# Road safety in Cambridgeshire: Who decides? A STAMP control structure analysis

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## THE WORK IN CONTEXT

Until the introduction of the Locomotives on Highways Act on 14th November 1896 'locomotives' used on the 'Queen's Highway' in the UK had to be driven very slowly and preceded by a man on foot holding a red flag. Approximately 120 years later, trials of driverless pods on the Greenwich peninsula in London took place where the vehicles could travel at a 'fast walking pace' accompanied by marshals on foot wearing hi-visibility jackets. The comparison between the risk mitigation techniques applied in these two developments in road transport is striking and serves as the context for this work. In the 120 years between these two events a vast international body of knowledge and understanding has been developed, but the decision taken when dealing with a key technological development is almost identical. This research aims to understand the decision-making processes in relation to road safety in the UK, focussed on the municipal area of Cambridgeshire. The STAMP control structure analysis method, verified using a modified two-stage Delphi approach, has previously been used to map the road transport system in Queensland, Australia. This approach was replicated to map the actors involved in the Cambridgeshire road transport system and demonstrate the validity of this method for the UK.

## KEYWORDS

Road safety management, STAMP, control structure

### A brief outline of the work carried out

There is a clear drive for road safety strategies to learn from other industries and adopt more system-based approaches in order to further reduce road casualties (Hughes et al., 2015; Hughes, Anund and Falkmer, 2015, 2016, 2017). Two methods have been used in recent studies specifically to map the organisations and individuals involved in the road transport system and, importantly, their influence: Leveson's (2004) STAMP control structure analysis was used by Salmon, Read and Stevens (2016) to map the road transport system in Queensland, Australia; and the Actor Map representation tool from Svedung and Rasmussen's (2002) Accimap approach to accident analysis was used by McIlroy et al. (2019) to map the actors involved in the road transport system in five contrasting countries – Bangladesh, China, Kenya, Vietnam and the UK. For this study the STAMP control structure methodology was chosen as it was considered more comprehensive in capturing the interrelationships between actors at different levels of the system.

The study followed the same methodology as Salmon, Read and Stevens (2016) beginning with a desktop search of academic and grey literature to establish a draft diagram which was then shared with subject matter experts to refine the content through a modified two-round Delphi approach (Hasson and Keeney, 2011; Trevelyan and Robinson, 2015).

## Findings/solutions

A comprehensive control structure diagram was compiled including the interrelationships between groups of actors within level two (government agencies, industry associations, user groups, insurance companies, courts, universities) and level three (operational delivery and management) strands.

The first round of the Delphi study was sent to 242 identified individuals across all levels of the diagram. Round two was only sent to participants in round one. The level of agreement of the Delphi respondents is shown in Table 1, below. Overall, 94.4% of respondents agreed or strongly agreed that the diagram identified all the relevant actors and stakeholders, control mechanisms and feedback mechanisms. This was above the 80% threshold used by Salmon, Read and Stevens (2016) to represent consensus.

Table 1: Participant responses to Delphi questionnaires

| **Question** | **Delphi round one (n=30)** | | | | | **Delphi round two (n=18)** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **% Strongly agree** | **% Agree** | **% Neither agree / disagree** | **% Disagree** | **% Strongly Disagree** | **% Strongly agree** | **% Agree** | **% Neither agree / disagree** | **% Disagree** | **% Strongly Disagree** |
| Diagram identifies all relevant levels and actors/stakeholders? | 32.1 | 64.3 | 0.0 | 3.6 | 0.0 | 33.3 | 61.1 | 5.6 | 0.0 | 0.0 |
| Diagram identifies all relevant key actors/stakeholders? | 23.3 | 53.3 | 6.7 | 16.7 | 0.0 | 27.8 | 61.1 | 5.6 | 5.6 | 0.0 |
| Diagram identifies all relevant control mechanisms? | 32.1 | 39.3 | 28.6 | 0.0 | 0.0 | 11.1 | 83.3 | 5.6 | 0.0 | 0.0 |
| Diagram identifies all relevant feedback mechanisms? | 29.6 | 44.4 | 18.5 | 7.4 | 0.0 | 11.1 | 83.3 | 0.0 | 0.0 | 5.6 |
| Overall, diagram identifies all relevant actors/stakeholders, control mechanisms and feedback mechanisms? | 23.3 | 63.3 | 13.3 | 0.0 | 0.0 | 27.8 | 66.7 | 5.6 | 0.0 | 0.0 |

## Impact

This study demonstrates the validity of using the STAMP control structure analysis approach to map the road transport system to a municipal level in the UK as well as in Australia with 94.4% of respondents agreeing or strongly agreeing that the diagram identified all the relevant actors/stakeholders, control and feedback mechanisms relating to road safety in Cambridgeshire, UK. Further research will explore the key feedback and control mechanisms in implementing evidence-based practice at a municipal level in the UK.

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