, the study found that emerging trends in the so-called performance vehicles were also linked with illegal speeding and road crash problems. Such vehicles enabled drivers with poor behavioural attributes to excessively exceed speed limits, especially on freeways. A South African car manufacturer defined high-performance vehicles as having superior speed and power abilities in relation to their body size (Minchin, 2021). Such cars are mostly acquired for “enjoyment” rather than mere transportation (Minchin, 2021). In the interviews, the enjoyment component is also captured by one of the interviews. Interestingly, another interviewee (I13) believed that different skill sets were required in operating such vehicles and these were not widely available amongst local drivers.

Some interviewees agreed that while awareness campaigns were offered by both law enforcement entities and traffic departments, more regular approaches to the campaigns were needed. This view agrees with comments by Taumang (2010) who noted that traffic awareness campaigns were often not always comprehensively carried out in all areas and neither were they regular occurrences.

In the study, there was also a small element of scepticism about whether training and awareness were effective considering the view that most errant drivers were generally not keen on learning anything that would drive them to change. This view was driven by some interviewees who noted that among the negative behavioural traits displayed by illegal speedsters was a disregard for knowledge of road safety. In other studies, Alonso, Esteban, Useche, and Colomer (2018) also note that strong social norms disempowered road safety teaching efforts and also diminished the power of road penalties in positively modifying driver behaviour. This study, however, made a stronger leaning towards the view that training and awareness can improve road safety based on the views expressed in the findings.

**Conclusions**

This study was designed with the need to understand the reasons behind the protracted road traffic crashes, the nature and extent of such crashes and the casualties associated with illegal vehicle speed occurrences in Tshwane. This involved the identification of the major factors behind this problem as well as their interaction. Thus human, road, and vehicle contributors were assessed in relation to existing traffic law enforcement systems and processes aimed at managing illegal speeding. The study produced a traffic law speed management model that could contribute toward conceptual thinking on road traffic safety in South Africa. This model is the study’s key and a major contribution to road traffic management theory and practice not only in Tshwane but in South Africa at large. It borrows systems theory conceptualisations and identifies input factors that cause illegal speeding and road crashes and the output factors that are mostly the adverse social impact that road crashes had on society.

Local, provincial and national government departments should coordinate towards the provision of permanent road safety awareness programmes that target behavioural changes among drivers and road users. Law enforcement and driver licensing systems needed to identify loopholes that enable corrupt practices in the issuance of drivers’ licenses. Also, motor vehicle inspections and regulation processes needed to be free of corruption to avoid vehicles that are not roadworthy from being registered. Road engineering should primarily focus on preventing illegal speeding on local, provincial and national roads. Secondly, a systems approach that ensures that in the event of human error, the road environment reduces both the occurrence of road crashes as well as the consequences of such crashes should be part of road design. Noting that the existing penalty systems were failing to deter illegal speeding due to poor follow-up processes and corruption. This study recommends improving the penalty administration capacity of the traffic law enforcement system by availing more strategic, human and technical resources. In addition, severe penalties should be imposed on traffic fine defaulters to ensure that violators are discouraged from ignoring penalties. A coordinated unit that focuses on following up on unpaid fines across the local, provincial and national law enforcement spheres could enhance the current penalty system’s effectiveness. There should be shared information through common information systems or interfacing the different systems across the departments.

**Acknowledgement**

All authors have read and agreed to the published version of the manuscript.

**Author Contributions:** Conceptualization, M.E.T., P.O.B., and A.A.O.; methodology, M.E.T., P.O.B., and A.A.O.; validation, M.E.T, P.O.B., and A.A.O.; formal analysis, M.E.T., P.O.B., and A.A.O.; investigation, M.E.T.; resources, M.E.T., P.O.B., and A.A.O.; writing—original draft preparation, M.E.T.; writing—review and editing, M.E.T., P.O.B., and A.A.O.

**Funding:** This research was self-sponsored and part of a Doctoral study at Tshwane University of Technology, South Africa.
Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

References


Department of Transport.


**Publisher’s Note:** SSBFNET stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

© 2022 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).