

Operational Improvement Outcomes through Voluntary Compliance in Road Transport Operations

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Abstract

This paper presents operational improvement outcomes of the Road Transport Management System (RTMS) in South Africa. The RTMS is a voluntary, self-regulation scheme that encourages consignees, consignors and road transport operators toward best practice in road transport. The views of consignors, consignees and road transport operators were surveyed to provide insights into perceptions and outcomes of the RTMS. Respondents indicated improved safety, operational efficiency, profitability, and reduced road crashes as outcomes of the RTMS. The main obstacles to increased certification are a lack of awareness of the RTMS and a poor understanding of the requirements for becoming certified.

Keywords

Road Transport, Voluntary Compliance, RTMS

1. INTRODUCTION

Logistics costs make up a significant percentage of a country's gross domestic product (GDP). In 2015 logistics costs in the USA were 7.85% of GDP (Logistics Management, 2016) and in South Africa an estimated 11.7% of GDP (Havenga *et al.*, 2016). This difference of 50% negatively impacts South Africa's manufacturing competitiveness and impedes economic growth and employment creation. Furthermore, South Africa has 12.5 truck crash-related deaths per 100 million kilometres travelled. This is 4 to 10 times higher than European countries such as Denmark, France, Germany and Switzerland (OECD, 2011).

Every heavy vehicle in South Africa is meant to have a valid roadworthiness certificate, obtained through inspection by authorised facilities. Many of these vehicles are however not roadworthy. Fleetwatch magazine in South Africa facilitates workshops and training events called The Brake and Tyre Watch where technical experts provide training to traffic officials regarding truck inspections. Heavy vehicles are pulled off the road and checked for vehicle defects especially relating to brakes and tyres. During 37 events conducted between 2006 and 2017, 712 vehicles were inspected with 486 being discontinued, i.e. 68% of vehicles were found to have defects so serious that the vehicle was taken off the road (Brake & Tyre Watch, 2017).

The high logistics costs, unacceptably high truck crash fatality rate and poor truck maintenance in South Africa suggest that law enforcement alone is unable to ensure compliance with the road traffic legislation (Nordengen, 1998). Consequently, the Road Transport Management System (RTMS), SABS standard SANS 1395:2014, has been established to address this by complementing law enforcement efforts with voluntary compliance. RTMS is defined as “an industry–led, government-supported, voluntary, self-regulation scheme that encourages consignees, consignors and road transport operators to implement a management system (a set of standards) that demonstrates compliance with the Road Traffic Regulations and contributes to preserving road infrastructure, improving road safety and increasing productivity” (RTMS, 2018). Voluntary compliance promotes daily inspection and a routine check for fitness for purpose, while the traditional truck inspection through law enforcement occurs at the roadworthy inspection and occasional roadside inspection.

The RTMS is designed to not only foster a corporate culture of observing the law, but also to promote good corporate governance. The RTMS provides a framework for developing management systems for a road transport company to ensure adherence to good practice. The system is intended to help the road transport operator achieve legal compliance, improve driver wellness, reduce corporate risk, and improve profits. Road transport operators have reported significant improvements in all these aspects of performance after becoming RTMS-certified. The RTMS allows operators to define their own RTMS policy which details the way the objectives of the RTMS will be met in the organisation. This approach allows operators to tailor the RTMS implementation to suit their particular operations. South African case studies show a 40%-45% reduction in overloading (Nordengen & Oberholtzer, 2006), a 66% reduction in crashes, and a 24% reduction in fuel consumption and CO₂ emissions (Nordengen & Naidoo, 2014). As at 04 May 2018, 249 South African transport fleets were RTMS certified. This represents less than 5% of the national road transport fleet. This paper presents surveyed operational improvements outcomes from implementing the Road Transport Management System in road transport companies in South Africa.

2. LITERATURE REVIEW

Population and GDP growth rates give rise to an increase in the movement of physical goods which places an increasing burden on all transport systems including road networks. In the late 1990s Australia introduced higher mass limits vehicles with "road friendly" suspensions. The National Heavy Vehicle Accreditation Scheme (NHVAS) was created as a voluntary compliance initiative which is administered by the State through a national regulatory agency (Yeo & Moore, 1998). This scheme focuses on three pillars of compliance: fatigue management, maintenance management, and mass management. The program functions on an opt-in and modular basis. Yeo and Moore (1998) proposed that if implemented carefully, voluntary accreditation schemes comprising management based compliance can improve the productivity of scheme members, improve the effectiveness of conventional enforcement and improve compliance outcomes overall. Compliance with heavy mass limits can be improved with more flexible and sophisticated approaches, provided regulatory incentives are sufficient to attract a critical mass of operators.

Regulatory concessions offered under the scheme include:

- Additional mass for membership of the mass module
- Exemption from mandatory annual vehicle inspection for membership of the maintenance module
- Eligibility to drive longer hours under the fatigue management module

The scheme is popular among Australian truck operators with over 9000 vehicles on the program and is viewed favourably by operators (Walker, 2012). In 2007, Australia introduced the Performance Based Standards (PBS), offering the potential to achieve higher productivity and safety through innovative truck and bus design. To gain approval to this scheme, vehicle designs are tested against 16 safety and 4 infrastructure standards (Koniditsiotis & Sjorgen, 2012).

Sweden began a shift to high capacity transport (HCT) in 2006 through an initiative led by the Forest Research Agency. The initial aims focused on fuel and emissions reduction. The Swedish experience of HCT illustrates that a 20% improvement in fuel consumption and carbon emissions is possible with no negative impact on road surfaces or road safety (Koniditsiotis & Sjorgen, 2012). A survey of Swedish road transport companies found that 72% of companies surveyed reported that voluntary accreditation contributes to a company's profitability at a high or the highest possible level of fulfilment, 84% reported high or the highest possible level of fulfilment in road traffic safety, and 85% reported high or the highest possible level of fulfilment in overloading compliance (Johansson, 2012).

In South Africa an Overload Control Strategy was proposed for the province of KZN as early as 2000 (Nordengen, et al., 2000) with manned control centres on major routes. South Africa introduced the Load Accreditation Program in 2002, which was aimed at reducing over-loading in the forestry industry (Nordengen & Oberholtzer, 2006). The heavy vehicle accreditation scheme was developed in 2003 which was based on the Australian model. This initiative was initially confined to the forestry sector but was eventually expanded to be all inclusive to allow a broader impact on all road transport activities and a National Steering committee was established (Nordengen & Pienaar, 2008). Since vehicle monitoring under the LAP commenced, prosecutable overloading (more than 5% over limit) has dropped by 40% to 45%. In addition, average overload has reduced by 14% (Nordengen & Oberholtzer, 2006)

It was felt that the name "Load Accreditation Program" placed too much emphasis on mass compliance, without recognising the other aspects such as vehicle maintenance, driver wellness, training and productivity. Thus, the Road Transport Management System was introduced in November 2005 as a comprehensive scheme to promote self-regulation in the South African road transport sector (Nordengen & Naidoo, 2014). The RTMS is voluntary and self-regulating and is much broader in its scope than the NHVAS and is aimed at consignors, consignees and road transporters. In addition, it covers a much wider spectrum of road transport activities including:

- Loading control (mass and dimensional compliance are core aspects of the program to eliminate overloading and reduce underloading in order to optimise efficiency without compromising safety or road degradation)
- Driver wellness (diet, rest breaks, HIV prevention and testing, driver scheduling and fatigue management, vehicle scheduling, etc)
- Safety and compliance (speeding control, maintenance planning, pre-trip inspections, tyre management, documentation and systems)
- Training and development (training plan, defensive driving instruction, mentoring, monitoring)

These pillars were incorporated into the 10 elements of the RTMS standard as follows:

1. Fleet inventory
2. Load assessment and verification
3. Road safety
4. Maintenance of roadworthy vehicles

5. Vehicle and load safety
6. Health and wellness
7. Training and HR development
8. Documents and records
9. Performance evaluation
10. Continual improvement

In 2006, Standards SA was tasked with developing the RTMS into a "Recommended Practice" (ARP 067). An SABS working committee was constituted, STANSA TC181B: Road Transport Management Systems. The ARP 067-1:2007 Part 1: Operator Requirements-Goods Standards SA was established in February 2007 and evolved into SANS 1395-1:2012 Road Transport Management Systems. In developing this standard, consideration was given to the relevant provisions of ISO 39001:2012 Road Traffic Safety Management Systems (Nordengen & Naidoo, 2014). The intention was that companies aligning to the RTMS would easily be able to attain ISO 39001 should this be required.

The goals of the RTMS (Nordengen & Oberholtzer, 2006) are to:

- Improve efficiency
- Increase levels of compliance
- Reduce accelerated road infrastructure damage due to overloaded vehicles
- Improve road safety

Incentives mooted are:

- Weigh-less concessions at weigh bridges where RTMS vehicles would usually be waved through
- Operational concessions

In addition, other possible incentives are:

- Discounts on vehicle insurance premiums
- Discounts on toll fees
- The introduction of Performance Based Standards vehicles to increase payload efficiency without negatively impacting on the road surfaces

The implementation of the RTMS has directly contributed to improved road safety, compliance, and operational efficiency. This has resulted from companies implementing policies around key objectives of the RTMS, and by monitoring and correcting any deviations from standards. It is through constant measuring of key performance criteria against standards that a cycle of continual improvement arises and organisational development occurs. Companies implementing the RTMS have reported qualitative and quantitative benefits such as: reduction in crashes, reduction in overloading, reduction in speeding incidents and improved fuel efficiency (Nordengen & Naidoo, 2014).

Barloworld Logistics achieved a 66% reduction in the number of crashes in the owner driver fleet. Vehicle Delivery Services experienced a 42 % reduction in serious accidents in 2011/2012. Timber Logistics Services reported a 50% reduction in accidents from 2009 to 2012. City of Cape Town Electricity Support Services achieved a 44% reduction in the number of crashes. Unitrans Amatikulu reduced the cost of crashes from 5% of revenue to 1.3% of revenue.

In the timber industry, overloading has been reduced to under 4% from more than 20% prior to RTMS. In the sugar industry it has been reduced from over 30% to about 7%. Speeding is a key contributor to crashes and RTMS compliance involves diligent monitoring of speed. Vehicle Delivery Services reported a 30% drop in speeding violations as observed through fleet tracking. Barloworld Logistics and Tanker Services achieved 100% compliance to speed controls implemented as part of the RTMS.

Operators report significant fuel efficiency gains with City of Cape Town Electricity Support Services achieving improvement from 5,9 km/l to 8,3 km/l. The strong emphasis on driver training has played a significant part in fuel savings. A further contributing factor has been tyre management which results in correct tyre inflation pressures as well as frequent wheel alignment. This has a positive impact on fuel efficiency as well as safety.

Qualitative benefits observed are:

- Reduced turnover of drivers due to health and medical reasons
- Improvement in driver wellness, resulting in decrease in absenteeism
- Reduction in vehicle breakdowns
- Improved fleet utilisation through reduced downtime
- Reassurance that drivers are fit to drive a heavy vehicle
- Improved employee motivation

This demonstrates the achievements of the RTMS in a relatively short time frame. The RTMS has been successful in meeting its objectives. This, in a country where overloading had been a norm with some companies deliberately over-loading 22 metre combinations by more than 40 tonnes beyond regulations (Nordengen, 1998). Transport companies are increasingly realising that in order to become an embedded part of a client's logistics value chain, they have to deliver value in terms of the triple bottom line. Profitability, environmental sustainability, and social responsibility is what drives value and builds brand equity (Elkington, 1999). The RTMS provides a pathway to continual improvement in crucial aspects of road transport operations as well as demonstrating good corporate citizenship as a road transporter.

3. METHODOLOGY

The perceptions of consignors, consignees and road transport operators in terms of expected RTMS outcomes were polled using an online survey developed using Google Forms. Transport organisations were contacted and requested to forward a participation information sheet and internet link to the online poll to their members. Organisations contacted included the National Bargaining Council for the Road Freight and Logistics Industry (NBCRFLI), the Road Freight Association (RFA), the Transport Forum, the Institute of Road Transport Engineers (IRTE) and the RTMS steering committee. Participation information sheets with the internet link to the online poll were also distributed at transport presentations organised by the Transport Forum and RTMS workshops. Ethics clearance was obtained for the surveys through the School of Mechanical, Industrial and Aeronautical Engineering at the University of the Witwatersrand (Clearance MIAEC 001/16 and 006/18). More than 1 000 road transport operators, consignors and consignees were sent email survey requests. The online survey was completed by 56 respondents which represents a response rate of approximately 6%. The number of respondents could be viewed as a limitation of the study; however, the researchers believe that the nature of the sampling pool could be regarded as adequately representative of the industry perspective.

4. RESULTS

Respondents were mainly from the FMCG, courier, bulk, automotive, general cargo, container, hazardous cargo, and abnormal loads sectors (79%). Most of the respondents (82%) were middle/senior management or business owners/directors. Respondents were asked to indicate their function within the logistics chain and their RTMS status. Figure 1 shows that 72% of respondents were road transporters, 23% were consignors and 5% were consignees. Of the survey population, 44% were already RTMS-certified, 12% had begun RTMS implementation but were not yet certified and 44% had not yet decided whether or not to become RTMS certified.

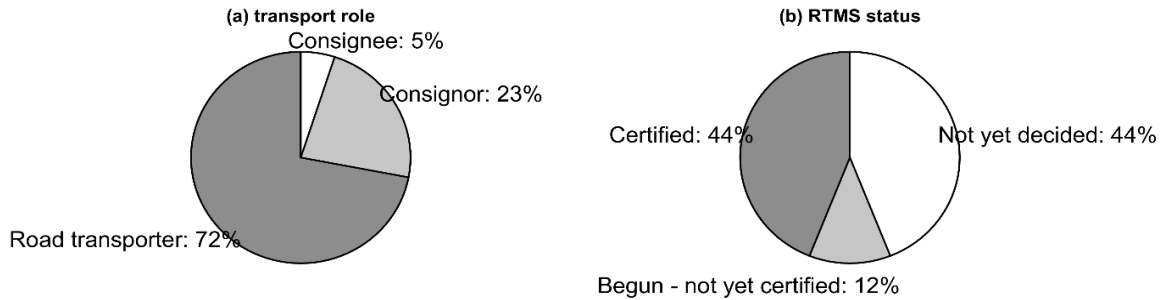


Figure 1. Survey respondents' (a) transport role, (b) RTMS status

When asked how they became aware of RTMS, 35% of the RTMS-certified companies indicated that they had heard of the RTMS from clients while 40% of the companies that were working toward certification became aware of the RTMS through various workshops, meetings, courses and personal communication. A large number of companies (35%) that had not yet decided to implement the RTMS had no prior knowledge of the RTMS. This implies that clients are a strong influencer for RTMS uptake, as are the road transport meetings and workshops. It also suggests that there is a need for improved awareness of the RTMS. Survey respondents were also asked to indicate the reasons why they sought certification and the duration of their certification process. 42% of the RTMS-certified companies attained certification within 6 months, while 42% took between 6 months and a year, and only 16% took more than a year. Of the respondents that were still working towards RTMS certification, 60% had been working at it for less than 6 months, and 40% were at it for over a year. The 40% of candidate RTMS companies taking longer than a year are cause for concern. They may be having trouble aligning their operations with the RTMS. These results are depicted in Figure 2.

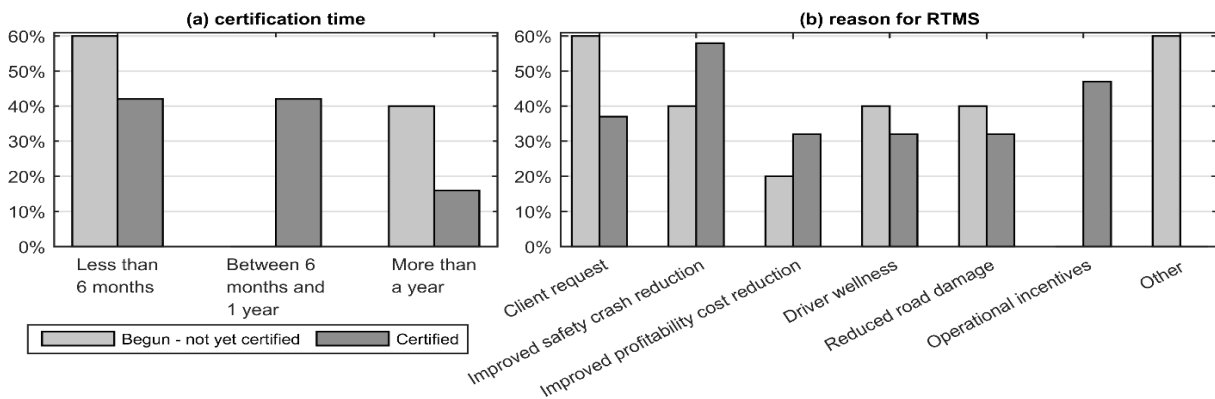


Figure 2. Respondents in terms of (a) certification time & (b) reason for RTMS

When asked to indicate the challenges to certification, the main obstacle cited by RTMS certified companies was a lack of understanding of the RTMS requirements, whilst in companies that had begun but had not yet been certified 60%, reported no obstacle. These results are depicted in Figure 3. For companies working toward RTMS, 40% indicated that their clients were unaware of the RTMS while 20% reported that clients insisted on certification; a further 20% said clients were supportive of RTMS certification and 20% reported that clients liked the RTMS and the associated benefits. 62% of companies that had not yet decided to implement the RTMS reported that their clients had no prior knowledge of it. 25% of RTMS certified companies indicated that their clients were unaware of the RTMS, while 25% supported RTMS certification. 15% of respondents reported that clients insisted on certification; and 35% indicated that clients liked RTMS certification and the associated benefits. From these responses it appears that more work needs to be done to improve the awareness of the RTMS as well as clear guidelines to the requirements of the RTMS and tools for implementation.

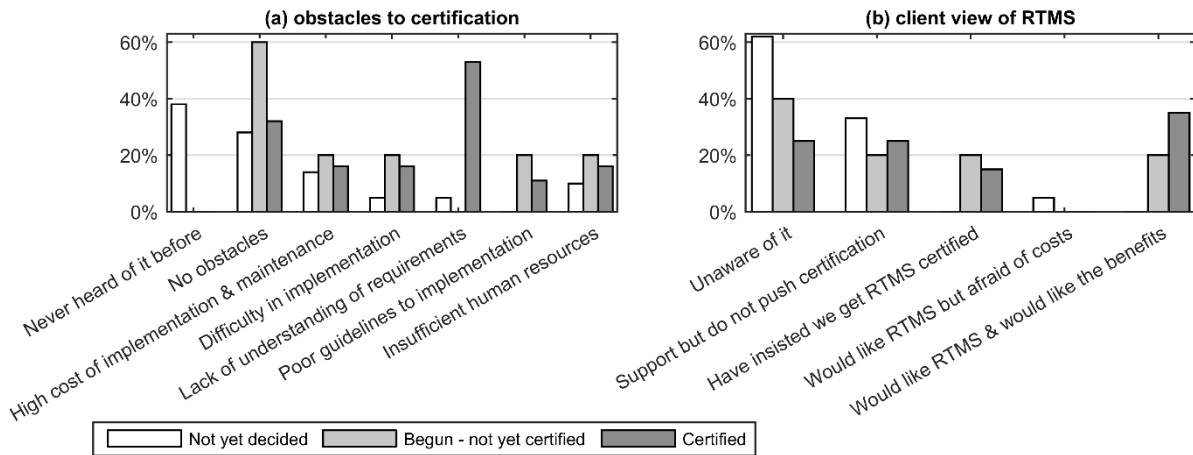


Figure 3. Respondents' (a) obstacles to certification & (b) client view of RTMS

The benefits of the RTMS in terms of safety, cost reduction, driver wellness, reduced road damage, operational efficiency and impact on business profits is shown in Figure 4. Thirty percent of RTMS certified companies identified some safety benefit in the RTMS, 15% identified significant benefits, and 50% indicated crucial benefits. Of the companies working towards RTMS, 20% perceive some safety benefit, 40% perceive significant benefits, and 20% perceive crucial safety benefits. Safety is therefore a significant outcome of the RTMS.

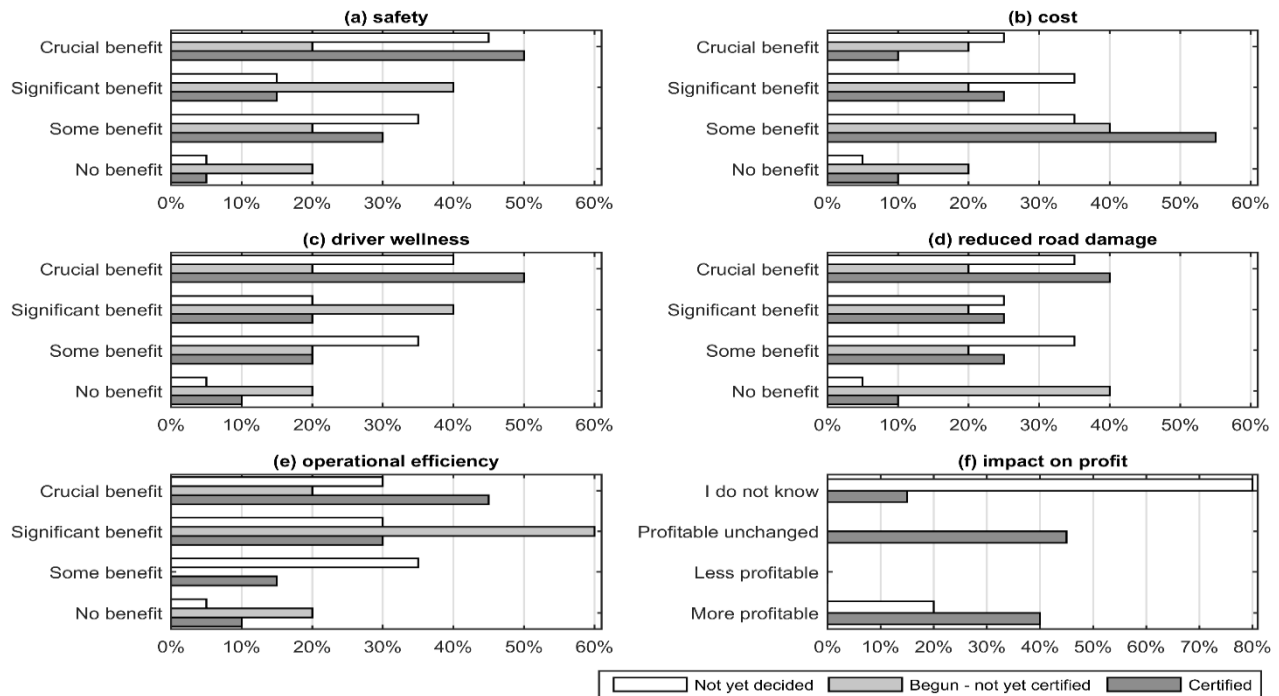


Figure 4. Respondents' perceived (a) safety, (b) cost, (c) driver wellness, (d) reduced road damage, (e) operational efficiency & (f) impact on profit

Figure 4 further shows that 50% of RTMS certified companies found some cost reduction benefit, 25% found significant benefits and 10% indicated crucial benefits in cost reduction. Among the companies still working toward RTMS certification, 40% indicated some cost reduction benefit, 20% indicated

significant cost reduction benefits, while 20% indicated crucial cost reduction benefits. This indicates that there are cost reduction benefits realised or expected in 85% of RTMS certified companies. Among RTMS certified companies, 20% found some benefit in driver wellness, 20% found significant benefits, and 50% found crucial benefits. Of the companies still working toward implementing RTMS, 20% expect some benefit, 40% expect significant benefit, and 20% expect crucial benefit in driver wellness. Driver wellness is therefore a significant outcome of the RTMS.

Ten percent of RTMS certified operators believe there is no benefit in terms of reduced road damage, 25% reported some benefit, 25% reported significant benefit and 40% reported crucial benefit in terms of road damage. Of the companies working towards RTMS certification, 40% reported no benefit, 20% reported some benefit, 20% reported significant benefit and 20% reported crucial benefit in terms of reduced road damage. It is suggested that the difference in perceived outcome is due to a change in awareness of the impact of overloading and improved vehicle design on road network wear as respondents progress through their own RTMS awareness “evolution” and come to understand some of the external impacts of their operations.

Fifteen percent of RTMS certified operators reported some benefit in improved operational efficiency, 30% reported significant benefit and 40% reported crucial benefit in operational efficiency. In the companies working toward RTMS certification, 60% reported significant benefit in improved operational efficiency and 20% reported crucial benefit in improved operational efficiency. Significant improved operational efficiency has therefore been achieved as an outcome for an overwhelming majority of stakeholders in RTMS certification.

Forty percent of RTMS certified companies reported greater profitability as a result of the RTMS, 45% reported no change in profitability and in companies working towards RTMS, 20% reported increased profits as a result of the RTMS, while 80% did not know if there would be an increase in profit. These responses may also be influenced by financial information not being within access of respondents. It is probable that improved business profits are therefore a very likely outcome of the RTMS.

Figure 5 shows that of the companies that are RTMS certified, 70% believe that the RTMS is a small investment in relation to what it achieves. In companies that are working towards RTMS certification, 20% believe it to be an expensive exercise, 20% believe it costs a lot but is worth it, and 60% did not know. The RTMS is therefore perceived to be worth the costs involved by the majority of RTMS certified companies, but it is less clear to companies still working toward RTMS certification. The majority of RTMS certified companies (60%) believe that it has been worthwhile and that the business runs better because of the RTMS, while 20% of the companies working towards RTMS certification derive benefit from it, and 20% believe there may be a benefit, while 60% did not know.

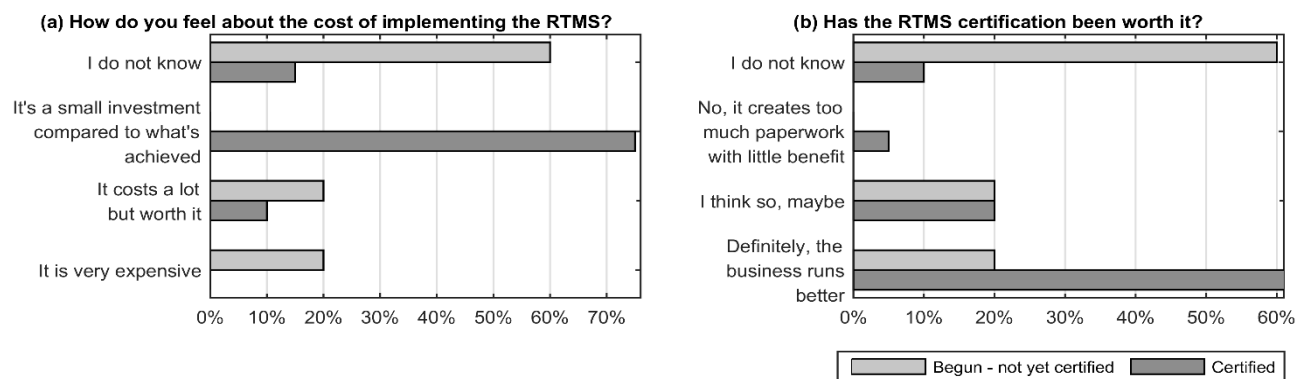


Figure 5. Respondents' opinions on (a) cost and (b) worth of RTMS

The survey responses from the RTMS Steering Committee show that they believe that the RTMS has been effective in reducing crashes, minimising overloading, reducing road traffic offences, and achieving self-regulation amongst certified companies. The costs to implement the RTMS are regarded as minimal in comparison with the benefits for the operator, and it is viewed as having a good return on investment. The reduction in crashes, reduction in fuel consumption, and improved operational efficiencies provide the payback to RTMS-certified operators.

Lack of awareness of the value of RTMS certification, lack of exposure to management systems, and lack of buy-in from staff and management are seen as impediments to the widespread adoption of the RTMS. One respondent suggested that more work needs to be done in aligning the RTMS with the road traffic legislation to improve compliance. The respondents were unanimous in agreement that the RTMS has been successful thus far. In response to ways in which to improve the number of companies that are RTMS-certified, one respondent suggested that a “toolkit” approach be implemented with templates and procedures to assist companies that have difficulty in developing a system. Another suggestion was that more of the achievements of RTMS certified companies should be marketed to demonstrate the benefits. When asked for advice to companies seeking RTMS certification, the respondents suggested making a start, taking the first step, doing a gap analysis and implementing a project plan, with internal audits guiding the process.

Survey responses from road traffic authorities indicate that they see the role of the RTMS to support legislation and promote compliance. It is viewed as having achieved this objective, as well as improving safety and productivity, while reducing breakdowns and maintenance costs. More effective marketing of the RTMS, as well as improved operational incentives and consignor awareness of the RTMS benefits are viewed as strong drivers for increasing RTMS certification. Suggestions for improved monitoring of the RTMS achievements are to collect data regarding crashes, maintenance costs, and costs of logistics operations. A caveat is in the observed gap in roadworthiness of vehicles and the manner in which they are operated, as compared to the standard to which they are certified. Some work needs to be done to ensure alignment of processes.

5. CONCLUSIONS AND RECOMMENDATIONS

RTMS certified road transport operators have reported significant benefits in improved safety, reduced crashes, improved fuel consumption, operational efficiency, as well as operating profits and regard the RTMS as well worth the effort and investment. There is significant alignment between the objectives of the RTMS and the user experience of the RTMS in practice. It is recommended that the RTMS steering committee embark on initiatives that will increase awareness of the improved road transport sustainability achieved through the RTMS. Clients of logistics service providers are key influencers in the decision to become RTMS certified, and their role should be leveraged in promoting the RTMS and its benefits.

The requirements for RTMS certification need to be made clearer and more transparent. More effort needs to be expended in the marketing of the RTMS and its benefits. In addition, improved operator incentives may contribute significantly in the drive to increase the levels of RTMS certification. The RTMS is perceived as having achieved its stated objectives of improved operational efficiency and profits, increased levels of compliance, reduced damage to road network, improved road safety and driver wellness. The main challenge now is to create the right conditions for increasing the number of companies that attain certification.

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Paul Nordengen is a Principal Researcher at the CSIR. He obtained his PhD in the area of PBS for heavy vehicles in 2013. He has been involved in the development of various infrastructure asset management systems in various countries in Africa. He is a Council Member of the SA Road Federation, an IFRTT Board Member and Past-President of both organisations. His current areas of research include self-regulation (RTMS), performance-based standards for heavy vehicles and bridge management systems.