Exploring a Social Licence to Operate the Road System

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Abstract

It is generally considered that the transport system needs the support and engagement of the public in its development and implementation. This paper looks at an approach for gaining insight into how the community views the performance of the road transport system. It explores the concept of the Social Licence to Operate the Road System (SLORS) and shows how it can assist in road policy and network considerations. The paper looks at 18 policy issues and identifies how these can be placed into a SLORS framework. The policy issues are categorised as falling into 5 zones: User Advocacy Zone, Support Zone, Equilibrium Zone, Tolerance Zone and Opposition Zone. The zone the issue falls into provides information to policy makers on the public's view of the policy. For instance: in the Advocacy zone issues like Driver behaviour should improve, Roads must be safe for all users, the Physical quality of the road and their surface should improve, and Road travel should be more environmentally sustainable in the future are supported. These should be relatively easy to implement. In the Opposition zone People paying a toll or road charge for each trip, Private companies having a large role in planning and management of roads, increased congestion and increased traffic on our roads in the future receive less support. These will require considerable effort marketing their implementation. This information may assist in pointing the policy maker in the best direction to get the policy supported. The paper closes with some indications of further work.

1. Introduction

It is generally considered that the transport system needs the support and engagement of the public in its development and implementation. A social model approach to developing roads policy looks beyond the transport sector, beyond governments and beyond the road community to build wider acceptance of transport solutions. This paper looks at an approach for gaining insight into how the community views the performance of the road transport system. It looks at the interpretation of the Social Licence to Operate the Road System (SLORS). In exploring the concept of the SLORS, this paper shows how it can assist in the implementation of road policy and network considerations. This paper initially reviews the social licence to operate (SLO) approach and how it adds to other approaches. The policy issues are then categorised as falling into 5 zones: User Advocacy Zone, Support Zone, Equilibrium Zone, Tolerance Zone and Opposition Zone. Interpretation the SLORS in a policy sense is outlined graphically.

2. Research into the public's acceptance of road transport system

Road infrastructure operations require a co-ordinated, efficient and well-informed planning process, triple bottom line assessment and strategic asset management system at its base. Since it is generally thought that an acceptable road system must meet the needs of the community their view of the transport policy is an important input into these processes. Community

consultation and people's behaviour is the main form of collecting this information. As the transport system becomes more complex and invasive the general community is showing more concern about its impacts on them and many transport projects and government decisions have been questioned. In some cases transport projects have been stopped, delayed or not started. Public acceptance has been suggested as an important factor for the successful realisation of transport plans, projects and policies (Kikhofer et al, 2010). A number of approaches have been used to quantify the performance and customer satisfaction with transport infrastructure (BITRE, 2017). A brief review of approaches used to ascertain the publics acceptance of road projects is presented below.

A common approach (Kickhofer et al 2010) to measure public acceptance of transport projects is to use mathematical models. These models are simplifications of the transport user's decision-making processes. They range from broad strategic models that look at the environmental, land-use and transport system; through models that look specifically at transport systems (Meier and Miller, 2000; McNally, 2000; Ortuzar and Willumsen, 2001); to microscopic (Hidas, 2005; Horni et al 2016) models. These models explore measure like value of time, public welfare and level of service. The models have been used to represent the impact between the supply of and demand for transport. They have been applied to explore policy issues like: the impact of tolls, congestion pricing, road safety policies etc. The approaches add to the understanding of travel behaviour and people preference at a systems level but need to go further to understand the communities view and acceptance of the transport system.

As transport moves from a derived demand to a service it has attracted more market research to determine what people think about roads (BITRE, 2017). There is a growing interest in the use of market surveys to ascertain the community's view of road use, transport and the liveability of cities. There has been an increasing call that to develop the robust transport systems we need to involve the community in the transport decision making process.

The involvement of road users is particularly found in road asset management and pavement design (Shackleton, 1995, BITRE, 2017). In several instances, the road user has been used to calibrate intervention levels and link technical standards with levels of perceived comfort (NAASRA 1985, O'Connor et al 2020). In these instances, users are asked to rate the comfort of a road while travelling in a car, or in the case of the latter, to rate the 'acceptability' of a road based on pre-recorded video imagery of the roadway. Importantly the results of these initiatives are measured and recorded in order to enhance and monitor improvements.

Community participation takes place at all levels of road planning, construction and operation. It is an important part of meeting the social responsibility of governments. It usually consists of the development of road project plans which are then open to the community for comment. The consultation process may take some time and may involve open discussion sessions to try and come to some agreements. This consultation is important since it allows people to present their views of the system and for these to be recognised in its final implementation.

A social model for road safety is being considered in Australia (Australian Government, 2020) in the road safety arena. It is thought that involvement of the public in improving road safety can be enhanced through the adoption of a social model. The social model (Australian Government, 2020) is layered, with the individual at its heart. It expands from responsibility for an individual's own behaviour to their ability to influence other individuals and

organisations, to organisations actively prioritising safety, community influence and advocacy, right through to systemic change at a macro societal level. The specific layers are: The system /public outcome approach: influence road safety outcomes; community approach; organisational response; interpersonal function; and the individual. measure of performance on this approach is improved safety outcomes; in terms of loss of life and seriousness of injuries. The aim of using a social model approach is to build road safety into "business as usual" through various touchpoints and mechanisms across multiple sectors of society.

Most programmes in a Total Asset Management Plan would have been derived through a benefit-cost analysis (including a risk analysis), plus a public consultation process. In an ideal world, those with the highest benefit-cost (or highest risk reduction) would be implemented first. However, plans are derailed or delayed due to adverse public reaction. More and more projects are utilising a SLO approach to assist in their implementation, A continuous quantification of a Social Licence to Operate (SLO) approach may assist avoiding this imperfection in the broad policy development process also.

The previous discussion has indicated that involvement of the community in planning at all levels is an essential component of developing an acceptable road project and consequently system. A key component of communication with the community in the roads area is transparency and a need to quantify their view. This paper adds to the above approaches by exploring the quantification of a social licence to operate the road system (SLORS).

3. Consideration of a Social Licence to Operate the Road System

This paper looks at including the public in the development of road policy decisions as part of the planning and policy development processes. The views of the community about the future of roads is an essential input into each of the planning processes as they are the system end-users. This can be assisted by the quantification of a SLORS. At a policy development level there could be varying levels of acceptance of particular issues by the community.

The survey methodology and data used in this study has been collected from a series of cross-sectional questionnaires and focused group open-ended surveys over a period of three years. Industry and respondents were asked what were the major issues and these were developed into a series of formal questionnaires. The questionnaire sample was collected using social media and a panel. The policy issues have been developed over a three-year period (see Table 1) and changed as new issues are found and old issues refined. Respondents were asked what "Should" take place and what they think "Will" take place. The will and should questions form the base of the quantified views. They are quantified using 5 point semantic scales. The gender distribution of respondents is shown in Table 1. This paper only looks at the stage 3 data.

There were 18 policy issues considered in stage 3. These 18 issues (see Table 2) can be can be grouped as follows:

Change
- Roads and their use should/will remain largely the same as they are today.

Infrastructure design and operations
- On major roads like highways, cars and trucks should/will be separated from cyclists and pedestrians.

- The physical quality of roads and their surfaces should/will improve in the future.

Table 1: Gender

Label	All data	Percent	Stage 1 data	Percent	Stage 2 data	percent	Stage 3 data	Percent	Australian Percent
Male	1963	49.37	253	53.36	913	49.84	797	47.72	49.59
Females	1977	49.72	221	46.62	907	49.51	849	50.84	50.40
Other identification	11	0.28	0	0	1	0.05	10	0.60	
Prefer not to say	25	0.63	0	0	11	0.60	14	0.84	
Total useable cases	3976		474		1832		1631		

- Underground road and rail tunnels should/will be more common in the future
- Parking on major roads should/will not be permitted.
- Local roads, and roads through shopping areas, should/will give priority to pedestrians and cyclists**.**

Demand and Usage
- There should/will be increasing congestion on our roads in the future
- There should/will be increasing traffic on our roads in the future

Drivers
- In the future, roads should/will be much safer for all users
- Driver behaviour should/will improve in the future

Technology
- The use of technology should/will improve the level of service of roads in the future
- Smart road infrastructure (e.g. variable signs informing travel time on freeways etc.) should/will become a necessary part of future roads
- Car, truck and bus travel should/will all be automated (e.g., driverless) in the future

Management and policy
- Private companies should/will have a larger role in the planning and management of roads in the future
- People should/will pay a toll or road charge for each trip, with charges dependent on the time of day, route and distance
- Road travel should/will be more environmentally sustainable in the future
- Public transport should/will be a more common mode of travel in the future

These 18 issues form the base of the exploration of the SLORS. Figure 1 presents the SLORS framework for consideration of these issues in a policy sense. It can be measured in terms of what the public perceives. That is, whether a policy issue will and should take place in road operation. The will provides an indication of what the respondent thinks the particular issue will be like in 30 years. Should indicates what they think should occur. The will and should perceptions form a grid showing the implications of SLORS. The grid has what should happen as the vertical access and what will happen as the horizontal axes. The SLORS measure is the difference between should and will ratings. Other relationships between the should and will ratings like ratios, logarithms etc are shown by the graph. They will be explored further in the future. The vertical distance between should rating and the line of equality (the approximately

Table 2: Average measures of SLORS, Should and Will scores.

Rank order SLORS	Mean SLORS score[1]	Mean Should score	Mean Will score	All factors
1	1.44	3.81	2.37	Driver behaviour Should minus Will improve in the future
2	1.15	4.18	3.03	In the future, roads Should minus Will be much safer for all users
3	0.99	4.14	3.15	The physical quality of roads and their surfaces should minus Will improve in the future
4	0.83	4.09	3.26	Road travel Should minus Will be more environmentally sustainable in the future
5	0.61	4.22	3.61	On major roads like highways, cars and trucks Should minus Will be separated from cyclists and pedestrians.
6	0.49	4.02	3.52	The use of technology Should minus Will improve the level of service of roads in future
7	0.45	3.88	3.42	Public transport Should minus Will be a more common mode of travel in the future
8	0.12	3.84	3.72	Underground road and rail tunnels Should minus Will be more common in the future
9	0.05	3.57	3.48	Local roads, and roads through shopping areas, Should minus Will give priority to pedestrians and cyclists
10	0.05	4.00	3.94	Smart road infrastructure (e.g. variable signs informing travel time on freeways etc.) Should minus Will become a necessary part of future roads
11	0.03	3.67	3.63	There Should minus Will be an increase in the number and capacity roads in the future
12	-0.14	3.63	3.77	Parking on major roads Should minus Will not be permitted.
13	-0.33	2.85	3.18	Roads and their use Should minus Will remain largely the same as they are today.
14	-0.47	2.78	3.26	Car, truck and bus travel Should minus Will all be automated (e.g., driverless) in the future
15	-0.86	2.72	3.58	Private companies Should minus Will have a larger role in the planning and management of roads in the future
16	-1.18	2.34	3.52	People Should minus Will pay a toll or road charge for each trip, with charges dependent on the time of day, route and distance
17	-1.34	2.92	4.26	There Should minus Will be increasing traffic on our roads in the future
18	-1.50	2.67	4.17	There Should minus Will be increasing congestion on our roads in the future

Note 1: The SLORS for an individual is the difference between should and will rating for each respondent. The average of the SLORS is the average of the difference between should and will ratings for each individual. This will differ slightly from the difference in the average will and should ratings.

45° line) between will and should ratings pictorially represent the SLORS. The SLORS is the discrepancy between what the respondent thinks should take place and will take place. This discrepancy, depending on its positive and negative value will indicate the level of support, tolerance and opposition to the particular issue. More specifically, line of equality (Should-Will) is a level of acceptance the community thinks these issues will take place and that they should take place at the same level at a particular point in time. Above the line of equality we have a situation where the community thinks that these policy issues should take place and that they will take place at a lower level. This is a level of advocacy and support for these issues. Below the line of equality is opposition to particular issues. These measures of the issues SLORS can be sub-divided into 5 zones (Figure 2): User Advocacy Zone, Support Zone, Equilibrium Zone, Tolerance Zone and Opposition Zone.
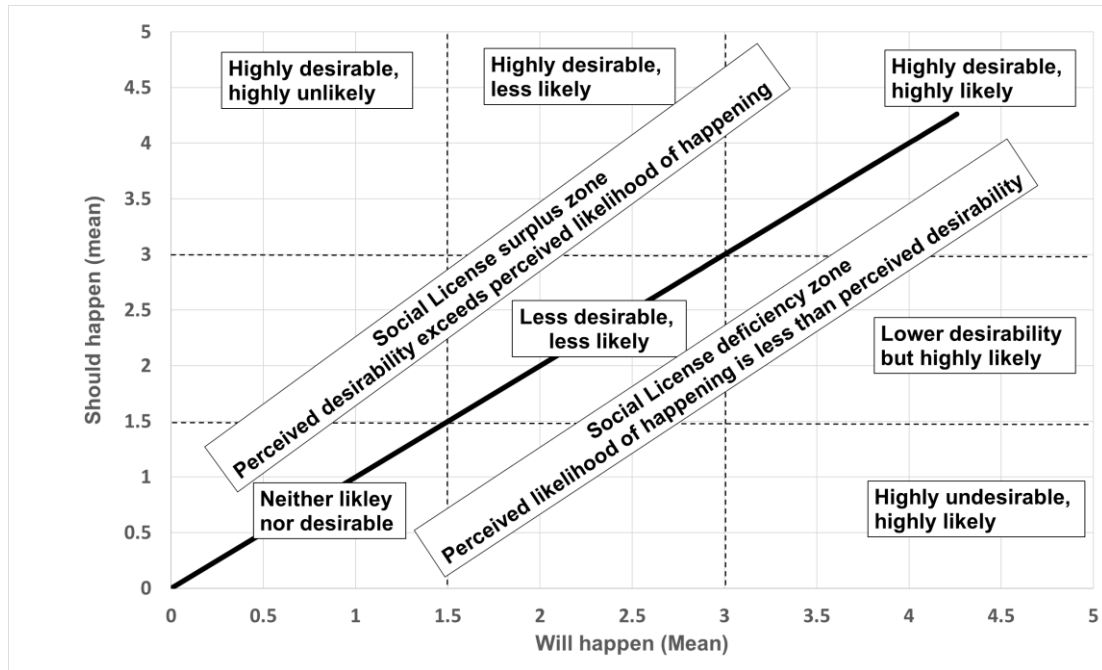
Figure 1: Some implications of the relativity of average should and will ratings. The SLORS framework

4. The data

The data used in this paper is a subset of data collected for a broad study of the future of roads. This study looks at Stage 3, of the data collected. It includes only data where all should and will ratings were given. This data was collected between 24/2/20 and 24/4/20. The 18 policy issues (see Table 2) are included in the questionnaire. The respondents were asked to answer how likely they thought that each statement described WILL occur (Table 2) and to what extent they agreed that what the statement described SHOULD occur (Table 2). These ratings form the base for the SLORS (Table 2) and are discussed below.

5. The quantification of the SLORS

5.1. The respondents view of what SHOULD happen to roads

The measure of the community's support for particular policies comes in many parts. One measure is what they think should happen. This was measured using a 5 point Likert scale. The levels were Strongly Agree (5), Agree (4), Neutral (3), Disagree (2) and Strongly Disagree (1). Table 2 presents the of mean for should rating for each policy issue. The quantitative results of the data show most things are changes that people think should happen. This is measured by a mean above an average score of 3.00 in Table 2. The average rating ranges from a high of 4.22 (separation of bicyclists and pedestrians from cars and trucks) to a low of 2.34 (paying tolls and road charges. Overall, the should ratings and the percentage of people disagreeing with the issue provides a good indication of the community support for particular policy issues. This is one measure of the community's view of what the road system should be like and should be taken into account when considering particular policies.

5.1. The respondents view of what WILL happen to roads

A complementary measure to what should happen, is the community's view of what will happen. This was measured using a 5 point Likert scale. The levels were Very Likely (5),

Likely (4), Neutral (3), Unlikely (2) and Very Unlikely (1). Table 2 presents the ranking of average rating for the will scores. The quantitative results of the data show's most things are
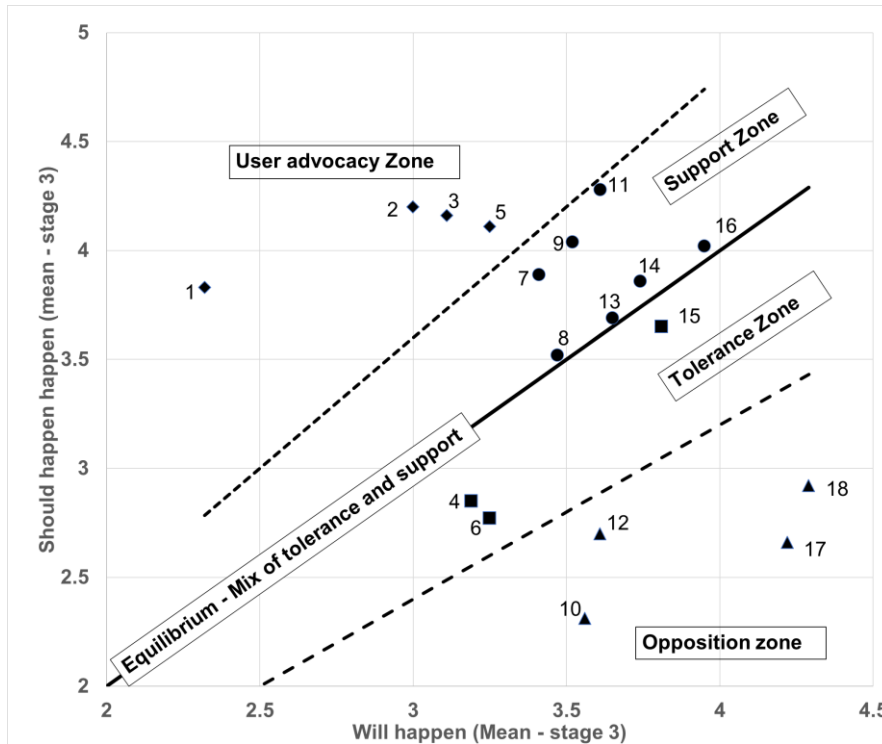
Key to data point numbers (descriptions précised)

Advocacy zone

1	Driver behaviour	2	Roads much safer for all users
3	Physical quality of roads improves	5	Road travel more environmentally sustainable

Support zone

7	Public transport more common mode	9	technology improve the level of service of roads
11	Cars/ trucks separated from cyclists and pedestrians		

Equilibrium zone

8	Local roads priority to pedestrians/ cyclists	13	increase in number & capacity of roads
14	road and rail tunnels more common in the future	16	Smart road infrastructure become necessary

Tolerance zone

4	Roads and their use remain the same	6	Car, truck and bus travel all driverless
15	Parking on major roads not be permitted.		

Opposition zone

10	People pay a toll or road charge for each trip	12	Private companies have a larger role
17	Increasing congestion on our roads in the future	18	Increasing traffic on our roads in the future

Figure 2: Issues on SLORS framework

changes that people think will happen. The average will ratings ranges from a high of 4.26 (increasing traffic) to a low of 2.37 (improving driver behaviour). The respondent's indication of what will happen is not an indication of the SLORS but taken with the support levels for the policy issues provides a strong indication of the difference between what people want to happen and what they think will happening. This will be considered in the next section.

5.2.   The SLORS

Should ratings provide one measure of the community's view of road transport policy. It does not however provide an indication of the community's dissatisfaction with the policies since they understand some things will happen. The difference between should and will ratings provides a measure of the level of the discrepancy or dissatisfaction people have with transport policy. More specifically, the will ratings (Table 2) indicate what the respondents think the road system will be like in the future. The combination of this measure with should rating (Table 2) gives the magnitude of dissatisfaction with what should and will take place in 30 years. This is the SLORS. Table 2 shows information on the SLORS. It is **should minus the will difference** for each respondent, averaged over the entire population. A positive ranking indicates that the desirability of a measure exceeds the likelihood of it happening. This is the support region on the SLORS diagram (Figure 2). A negative indicates things that will happen but should not: The opposed region.

The SLORS diagram (Figure 2) shows should and will mean ratings for the data set plotted against one another. The 45 degree line is the line of equality between should and will. As SLORS is estimated by subtracting will from should, those attributes with a positive SLORS are above the line and they show where the perceived desirability exceeded the perceived likelihood of eventuating. For instance, it shows that although the respondents think that driver behaviour should improve (1.44), roads should be safer (1.15), and the physical quality of the roads should improve (0.99) this is unlikely to happen. There is a net support for these issues. Those attributes with a negative SLORS are below the line of equality they show where perceived likelihood of happening exceeds the perceived desirability. Increased congestion (-1.50), increased traffic (-1.34), road charges (-1.18) and the role of private companies in planning (-0.86) fall into this category. They have a negative SLORS and have less support. These issues are likely to happen but people think they should not happen. There is less support for these policy issues. Increased action would need to be put in place to achieve these goals

5.3.   Interpreting the SLORS

There are two major differences in this application of SLO from previous social licence to operate applications in roads. These are:

1. The road users have views on a wide range of policy issues from planning through to constructed infrastructure and even the behaviour of users. It does not look only at a project as do other applications of SLO.
2. Other than in project specific studies, users are seldom asked for their views on what they think should happen and at the same time what they think will really happen on roads. Generally the studies look at only what should happen which is only half of the picture.

These contributions are potential keys to solving a number of implementing agency issues before they take place. Strategic initiatives and policy changes may meet significant stakeholder opposition, effectively preventing implementation of something that makes engineering and/or economic sense. An example is that of road-pricing and the concept that users should pay for the network capacity they use, and critically only the network capacity that they use. The net result is that custodians of the road network often face a choice – do nothing, or risk a public backlash. The net result is long lead-in times for projects and changes,

giving rise to perceptions that change is slow. Thus, an important part of change is the marketing of the changes to stakeholders, including road users.

The methodology described in this paper, may allow an agency which is considering a basket of policy options or initiatives to gain some insight as to a phasing strategy. They can begin with options with a high SLORS to start getting some benefits of change, while change requiring a significant shift in attitudes can be shepherded over longer periods to win road users over, or gain their license to bring about the envisaged change.

Thus, points below the equality line on Figure 2, represent issues where will is greater than should; factors where support is less than the perceived inevitability or where social license is deficient. Points above the equality line represent issues where the social license is positive; road users want the change more than they perceive it to be likely to eventuate. Points on the line represent issues where support and perceived eventuation are in balance.

This gives some idea of what the 'quick wins' might be and where significant effort may need to be put into winning road users over. This approach can be incorporated into the SLORS framework (Figure 2). The idea of road users taking on an advocacy role (User Advocacy Zone) against hold outs for changes the agency wants to make would have strong appeal to the agency. It avoids the agency being accused of forcing their change through and it reduces the expenditure of resources that the agency needs to effect the change. To take advantage of this, it would be necessary to know at what point does support tip to advocacy on the road network.

Similarly, it would be helpful to know – for those factors in the social license deficiency zone (Opposition Zone) – which are possible to change road user perceptions and gain social license in a reasonable amount of time, and which are candidates for really long term efforts, or for which a rethink may be needed.

To illustrate how a finer gradation of support/opposition is introduced. Two lines are added to the SLORS framework in Figure 2 to represent these tipping points (Support Zone, Opposition Zone). The lines shown represent 120% (Support Zone) and 80% Opposition Zone) of the line of equality value (Equilibrium Zone – mix of tolerance and support).

If adopting such an approach to assessing social license, an agency would then have the following strategies:
1. Feed users with materials and publicity for items in the advocacy zone
2. Embark on minor 'marketing' of items in the 'Support' zone to reduce resistance
3. Focus efforts on items in the Tolerance and Equilibrium zones in order to gain some degree of social license for the items
4. Rethink desirability of items in the Opposition zone, form coalitions with others trying to achieve the same measures or make plans for a long process of persuasion.

Figure 2 shows the eighteen policy issues identified in their SLORS zones, for the tipping points described above. Two of the 'Opposition' zone factors are in fact outcomes – increased traffic and congestion. Therefore, if an agency hoped to do nothing to reduce traffic or congestion that 'do nothing' approach would be resisted. Conversely though, any actions taken to ameliorate outcomes in the 'Opposition zone" can be assumed to have 'Support' or enjoy the 'Advocacy" of road users.

Put another way, the should, will and SLORS rating provide guidance on the acceptance or not of particular policy issues by the community. These need to be put into an overall policy context. Figure 2 shows the full SLORS framework and the ratings for the 18 policy issues. It illustrates the policy tipping points. Issues can be divided into 5 zones: Advocacy support Alignment between desirability and likelihood; Issues where people show some Tolerance; and Issues where there is Opposition.

Advocacy support can be found in the areas of improvements in: driver behaviour (1.44), road safety improvements for all road users (1.15), improvements in the quality of the road surface (0.99) and road transport being environmentally sustainable (0.83). **Support** is likely for policies related to: physical separation of active transport from cars and trucks (0.61) use of technology to improve level of service (0.49) and public transport being a more common mode choice (0.47). A mix of **tolerance and support** may be obtained for: priority given to: more tunnels for road and rail (0.12), active travel in local and shopping roads (0.05), more smart infrastructure (0.05) and increased number and capacity of roads (0.03). For these factors, views of desirability and likelihood are similar in magnitude. The factors where the respondents may show some **tolerance,** are: banning parking on major roads (-0.14), roads and their use will stay the same (-0.33), and automation of the road transport network (-0.47). Those factors where there is likely to be **opposition** are private sector being involved in planning (-0.86), pay for the use of the network (-1.18), increased traffic in the future (-1.34), and increased congestion (-1.50).

Under the SLOR zones posited, then, Australian Road agencies can rely on user advocacy for actions and strategies to:
1. Improve driver behaviour, make roads safer, better physical quality and make use of roads more environmentally sustainable.
2. By virtue of 'increased traffic' and 'increased congestion' being in the 'opposition' zone as posited, strategies to reduce traffic and congestion may also enjoy advocacy;
3. Can rely on support for strategies to improve the attractiveness of Public Transport as a choice, increase deployment of technology (ITS/VMS) to improve levels of service on roads and to physically separate motorised traffic from cyclists and pedestrians.
4. Need to work on public acceptance of an all-autonomous motorised vehicle fleet, a ban on parking along major roads and any plans to allow road usage to stay the same.
5. Should reconsider pricing as a strategy, or significantly change how it may be applied, or simply educate the road users on an intelligent reframing of what 'pay per use' means.

The SLORS concept is still in development. An alternative means of interpreting the SLORS for the 18 policy issues is shown below in Figure 3, with the same basic plot, but different ones identified. Under this framework, areas of concern for road agencies would be: Increases in congestion; Plans to implement pay-per-use network access; The notion of an all-autonomous motorised vehicle fleet; Plans to involve the private sector more in planning and maintenance; and Plans to maintain the status quo in terms of road usage. Agencies wishing to be seen in a positive light would demonstrate a strong focus in driver behaviours (in reality a very broad coalition of bodies is needed to address this) and pro-actively taking steps to improve safety in the road for all road users.

6. Conclusions

It is generally considered that the transport system needs the support and engagement of the public in its development and implementation. This paper explores an approach for gaining insight into how the community views the performance of the road system. It explores the
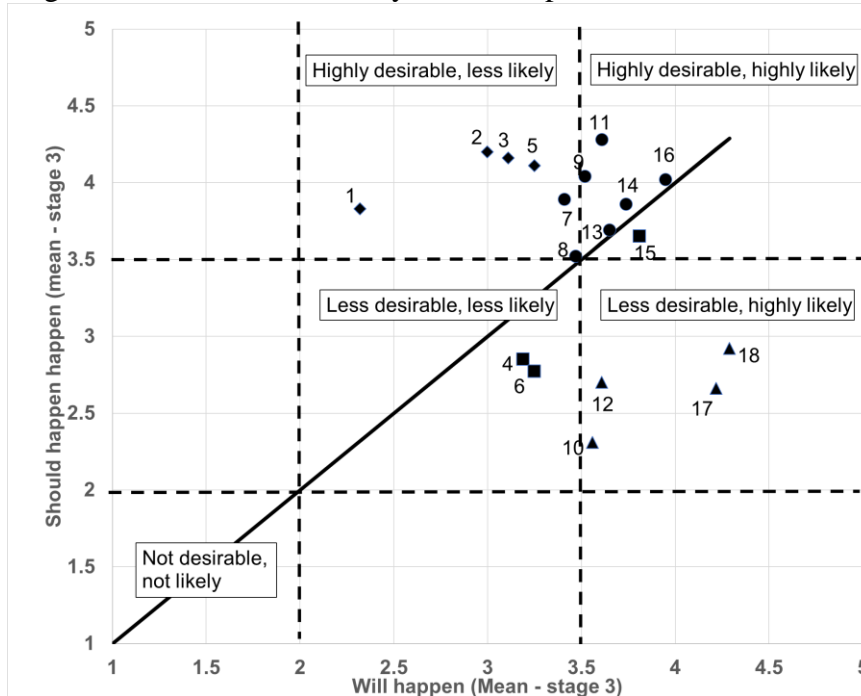
Key to data point numbers (descriptions précised)

Highly desirable, Highly likely

9	Technology improves level of service of roads	11	Cars/ trucks separated from cyclists & pedestrians
13	Increase in number & capacity of roads	14	Road and rail tunnels more common in the future
15	Parking on major roads not permitted	16	Smart road infrastructure become necessary

Highly desirable, less likely

1	Driver behaviour improves	2	Roads much safer for all users
3	Physical quality of roads improves	5	Road travel more environmentally sustainable
7	Public transport more common mode	8	Local roads priority to pedestrians/ cyclists

Less desirable, less likely

4	Roads and their use remain the same	6	Car, truck and bus travel all driverless

Less desirable, highly likely

10	People pay a toll or road charge for each trip	12	Private companies have a larger role
17	Increasing congestion on our roads in the future	18	Increasing traffic on our roads in the future

Figure 3: Alternate zone definition for SLORS framework.

concept of the Social Licence to Operate the Road System (SLORS) and shows how it can assist in the implementation of policy and network considerations. The measurement of the SLORS is outlined. Eighteen policy issues are rated for whether they Should and Will be implemented. The SLORS is the difference between the should and will ratings. The policy issues are categorised as falling into 5 zones: User Advocacy Zone, Support Zone, Equilibrium Zone, Tolerance Zone and Opposition Zone. The Zone the issue falls into provides information to policy makers on the public's view of the policy. For instance: in the Advocacy zone issues

like Driver behaviour should improve, Roads must be safe for all users, the Physical quality of the road and their surface should improve, and Road travel should be more environmentally sustainable in the future are in the user advocacy zone. In the Opposition zone People paying a toll or road charge, Private companies having a large role in planning and management, increased congestion and increased traffic on roads in the future receive less support. This information may assist in pointing policy makers in the best direction to get support.

The concept of SLORS is still in its early days. There is a need for rigorous analysis of the concept by the profession and its application to a road system. Further there is a need to explore the character of the index to look at variations in the perception of road users of the system. These variations can occur over time and over respondent characteristics. Variations by age, gender, car ownership, urban/rural require investigation. Further the sensitivity to change of the index over time and between demographic groups needs exploration.

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