

# TOWARDS THE DEVELOPMENT OF A SCIENTIFICALLY ACCOUNTABLE, COMPREHENSIVE AND INTEGRATED NATIONAL ROAD TRAFFIC SAFETY DATABANK IN SOUTH AFRICA

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## ABSTRACT

This paper provides background on and summarises the main findings of an investigation into the need for a National Road Traffic Safety Databank (NRTSD) in South Africa. The research findings confirmed the study's hypotheses that (1) road traffic safety and the effective countering of road traffic crashes in particular, were hampered by a deficient database and data-gathering processes in South Africa; and (2) South African road traffic safety agencies would be agreeable to rectifying the deficiencies, e.g. by integrating verified road traffic safety/crash data into a comprehensive road traffic safety databank.

## 1. INTRODUCTION

The paper summarises the main findings of the study that investigated the status of empirical data on road traffic safety and road traffic crashes in particular, as well as needs in this respect in South Africa. The more particular focus of the study was on whether it was necessary to establish a comprehensive, integrated and scientifically accountable databank on road traffic safety in South Africa and, if so, what such a databank should look like. This paper also provides background on the study and concludes with some recommendations.

### 1.1. Background

The study reported on was developed against the background of indications that road traffic crashes can slow down socio-economic development (International Road Federation, 2012; Sachs, 2012; Thompson, 2011; Watkins, 2010; Lagarde, 2007; Peden, Scurfield, Sleet, Mohan, Hyder, Jaravan and Mathers, 2004). Cognisance was taken of the findings of preliminary analyses that the comprehensive, integrated, reliable and compatible data needed to counter road traffic crashes, and more generally, to draft and implement effective road traffic safety policies and actions did not exist (Röthe, 2009; Van der Sluis, 2001). It was also clear that (1) available data were not easily accessed and thus not necessarily usable, and that (2) efforts to rectify the status quo had to build on existing data-gathering structures and processes, as well as on stakeholders' views regarding information needs.

## 1.2 Aim of the paper

The aim of the paper is to illustrate the need to develop a model that would provide pointers for establishing and managing a scientifically accountable, comprehensive and integrated NRTSD in South Africa. The more specific objectives were to:

- assess (1) what type and quality of data were available, and (2) what data-gathering structures and processes existed with regard to road traffic safety and road traffic crashes in particular;
- assess the information needs of road traffic safety stakeholders in South Africa, including whether a need existed for establishing a comprehensive, integrated and scientifically accountable NRTSD;
- draft a model that would facilitate the establishment and management of an NRTSD, (1) based on the results of the mentioned assessments, (2) bearing in mind international guidelines on the kind of data needed to counter road traffic crashes effectively, and in this way (3) contribute towards evidence-based road traffic safety policy and action as well as socio-economic development in South Africa;
- assess the contribution the CSIR could make towards the establishment and management of such an NRTSD.

The following general *hypotheses* were posited: (1) The effective countering of road traffic crashes in South Africa was hampered by a deficient database, e.g. by fragmented, incompatible, unreliable and insufficient data on the issues concerned; and (2) South African road traffic safety agencies would be agreeable to rectifying the deficient database. Current South African road traffic safety/crash data sets tended to be fragmented, incompatible, insufficient, collected non-scientifically; not easily accessed, and thus not used optimally.

## 1.3 Conceptual and methodological premises

Conceptually, it was assumed that road traffic crashes were preventable; and should be viewed in the context of a systems perspective of road traffic safety (Pretorius, 1999; Botes, 1996; Botes and Pretorius, 1994), and more particularly the Road Traffic Management System as described by South African researchers such as Pretorius and Mulder (1991).

Furthermore, and in line with international and local agencies (Road Safety Collaboration, 2012; World Health Organization, 2012; Ratau, 2008; Peden et al., 2004), the research team accepted that road traffic crashes were generally the outcome of interaction between three elements: vehicles, humans and the wider environment in which road traffic crashes occurred.

Methodologically, the study can be described as developmental and applied while it should simultaneously be viewed as exploratory and descriptive. Furthermore, the research team employed what De Vos et al. (2011:442) describe as a triangulation mixed methods design, characterised by the use of both “...*quantitative and qualitative methods [and, more particularly, procedures and techniques] during the same time frame ... [whilst assigning] equal weight...*” to each type of method.

Importantly, the research was of a national scope and comprised a qualitative focus group discussion with key informants and a quantitative internet-based survey that was implemented largely within the same time frame. The focus group discussion occurred on 29 November 2012. The internet-based survey was launched on 29 April 2013. The target population comprised representatives of key road traffic safety stakeholder categories, functioning at a national, provincial or municipal level. The sampling frame was the CSIR's comprehensive customer relations management database, more particularly its list of representatives of road traffic safety stakeholder sectors.

These include representatives of the following sectors or stakeholder categories, functioning at national and/or provincial and/or municipal level, namely government departments and agencies, engineers, transport experts, town planners, construction workers and insurance agents, the South African Police Service (SAPS), provincial, metropolitan and local traffic police, assessors, legal consultants specialising in road traffic crashes, private road crash investigators, national research houses and research centres/sections at tertiary institutions, government and private emergency services, and the media responsible for road traffic safety.

The internet-based survey used the following two-stage sampling procedure: Sampling occurred firstly in a purposive way. Persons most experienced in terms of number of years operating in a particular sector were selected within each of the sectors in the list of stakeholder sectors mentioned. In the second stage, a sample of 800 respondents was systematically drawn from the persons selected during the first sampling stage. Although the overall response rate (25%) – the proportion of respondents who completed the survey questionnaire – was comparatively low, the proportional composition of the realised sample reflected largely that of the original sample.

Altogether 27 representatives of the following agencies participated in the focus group discussion: the CSIR, Road Traffic Management Corporation (RTMC), Department of Transport (DoT), Road Accident Fund (RAF), Tshwane University of Technology (TUT), Department of Health (DoH), Justice Project of South Africa, SAPS, Ekurhuleni Metro Police Department (EMPD), Johannesburg Metro Police Department (JMPD), N3 Toll Concession (N3TC), Vaal University of Technology (VUT), Automobile Association of South Africa (AASA), Administrative Adjudication of Road Traffic Offences (AARTO), ER24 Emergency Services Pty (Ltd) (ER24) and Systellence.

The research team decided to include a larger than usual number of participants in the focus group discussion mainly because those who had agreed to participate indicated that they were committed towards contributing to the establishment of quality road traffic safety data.

A semi-structured schedule guided the focus group discussion. In the survey, data were gathered through a largely closed-ended internet-administered questionnaire. The decision to implement an internet-administered questionnaire was taken against the background of especially its cost effectiveness, indications that the members in the survey sample had access to the internet, and indications that respondents were less inclined to give socially desirable answers in online than in a face-to-face survey (Goldenbeld and De Craen, 2013; Benfield and Szlemko, 2006; Berry, 2004).

Special care was taken to ensure ethical data gathering as well as high integrity of the data gathered, bearing in mind De Vos et al.'s (2011) guidelines in this respect. For example, the research team ensured that the research participants (1) were well informed about the purpose of the research, (2) participated voluntarily, (3) knew that the information they provided would be treated with the utmost confidentiality, and (4) knew that they could withdraw at any time.

The focus group discussion, took place in a non-threatening 'neutral' setting, namely a seminar room at the CSIR. The room was setup as a 'café' with small tables and six chairs per table. In this way participants with more or less similar backgrounds and interests were able to group together and confer with one another.

Data analysis comprised thematic analysis in the case of the qualitative data set, and descriptive and inferential statistics in the case of the quantitative data set (De Vos et al., 2011). The qualitative and quantitative data sets were compared to establish areas of convergence as well as the extent to which these complemented or refined one another.

## **2. RESEARCH FINDINGS**

### **2.1 Type and quality of data and data gathering**

The participants in the focus group discussion and survey indicated that a wide range of data existed on road traffic safety issues and crashes, in particular. The data focused on three main elements, namely road users, vehicles and the road environment.

This focus is consistent with (1) the present study's conceptual premises; (2) the safe system and public health approach to road traffic safety, propagated by, for example, the World Health Organization (WHO); and (3) key issues addressed in various (South) African and global road safety plans (WHO 2012; Peden et al., 2004; Department of Transport, 2001; Department of Transport, 1996). The data pointed out by the research participants also reflected the following categories of data that the WHO had recommended as essential for developing appropriate road traffic safety policy and actions (WHO, 2010a):

- Final crash outcomes (e.g. crash fatalities and injuries);
- Exposure issues (e.g. data on road users, vehicles and the road environment);
- Intermediate crash outcomes and more particularly data on road traffic safety performance (e.g. data on driver behaviour, vehicles, roads, and the management of traffic and trauma);
- The cost of crashes.

A variety of data-gathering structures/processes relating to road traffic safety/crashes exists, comprising routine data-gathering as well as scientific research (e.g. periodic surveys on road traffic safety issues). Various data gathering structures/processes have existed, in addition to the official road traffic crash reports routinely issued by the SAPS and the RTMS.

Structures and processes include the criminal administration system of the SAPS; the records of offences, prosecutions and convictions of the Department of Justice; the asset management systems of transport authorities; and the records of the municipal vehicle registration offices, vehicle testing stations, eNaTIS and the Road Accident Fund.

Research participants characterised the quality of existing data and data-gathering structures and processes on road traffic safety/crashes as deficient in various respects. For example, participants described available data and data-gathering structures/processes on road traffic safety and crashes, in particular, as follows:

- Data were not necessarily accurate, complete, relevant or current, particularly with regard to rural areas.
- Data tended to be fragmented, and not freely available.
- The data required to monitor and evaluate road traffic safety interventions were limited.
- Data-gathering agencies – especially those responsible for routine data gathering such as the SAPS – tended to focus on the fatal road crashes and neglect minor and not very serious crashes; had inadequate material and human resources (were ‘overburdened’); tended to focus on issues other than road traffic safety; and generally lacked adequate training and a ‘statistical analytical perspective’.
- Road traffic safety/crash data were not necessarily collected scientifically and regularly.
- The process of crash-reporting and the completion of a crash report form were laborious, indeed time-consuming.
- The current crash report form was ‘outdated’ and did ‘not capture essential information’.
- A fragmented approach to data gathering and the different formats in terms of which data were captured contributed towards incompatible data sets, complicating comparisons over time and place, integration and consequently a an uncomprehensive understanding of relevant issues as well as inappropriate counteraction.
- Transport authorities have as yet not demonstrated the political will to ensure the development and maintenance of an appropriate data-gathering process and a databank on road traffic safety/crashes.

However, the respondents also pointed out that data sets such as the following were generally seen to be trustworthy: Demographic and population data; automatic traffic recorded volume counts; road network data; data on land use; and data on freeway management systems.

## **2.2 Needs**

Regarding data requirements, the point was made, for example, that road safety agencies had to ensure that the data gathered facilitated (1) the measuring of the impact or performance of road traffic safety initiatives; (2) the generation of expected road traffic safety scenarios; (3) the identification of patterns and trends in road traffic crashes; and (4) the identification of ‘driver and vehicle risk profiles for insurance agencies’.

Respondents also indicated the need for data on prosecution outcomes, especially in respect of serious road traffic offences; road traffic safety issues relating to the use of bicycles, pedestrians and passengers; traffic signal timing; and freight commodity movement. The research participants were emphatic that road traffic safety data gathering and in particular scientifically accountable data gathering were essential for effective road traffic safety planning, policy and action.

Table 1 illustrates that 95% of the survey respondents (strongly) agreed with the statement that “road traffic safety research is important for South Africa”; 90% (strongly) agreed that “in South Africa better road traffic safety data will assist in better planning of road traffic safety operations”; and 82% (strongly) agreed that “better road traffic safety data will assist in better law enforcement ... in South Africa”.

Other data-gathering needs identified by the research participants included, for example, the development of a “universal methodology to standardise data collection”; and “automatic data recording equipment such as sensors”. Moreover, the respondents tended to prefer a scientific data-gathering process that ensured accuracy rather than a ‘quick and dirty’ process.

**Table 1: General views regarding road traffic safety research and data in South Africa\***

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total
<b>1. Road traffic safety research is important for South Africa</b>	(4%)	(1%)	(1%)	(6%)	(89%)	(101%)
<b>2. Road traffic safety data are collected scientifically (good quality) in South Africa</b>	(29%)	(34%)	(21%)	(13%)	(4%)	(101%)
<b>3. Sufficient South African road traffic safety data are collected regularly</b>	(24%)	(37%)	(29%)	(7%)	(4%)	(101%)
<b>4. In South Africa, road traffic safety data sets are compatible with one another</b>	(35%)	(32%)	(23%)	(7%)	(4%)	(101%)
<b>5. Road traffic safety data are used optimally in South Africa</b>	(34%)	(39%)	(20%)	(6%)	(2%)	(101%)
<b>6. Data will assist in better planning of road traffic safety operations</b>	(2%)	(4%)	(5%)	(18%)	(72%)	(101%)
<b>7. Better road traffic safety data will assist in better law enforcement, etc. in South Africa</b>	(2%)	(7%)	(9%)	(25%)	(57%)	(100%)

\*Each response category indicates the number (n) of persons who registered such a response, with the proportion (%) who did so in brackets. As the percentages have been rounded to whole numbers, the totals vary between 100% and 101%.

Research participants also stressed the importance of:

- ensuring that routine data gathering did not comprise laborious processes;
- revising the current crash report form;
- developing an electronic and standardised crash reporting system;
- integrating road traffic safety/crash data into a central databank while ensuring that the data included were accurate;
- instituting measures that ensured that road traffic safety/crash data were available to all concerned.

The following comment was made:

“There should be one centralised custodian of road traffic crash data that (1) operates independently of government structures, (2) provides and ensures the implementation of standardised data-gathering guidelines based on researched best practices, (3) collates and integrates road traffic crash data into a centralised comprehensive databank, and (4) disseminates road traffic crash data and reports”.

The research participants identified various functional areas (also known as the ‘Es’ in road traffic safety, namely Engineering, Education, (law) Enforcement, Evaluation and Encouragement) as needing road traffic safety/crash data. The survey participants, for example, indicated that sectors working in a logistical environment particularly required quality road traffic safety data.

### **2.3 National Road Traffic Safety Databank**

The research participants tended to be in favour of the establishment and maintenance of a comprehensive and integrated NRTSD, including measures that –

- ensures the reliability of the data captured and stored in the databank;
- ensures the comparison of key road traffic safety/crash data across place and time;
- ensures the usefulness of road traffic safety/crash data to end-users (e.g. health agencies);
- ensures wide accessibility of available road traffic safety/crash data;
- builds on existing data gathering and data-storing structures and processes;
- facilitates an in-depth understanding of the dynamics of road traffic safety as well as evidence-based road safety planning, policy and action;
- facilitates an electronic or online system of data gathering/reporting.

The point was made that the recommended databank would only be effective if partnerships were forged between relevant agencies, an independent research or academic agency developed and maintained it, and the political will as well as funding for establishing and maintaining existed. In addition, the respondents indicated that the recommended databank could have advantages such as the following:

- The easing of the workload of data-gathering agencies;
- The provision of real-time road traffic safety indicators;
- The wide accessibility of road traffic safety/crash data via, for example, the use of cell phones;
- Opportunities for integration into other electronic databases such as eNaTIS;
- The limiting of fraud through, for example, the fingerprint verification of the identity of persons involved in a crash; and
- Usefulness to agencies focusing on other issues such as crime prevention.

However, the participants emphasised that challenges such as the following would have to be addressed when developing an online data-gathering/storing databank: (1) Electronic systems were not necessarily operational at all times and places; (2) existing legislation could inhibit the recording of the personal details of persons involved in a road traffic crash; and (3) it could be difficult to prevent double reporting of, for example, road traffic crashes and fraudulent practices.

## **2.4 Neutral custodianship**

On the potential neutral custodianship to sustainably maintain an NRTSD that can contribute towards enhanced road traffic safety research and development and concomitantly to the improvement of road traffic safety, the respondents noted

- a custodian should be internationally and nationally recognised, independent and free from normal government structures with the capability and expertise to fulfil a leading role in terms of road traffic safety research and data gathering based on scientific principles;
- could operate as the central point for all road traffic safety data requirements and needs while ensuring road traffic safety and road traffic crash data, in particular are accurate, current, reliable and freely accessible to all”.

The point was also made that research agencies, should focus on road traffic safety/crashes and must operate in close collaboration with the Department of Transport and other key stakeholders when gathering road traffic safety data.

It should be borne in mind that (1) the findings of the focus group discussion and the internet survey were consistent with one another; (2) the respective sets of survey responses were generally consistent with one another; and (3) the research team drafted a model for developing and maintaining an NRTSD, based on the research findings and the study’s conceptual premises.

## **3. CONCLUSION**

Overall, the research findings confirmed the study’s expectations that the effective countering of road traffic crashes in South Africa was hampered by a deficient database and data-gathering processes; and that South African road traffic safety agencies would be agreeable to rectifying the deficiencies. This could be achieved by, e.g. integrating verified road traffic safety/crash data into a comprehensive road traffic safety databank; by ensuring that an independent organisation gathers road traffic safety/crash data; by taking special care to release accurate data; by improving crash reporting; and by introducing an electronic road traffic safety/crash reporting system.

Finally, the convergence between the findings of the focus group discussion and the internet survey, and the logical consistency between various sets of survey responses demonstrated the integrity of the research. However, the exploratory nature of the study requires that its usefulness for road traffic safety in South Africa should be gauged in follow-up studies and, more particularly, that the usefulness of the recommended model be tested.

#### 4. RECOMMENDATIONS

In light of this paper, it is recommended that the model for developing and maintaining an NRTSD drafted by the research team be disseminated during a seminar among senior stakeholders in South Africa to assess whether it can be implemented; which adjustments are needed; and where to solicit (political) support for implementation. It is also recommended that the CSIR takes the lead in the dissemination and assessment process, given that the respondents in the study were generally of the view that the CSIR should lead a process of establishing, maintaining and managing a scientifically accountable, comprehensive and integrated National Road Traffic Safety Databank (NRTSD) in South Africa.

The world is now entering a new sub-revolution that followed the (1) agricultural revolution that started about three to four centuries ago, the (2) industrial revolution, followed by the (3) information revolution owing to the development of the microchip. However, the world has already entered the fourth revolution and that is the dissemination of data and information by using cyber space and nanotechnology.

If South Africa wants to keep pace with the rest of the world, the country should explore its traffic environment by ensuring that traffic data and information are available to manage crash risks effectively.

Other actions are to ensure that an independent organisation gathers road traffic safety/crash data; take special care to release scientifically validated and accurate data; improve road traffic crash reporting; and introduce an electronic road traffic safety/crash reporting system.

In conclusion, researchers and people who should intervene would do well to bear in mind that

- such a databank should form part of the Traffic Management System (TMS);
- “road traffic injuries and deaths are a major public health issue worldwide. Unless appropriate action is taken urgently, the problem will worsen globally ... particularly ... in those developing countries where rapid motorization is likely to occur over the next two decades” (Peden et al., 2004:25); and
- “to reduce the carnage on ... roads ... cognisance needs to be taken that] you cannot manage what you cannot measure, and you cannot measure without information” (Röthe, 2009:2). Without proper information, the RTMC would not be able to measure the year-on-year results of the Department of Transport (DoT).

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