

Abstract

In 1997 the Swedish Parliament adopted the Vision Zero road safety policy, which since 2009 is included in a consideration goal (road safety, environment, health) as one of two goals under an overall transport goal. The target of achieving Vision Zero is not specified for different authorities. Investments in infrastructure are a common way of designing a safe system. Plans for regional transport infrastructure are therefore tools to achieve the national target.

The aim of the study is to analyse how Vision Zero has been applied by regional authorities as a term, a goal or a clarification in justifying measures in county plans for regional transport infrastructure in the period 2014–2025 in Sweden. Ten of twenty-one plans were included in the analysis as they selected costs for road safety measures for both state and municipal roads. The plans were analysed using directed and summative content analysis.

The consideration goal is rarely in evidence. Measures are most often justified by accessibility and public transport, walking and cycling, as clarifications of the functional goal (accessibility). It is likely that the imbalance between the functional goal and the consideration goal reflects a lack of governance by the Vision Zero road safety policy. Fulfilling a national road safety target requires well-adapted sub-targets for the organizations concerned.

Introduction

In 1997 the Swedish Parliament adopted an innovative road safety policy called Vision Zero. The policy states that no one should be killed or seriously injured as a consequence of accidents in road traffic and that the design and function of the road transport system should be adapted to meet this ambition (Belin, 2012; Swedish Government, 1997). Vision Zero is based on the public health perspective that prevention of accidents should be a public rather than an individual concern, since mistakes by single road users are often caused by shortcomings in road transport (Baum, 2016; Tingvall & Haworth, 1999; Swedish Road Administration, 1996). The Swedish Vision Zero policy has influenced the WHO's strategy (World Health Organization, 2018) and the EU's objectives (European Commission, 2011). Vision Zero has thus become a well-

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Keywords:
Vision Zero,
Policy,
Management by objectives,
Road safety,
Road injury,
Plan

Scandinavian Journal of
Public Administration
24(1): 3-24
© Astrid Värnild, Anna
Johansson, Per Tillgren and
School of Public
Administration, 2020
ISSN: 2001-7405
e-ISSN: 2001-7413

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known symbol for achieving road safety through systematic redesign of the road transport system (Weible, 2014).

The aim of the study is to analyse the application of the Swedish Vision Zero road safety policy in County Plans for Regional Transport Infrastructure in the period 2014–2025, and to study potential differences in orientation between different types of regional planning authorities.

The following research questions are addressed:

1. How have Vision Zero and road safety been used as terms in the plans?
2. How has road safety been applied as the justification for measures in the plans?

Vision Zero policy and the Swedish Transport goals

The Vision Zero policy was originally a sub-goal under the overall Swedish transport goal: ‘to ensure the economic efficiency and long-term sustainability of transport provision for citizens and businesses throughout Sweden’ (Swedish Government, 1998:16). Prior to 1998, the overall transport goal included the term ‘safe’ (Swedish Government, 1988:21), however, this term was not included after 1998, as it was felt that the long-term sustainability of transport provision would demand high levels of safety to maintain quality and efficiency. The purpose of the overall transport goal is to achieve the other objectives for Swedish society with the ultimate aim of maintaining and developing welfare, which can also be linked to a cost-benefit analysis for measures relating to roads in national and regional plan processes (Andersson et al., 2018; Jacobsson & Mujkic, 2016; Thoresson, 2011; Swedish Government, 1998). The Government also stated in 1998 that the six sub-goals should be seen as clarifications of the overall transport goal and that the sub-goals should not be arranged in any particular ‘hierarchy’ (Swedish Government, 1998:18).

In 2009 the Swedish government concluded that the goal-structure had not adequately met the conditions of management by objectives and the six sub-goals were replaced within the overall transport goal with two new goals: a ‘functional’ and a ‘consideration’ goal (as illustrated in Tables 1 and 2) (Swedish Government, 2009:16, 30). The functional goal manages accessibility from a user perspective, while the consideration goal takes a societal perspective in relation to road safety, environment and health. The purpose of the new goals was to improve management and facilitate application of the transport goals. According to the government, the two new goals should have equivalent status, with both contributing to realisation of the overall transport goal (Swedish Government, 2009). The formulation of the consideration goal includes Vision Zero, together with statements about the environment and public health:

‘the design, function and utilization of the transport system are to be adapted in such a way that no one is killed or seriously injured in traffic. The transport system is also to be designed in such a way as to help achieve the overarching generational goal for the environment and the environmental quality objectives, and to contribute to improved health’. (Swedish Government, 2012a:10)

The orientation of the functional and consideration goals has been described in ten clarifications. The clarifications (highlighted as Clarification nos. 1–10 in Tables 1 and 2) are also justifications for measures in the subsequent regional planning process for road transport infrastructure.

The functional goal includes seven clarifications (nos.1–7) that are all linked to accessibility in different ways. The Vision Zero policy is indirectly connected to the functional goal by the demand that accessibility increases in relation to, for example, disabilities (no. 5), children (no. 6) and public transport, walking, cycling (no. 7) (Table 1).

*Table 1. Government clarifications of the functional goal.
(Keywords highlighted in **bold**)*

FUNCTIONAL GOAL – accessibility	
Clarification no. 1-7	
No. 1: Travel	Citizens' travel is enhanced through increased reliability, safety, and convenience.
No. 2: Commercial travel and shipping	The quality of commercial travel and shipping is improved, strengthening international competitiveness.
No. 3: Accessibility	Accessibility is improved within and between regions, and between Sweden and other countries.
No. 4: Egalitarian society	The development, implementation and results of transport policy contribute to an egalitarian society .
No. 5: Disabilities	The transport system is adapted to be accessible for persons with disabilities .
No. 6: Children	Children's opportunities to safely use the transport system and be in traffic environments.
No. 7: Public transport, walking and biking	The options of public transport, walking and cycling are made more attractive.

The consideration goal has three clarifications (nos. 8–10): road safety (no. 8), environment (no. 9), and public health (no. 10) (Table 2). The clarification of road safety (no. 8) is the only clarification connected to a formal short-term target for Vision Zero, i.e. Target 2020.

*Table 2. Government clarifications of the consideration goal.
(Keywords highlighted in **bold**)*

CONSIDERATION GOAL – road safety, environment and health	
Clarification no. 8-10	
No. 8: Road safety	Road safety: The number of traffic-related deaths is halved, and the number of serious injuries is reduced by a quarter between 2007 and 2020.
No. 9: Environment	The transport sector contributes to achieving the quality goal for the environment . Reduced Environmental Impact by successively increasing the energy efficiency of the transport system and breaking the dependence on fossil fuels. By 2030 Sweden's vehicle fleet should be independent of fossil fuels.
No. 10: Public health	The transport sector contributes to achieving the overarching generational goal for the environment and the remaining environmental quality goals, as well as to improving public health . Priority is given to those environmental policy goals for which development of the transport system is of great importance to their realization.

Although in 2017 Sweden had the best road safety in the EU (measured in the number of fatalities per million inhabitants) (European Commission, 2018), it

seems uncertain according to recent statistics whether Sweden will be able to achieve the 2020 targets (Swedish Transport Administration, 2019).

Regional planning for Regional Transport Infrastructure

The regional planning of transport infrastructure is a way for regional authorities to coordinate the efforts of different sectors and actors, and to find strategies for sustainable growth and development in line with the overall transport goal. Thus, the regional planning is a way to implement the Vision Zero policy and contribute to fulfilling Target 2020 (Swedish Government, 2012b; Hertting & Vedung, 2009). The Swedish government manages the regional planning process by means of goals, directives, statutory regulations and financial control (Swedish Government, 2012b). Furthermore, state agencies perform cost-benefit analyses of possible measures to facilitate regional decisions regarding transport infrastructure investments (Andersson et al., 2018; Thoresson, 2011).

Policy implementation through management by objectives

Quantitative targets for road safety, with or without performance indicators, are commonly used in highly-motorized countries (Wegman et al., 2015). When the Vision Zero road safety policy was adopted, management by objectives and results (MBOR) was at its peak. Since then MBOR has been reduced in Swedish public administration, but it is still important (Jacobsson, 2015; Kristiansen, 2015). MBOR will function differently in different contexts, and both the national and organizational contexts are important for implementing MBOR (Kristiansen, 2016; Kristiansen, 2015). To conduct management by objectives, the target needs to be in the correct position in the goal/target hierarchy and be adapted to or formed by affected organizations. If it is not, management by objectives will not work (Rombach, 1991). The Swedish target for 2020 was calculated by the Swedish Road Administration and adopted by the Parliament (Swedish Road Administration, 2008), but there are also examples from other countries where a calculated target is the result of a dialogue with decision makers on regional and local level together with other stakeholders (Wegman et al., 2015).

The Swedish Government underlines that ‘the basis for management by objectives is to have measurable targets, to perform measurement and to analyse the results’ (Swedish Government, 2009:7). This form of management requires performance information and/or measurable indicators to determine goal fulfilment for policy implementation success (Swedish Government, 2009; Rombach, 1991). Twelve national indicators are used in annual follow-ups of Target 2020 for road safety (Swedish Transport Administration, 2018).

Transferring implementation of a policy from national to regional level, and delegating the authority to twenty-one counties means that new politicians and officials in different organizations will manage the policy in new contexts. The implementation of Vision Zero measures may be a way of achieving a sector goal or a facet of the transport goals. Treating road safety as a facet of the transport goals is better adapted to a fragmented decentralized network where even other policy interests than transport goals will be managed (Bax et al., 2010). The change in the Swedish goal structure in 2009 involved a shift from a relatively clear sector goal for road safety to viewing road safety as a facet of the

transport goals. Even if the goal structure for the transport goals has changed, the method of governing Swedish road safety efforts remains the same as it was in 1998.

Management by objectives is a top-down steered activity based on the presumption that the implementation of a policy/goal/target can be arranged hierarchically and adapted to the organization's mission in a vertical context (Bax et al., 2010; Hertting & Vedung, 2009, Rombach, 1991). The principal party's or the government's responsibility is to allocate resources to achieve the goal, while leaving the actors free to choose specific measures (Bax et al., 2010; Hertting & Vedung, 2009; Rombach, 1991). Management by objectives encounters horizontal networks on the regional level which can use their own resources to amplify the government's efforts to achieve transport goals as well as Target 2020. On a regional level, public and private actors are brought together, and if the governance is too strict, network actors will become passive and less willing to participate in problem solving (Sørensen & Tofting, 2009). The decentralization of responsibility may however also offer new opportunities for implementation of measures (Bax et al., 2010) thereby increasing the possibility to achieve Vision Zero's Target 2020.

Material and method

A strategic sampling (Kvale & Brinkman, 2014; Flyvbjerg, 2006) of County Plans for Regional Transport Infrastructure (CPRT) concerning the period 2014–2025 (n = 10) has been deductively analysed with the use of content analysis (Hsieh and Shannon, 2005) (Table 3).

The plans and the planning process

The CPRTs are developed and adopted every four years. The planning process begins when directives and financial frameworks are issued by the government to the Swedish Transport Administration and the counties. For the period 2014–2025, the financial framework allocated 34.9 billion SEK (USD/SEK 6.70, 2012), or 12.4 per cent of the total sum for state transport investments, to the counties to use in their CPRTs (Swedish Government, 2012a).

The government orders the counties to draw up preliminary CPRTs. During the planning process the counties interact with the Swedish Transport Administration concerning the implementation of measures. It is possible to use the financial frameworks to fund measures together with other entities such as municipalities, county councils or private financing sources. The financial frameworks can also be used for measures in national infrastructure or for measures in other counties. The authorities responsible for the regional planning processes are also responsible for regional growth (Swedish Government, 2012b) and there are several regional programmes in the counties that must be taken into consideration in the work with CPRTs.

The CPRTs should include specified measures for state roads and motivated sums for unspecified small measures on state and/or municipal roads. The draft CPRTs are sent for public review to municipalities in the county, regional and national authorities, and other stakeholders. After this review, the plans are sent to the government together with a report on opinions submitted during the

review process. The government then examines the reviewed CPRTs and reported opinions, and on that basis determines the final financial framework for each county (Swedish Government, 2012b). The plans analysed in this article were adopted in May/June 2014 without modification by the government (Swedish Government, 2014).

The investigated plans

The selection of the CPRTs analysed in this article began with an examination of all the plans concerning the period 2014–2025 (N = 21) by the author (A.V.) to determine whether they had allocated sums for road safety measures for both state and municipal roads; if they had done so, they were included in the analysis (n = 10). The reason behind this strategic sample was that by allocating sums to both types of roads, these counties had indicated more interest in road safety than the other counties since the financial frames were primarily intended for measures on the state road network. According to Flyvbjerg (2006) extreme/deviant plans were chosen for the study (Kvale & Brinkman, 2014).

The plans concern transboundary infrastructure, but mainly apply to different types of road infrastructure. The study of the ten plans covers text passages containing justifications for measures connected to a manifest or latent intention to solve a transportation problem by some form of new road infrastructure. Altogether the analysed plans comprise 708 pages (varying between 37 and 103 pages) and 637 selected text passages. The ten plans in the article are referred to as Plans 1–10.

The responsibility for planning regional transport infrastructure in Sweden was originally delegated to state county administration boards (N = 21), but in 2014 there are three different types of regional authorities across the country that answer for the development and adoption of a CPRT (Swedish Government, 2012b). The ten plans were adopted by a state county administration board (n = 2, Plans 1–2), a county council (n = 3, Plans 3–5) and a federation of municipalities (n = 5, Plans 6–10). The populations in the ten counties included in the analysis vary between 60,000 and 2,300,000 inhabitants, and together comprise 57% of Sweden's population. The proportion of population living in urban areas ranges from 62% to 97% (Statistics Sweden, 2017) and the plans include geographic distributions based on the division of the country into southern, central and northern Sweden.

Data analysis of the plans

Initially a feasibility study was made by the first author (A.V.) to determine the suitable content analysis methodology and the steps in the process. Steps 1–4 were defined before the start of the analysis (Table 3a–b) while step 5 was developed during the feasibility study. Initially the length of the text passages were maximized to one section per justification.

Table 3a. An example of the process in step 1-4.

Step 1 Justification for measures	Step 2 Keyword	Step 3 Clarifications	Step 4 Goal/goals
There is also increased demand for improved bicycle infrastructure as more and more people choose to commute by cycling long distances or cycle as part of the journey. A dense urban environment with attractive street spaces creates the conditions for good accessibility by walking and cycling traffic. From a holistic perspective, it is also important to have safe and secure walking environments	commute, accessibility, walking and bicycle traffic, secure walking	accessibility, public transport, walking and cycling, road safety	functional, consideration

The feasibility study was done on three of the ten plans (CPRT). Each of the three plans was developed and adopted by one of the three types of regional authorities, in order to bring to light potential methodological differences in justifications for measures, but such differences could not be found. The results of the feasibility study were validated by the other authors (A. J. and P. T.) and minor adjustments were made in the process-steps (Steps 1–5, Table 3a-b).

Table 3b. Process for the content analysis of the County Plans for Regional Transport Infrastructure (CPRT).

Content analysis of the strategic sampling of the CPRTs				
All plans concerning the years 2014–2025 (N = 21) were initially scrutinized and ten plans (Plans 1–10) that had allocated sums for road safety measures for both state and municipal roads were selected for analysis. Steps 1–4 address research question 2, and Step 5 research question 1				
Step 1 Manifest	Step 2 Manifest	Step 3 Manifest/ Latent	Step 4 Manifest/Latent	Step 5 Manifest
Identify text passages (no more than one section per justification) that could be linked to justifications for measures: (1) general needs for road measures, (2) specified measures on state roads, (3) sums for unspecified small measures on state or municipal roads	Selection of key-words in the selected text passages	Selected text passages and keywords were manifest or latent sorted to a coding-scheme (bold text in Tables 1 and 2) for clarifications used as justifications for measures in the relevant passage	Deduction of applied clarifications in relation to the functional (nos. 1–7) and consideration goals (nos. 8–10) – a manifest or latent process as a result of Step 3	Word-searches: Vision Zero, road safety, safety/safe and accident Examination of the presence of regional statistics (about persons killed and seriously injured) linked or not to an analysis References to regional programmes – how many and what kind

The final content analysis of the CPRTs comprised five steps (Steps 1-5, Table 3b). All steps in the analysis were repeatedly discussed and validated in the author group. In steps 1–4 a directed content analysis (Hsieh & Shannon, 2005) was made of the CPRTs' contents to analyse how the road safety policy has been employed as goal and as a justification for measures in the plans; see, for example, research question no. 2 (Steps 1–4, Table 3a-b). In step 5, a summative content analysis (Hsieh & Shannon, 2005) was performed on the CPRTs' contents to analyse how Vision Zero and road safety have been used as terms in the plans; see, for example, research question no. 1 (Step 5, Table 3b).

Firstly, each of the selected CPRTs was read through to identify passages of text that could be linked to justifications for measures in relation to the overall transport goal and its two linked goal types (functional and consideration) together with their associated clarifications (nos. 1–10 in Tables 1 and 2). In accordance with government directives for the plan process (Swedish Government, 2012b), measures need to be justified by the transport goals, and identified text passages with justifications for measures were sorted into three groups: (1) general needs for road measures, (2) specified measures on state roads, and (3) sums for unspecified small measures on state and municipal roads (Swedish Government, 2012b). Content unrelated to any of the three groups of measures was excluded from further analysis. The ten clarifications of the functional and consideration goals (nos. 1–10, Tables 1 and 2) were used to guide the analysis of the plans as a coding-scheme. When all plans were analysed, each plan was re-read to check that all justifications for measures had been identified. All identified justifications for measures (quotes from the plans) were then copied into a computer program (Microsoft Excel) (Step 1, Table 3a-b) and used for managing and coding data (Steps 2 - 4, Tables 3a-b – step 5).

Secondly, the selected text passages (quotes from the plans) were concentrated to manifest keywords. To ensure a uniform extent of chosen text passages and keywords the selection in the three plans in the feasibility study were compared (Step 2, Table 3a-b).

Thirdly, the selected passages and keywords were related to a coding scheme. The coding scheme was based on, and labelled in line with, the central contents in the ten clarifications (marked with bold text in Tables 1 and 2). The scheme was used to investigate the presence of manifest or latent content related to the clarifications as a justification for measures (nos. 1–10) (Step 3, Table 3a-b).

Fourthly, the distribution of the labelled codes (i.e. clarification nos. 1–10) across the functional and/or consideration goals was examined to investigate the application of the two goals in the plans.

Fifthly, a summative content analysis (Hsieh & Shannon, 2005) was performed on the plans' contents, which included a quantitative analysis by word-searches (of the use of Vision Zero, road safety, safety/safe and accident). Examinations of the presence of regional statistics (about numbers of persons killed and seriously injured) and references to regional programmes (how many and what kind) (Step 5, Table 3b) and the result was then interpreted using manifest content analysis (Hsieh & Shannon, 2005).

The analysis process ended with a re-analysis of all investigated plans to ensure quality in all five analysis steps (Steps 1–5, Table 3b).

Results

In this section the results from the analysis of the County Plans' contents are presented based on the two research questions of the study.

How have Vision Zero and road safety been used as terms in the plans?

The word-searches of the plans reveal that the term Vision Zero is only mentioned a few times in five of ten plans representing all three types of regional authorities. When used, the term is mostly linked to formulations of the goal/target, but sometimes also to highlight the link between the policy and speed revision.

'In 2004 the government tasked the Road Administration with drawing up a strategy to successively adapt speed limits as part of Vision Zero. ... Part of the review involved finding a balance between the demands for road safety and the environment and accessibility, to promote positive regional development. Speed limits along 18,000 km of roads were reduced from 90 to 80 km/h, including in Blekinge.' (Plan 8, p. 21)

Another county is asking for other efforts than infrastructure development in order to limit single accidents in the work with Vision Zero.

'Major causes of accidents are excessive speed, alcohol, or not having used a seat belt. A long-term effort to realize Vision Zero therefore requires comprehensive work in the community, including among other things education, alcohol prevention, and changing regulations... Measures that fall within the scope of infrastructure planning have little overall effect on the incidence of accidents in this area.' (Plan 4, p. 40)

According to the Government's wish, one county has developed Vision Zero regionally by adopting a road safety policy for public transport and also articulating a way of increasing safety by separating cars from heavy traffic in the county.

'Safe traffic – few deaths and injuries in traffic: The transport system is designed to meet high standards for road safety. No one should be killed or seriously injured when travelling by public transport or on the way to or from public transport. High road safety and traffic flow [can be achieved] by separating heavy traffic and car traffic.' (Plan 10, p. 25)

The plans frequently use the term 'road safety' or, in abbreviated form, just 'safety/safe'. The word 'accident' is used infrequently compared with both 'road safety' and 'safety/safe', which means that there are road safety justifications in the plans, but these justifications are rarely explicitly linked to accidents.

Regional statistics are hardly included by the counties at all. Only three out of ten county plans report number of persons killed in the county and only one plan presents statistics on seriously injured persons. There is one regional follow-up of Target 2020 related to statistics for the county.

‘If you look at police reports for the number of fatalities and serious injuries in traffic accidents in Gotland, you’ll see that the Vision Zero target leading up to year 2020 has not been achieved. To achieve the target, the average number of traffic fatalities cannot exceed 1.6 per year and the number of serious injuries cannot exceed 24.3 people per year.’ (Plan 3, p. 24)

All plans refer to programmes for regional growth, and almost all to programmes on supply of public transport (n = 8) and system analysis for transport infrastructure shared with neighbouring counties (n = 7). The county councils refer in general to four or five regional programmes, the federations of municipalities to between two and five programmes and the county administration boards to three or four programmes.

Of the three types of regional authorities, two of three county councils investigated have allocated the greatest proportion of funds in their financial frameworks to small-scale road safety measures.

How has road safety been applied as justification for measures in the plans?

The number of justifications for different needs of measures in the plans varies a lot between the investigated plans, not only in terms of number of pages, but also number of clarifications used. A further difference concerns the relative emphasis on general justifications for measures as opposed to justifications for specified measures, which is also connected to the size of the counties’ financial frameworks. A more generous financial framework allows for more measures, and accordingly more justifications for measures. Every justification for measures is linked to on average to two or three clarifications (Table 4), often from both the functional (nos. 1–7) and the consideration goals (nos. 8–10).

Table 4. Number of justifications for measures and clarifications in functional and/or sustainability goals.

	Functional goal		Consideration goal		Func. + Con. goals	
	Number of justifications	Number of clarifications	Number of justifications	Number of clarifications (road safety)	Number of justifications	Number of clarifications (road safety)
Plan 1	41	76	5	6 (4)	33	96 (22)
Plan 2	28	50	1	1 (1)	20	72 (18)
Plan 3	18	40	2	2 (2)	45	155 (33)
Plan 4	46	89	6	6 (5)	48	135 (37)
Plan 5	17	30	2	3 (1)	15	54 (11)
Plan 6	31	57	0	0 (0)	26	94 (17)
Plan 7	22	42	2	2 (2)	23	66 (17)
Plan 8	46	84	0	0 (0)	21	63 (11)
Plan 9	35	61	2	2 (1)	26	87 (14)
Plan 10	54	107	1	1 (0)	21	60 (17)
All pl.	338	636	21	23 (16)	278	882 (197)

As for number of clarifications, there are more clarifications in justifications for measures when the two goals are combined, but if only looking at number of goals used, the functional goal is somewhat more frequent than the combination of functional and consideration goal and a sole consideration goal is rarely used (Tables 1, 2 and 5); when it is used, the purpose is mostly for road safety (no. 8), a few times for environment (no. 9) and not at all for public health (no. 10).

Table 5. Number of clarifications related to type of clarification and goals.

Type of clarification No. 1-10:	Functional goal	Consideration goal	Func. + Con. Goals
	Number of clarifications	Number of clarifications	Number of clarifications
Travel (1)	96	0	62
Commercial travel and shipping (2)	139	0	64
Accessibility (3)	233	0	220
Egalitarian society (4)	11	0	7
Disabilities (5)	10	0	7
Children (6)	8	0	23
Public transport, walking and biking (7)	139	0	144
Road safety (8)	0	16	197
Environment (9)	0	7	138
Public health (10)	0	0	20

Road safety (no. 8) is almost never used as the sole justification for measures, and when it is, it is either as a general need for road safety measures or to justify the use of a sum of money for this purpose.

‘These funds are earmarked for traffic-safety measures such as city thoroughfares, junction improvements and roadside fencing, or even trimming. Each year measures are given priority through dialogue with municipalities, the Road Administration, and the Public Transport Authority. At present we have no comprehensive picture of what are the greatest traffic-safety deficiencies in the county today. Therefore our priority is to increase our knowledge of deficiencies and problems through dialogues with the municipalities and others. (Plan 9, p. 49)

Public health is only used in statements that combine the functional and the consideration goals, but in this quote there is also a combination of public health (no. 10) and environment (no. 9). The consideration goal is combined with the functional goal in almost half of all justifications identified in the plans.

‘As a way of transportation, cycles have become increasingly popular in recent years, and nowadays there is agreement among officials and stakeholders in the county that trips by cycle should increase [no. 7]. A regional cycling plan has recently be released that indicates routes for home-work commuting by cycle, and several municipalities have drawn up municipal cycling plans. The question of recreational and tourist cycling has also been raised in several places. Increased

cycling has the potential to greatly contribute to a sustainable transport system, with almost exclusively positive effects in the form of reduced congestion, better environment [no. 9] and improved public health [no. 10].’ (Plan 1, p. 31)

The sole functional goal (nos. 1–7) prioritizes accessibility (no. 3) public transport, and walking and cycling (no. 7), together with commercial travel and shipping (no. 2). In this quote it also appears together with an egalitarian society (no. 4) (Table 1), which is sparsely used.

‘By making it easier for both men and women [no. 4] in different stages of life and with differing needs to travel to, from and within the central parts of the region, we strengthen the prerequisites for a dynamic, flexible, sustainable and growing business community [no. 2]. Good and efficient transport possibilities [no. 3], not least when it comes to public transport [no. 7], are essential to link the different cities and towns in the region and develop Östergötland into an urban region with multiple centres.’ (Plan 7, p. 21)

This quote also illustrates the fact that the most frequently used clarification (nos. 1–10) in the plans is accessibility (no. 3) ($n = 10$) and the second most used clarification is public transports, walking and cycling (no. 7) ($n = 4$). Alone or together these two clarifications (nos. 3 and 7) account for half of all clarifications identified in the study. Road safety (no. 8) accounts for somewhat more than a tenth of all clarifications identified in the plans, and in two plans is the second most common clarification.

Of the three defined groups (1) general needs for road measures, (2) specified measures on state roads and (3) sums for unspecified small measures on state or municipal roads, the greatest number of justifications are used for number (1). As a general justification, road safety (no. 8) occurs less frequently in the plans than statements about the need for specific measures.

General needs for road measures

The general needs for measures are mostly linked to the relevant county in a general sense and for different types of road users. Five clarifications (nos. 3–6 and 10) together with the consideration goal are justifications for general measures for all people living in and visiting the county.

‘The transport system should contribute to a basic level of accessibility [no. 3] and be equal [no. 4] for everyone, in order to meet men’s and women’s transport needs equally. It should be designed to be useable by persons with disabilities [no. 5] and to increase the possibility for children [no. 6] to safely utilize the traffic system on their own and to be in traffic environments. It should also be adapted so that no one is killed or seriously injured (consideration goal) and contribute to improved health [no. 10]. In this way, the transport system should facilitate accessibility [no. 3] and be possible to use for individuals regardless of age, sex and disability [no. 5].’ (Plan 3, p. 23)

But there are also general needs for addressing stakeholders’ interests, which typically are in line with the functional goal but also can have implications for the consideration goal (nos. 8 and 9).

‘For the business community, reliable, efficient and sustainable transports to our most important export markets are key to being competitive. As a border region, Skåne hosts several important freight routes along which a large amount of Swedish companies’ transports pass. The freight traffic through Skåne causes major environmental impacts [no. 9] and traffic accidents [no. 8]’. (Plan 4, p. 30)

General needs for different areas are also presented, which include safe areas for pedestrians.

‘A densely built urban area with attractive street spaces creates the prerequisites for good accessibility for pedestrian and bicycle traffic. From a whole-journey perspective, it is also important to have safe and secure pedestrian environments.’ (Plan 1, p. 20)

But also justifications for measures in general related to state roads are presented.

‘It is important to reduce actual speeds, for example with speed cameras, and to improve safety with separated opposing lanes and grade-separated junctions, instead of reducing speed limits across the board.’ (Plan 10, p. 34)

Specific needs for measures on state roads

The specific needs for measures on state roads in the counties are frequently linked to road safety (no. 8). Many justifications for specified measures combine road safety (no. 8) with accessibility (no. 3). The justifications for specific measures on state roads are mostly linked to planned measures in rural areas. The justifications are concrete and linked to statements about the problems that exists on a specific road and what measures are needed.

‘The existing Route 19 from Bjärlöv to Broby is narrow in relation to its traffic volume, which gives poor traffic flow [no. 3] and low road safety [no. 8]. The road passes through Hanaskog, Bössebacken and Knislinge, causing significant noise and barrier effects. The current road is 7–13 m wide, the speed limit varies between 70 and 90 km/h... Proposed improvements are to convert it to have separated opposing lanes (2+1) [no. 8] with a standard speed limit of 100 km/h (no. 3) and to adapt it for articulated-bus traffic. The road is part of the regionally important road network for car, lorry and bus traffic.’ (Plan 4, p. 71)

But a specified measure may also be just to achieve road safety in a junction.

‘The proposed measure consists of junction improvements in the form of a roundabout, pedestrian and bicycle underpasses for unprotected road users, and environmental improvements... The proposed measure will yield a more even traffic rhythm and have beneficial effects on road safety.’ (Plan 6, p. 19)

Justifications for sums of money

Justifications for sums of money for road safety differ in scope and specification between investments in state infrastructure and justifications for grants to

municipalities. A sum of money for unspecified measures on a state road is influenced by public transports, cycling and walking.

‘Measures falling under the heading of increased and safe cycling concern improvements along the regional road network. Examples of improvements are expansion of cycle parking lots at public transport transfer points, extension of pedestrian and cycle paths to give children safe routes to and from school, extension of cycle paths along stretches of road with separated opposing lanes, route guidance that agrees with route guidance on the municipal cycle path network, etc. The heading can also be used for joint planning of cycling measures in connection with the construction of roadways with separated opposing lanes along the regional road network.’ (Plan 2, p. 30)

The statements about the need for unspecified *small municipal measures* in the plans are few in number. Some plans just mention that there are opportunities to apply for state grants and give an example of possible justifications for measures.

‘58 million SEK have been set aside for joint state funding of measures to improve the environment and road safety on the municipal road network.’ (Plan 5, p. 30)

Discussion

The discussion will highlight the results linked to the government’s application of management by objectives in the planning process and its possible influence on Target 2020 and public health.

The Swedish transport goals – the government’s management by objectives of road safety in the regional plans

Despite the counties’ low prioritization of road safety as a justification for measures, the terms ‘road safety’ and ‘safety’ are frequently used in the plans, which can be seen as reflecting a general awareness of road safety’s importance for road transports in the counties, but also that, for various reasons, road safety aspects are difficult to make explicit in the planning process. In their planning work, counties shall take into account the government’s management through transport goals, including the target/clarification for road safety, at the same time as several of the government’s other clarifications of the transport goals have indirect effects on road safety. The road safety target is expressed quantitatively in terms of maximum number of persons killed and seriously injured in Swedish road traffic in 2020, which the counties must weigh against the other nine clarifications, which are formulated in qualitative terms and lack links to any sub-targets. Management by objectives presupposes well-adapted goals that have won broad acceptance (Hertting & Vedung, 2009; Rombach, 1991), but the planning directives for counties only contain the national Target 2020 for road safety, which refers to the overall national road safety effort. The government’s decision to express more clarifications for the functional goal than for the consideration goal is likely to affect the proportion of cited clarifications in the

plans, and thereby also the low prioritization of road safety as a justification for measures.

The results of the study show that the counties prioritize accessibility and public transport, walking and cycling as justifications for measures, while road safety is only mentioned to a limited extent, despite the target set for road safety in 2020. Road safety seldom occurs as a sole justification or together with the clarification for the environment in the consideration goal, and public health does not occur at all on its own; when used, the latter is always associated with the functional goal's clarifications about (mostly) public transport, walking and cycling. The difficulty that the counties face when having to weigh clarifications against each other may have contributed to relatively many measures being justified by multiple clarifications from both the functional and consideration goals, even if most measures are justified solely by the functional goal. The 2009 change of six sub-goals to functional or consideration goals was justified by the government with the argument that the management and implementation of the goals is facilitated by having fewer goals with simplified formulations and fewer clarifications (Swedish Government, 2009). The government's management of the transport goals and the initial road safety goal/target can hardly have been strengthened by the change, but the change has increased the range of possible justifications for counties to choose for measures.

Effective management of the road safety goal/target presupposes a goal located within a hierarchical structure of goals, with an overall goal out of which sub-goals can be lifted at different levels in a hierarchical organization (Hertting & Vedung, 2009; Rombach, 1991). The current overall transport goal from 1998 no longer contains the earlier term 'safe', which imposed high demands on safety. Since 1998, safety is viewed as a prerequisite for maintaining the quality and efficiency of the transport system in the long term (Swedish Government, 2009). Therefore neither overall goals or sub-goals work for management by objectives of road safety. A quantitative target functions only on the condition that it is assembled from below by summing up the commitments of concerned organizations (Wegman et al., 2015; Bax et al., 2010; Hertting & Vedung, 2009; Rombach, 1991).

Most of the plans lack analyses of the road safety situation in the relevant county, which in one plan is explained by a need to gather more knowledge about the need for road safety measures through, among other things, dialogue with the municipalities in the county. The counties' justifications for an increased need for road safety are hence not based on a comprehensive analysis of the road safety situation in the county, but instead are primarily connected to argumentation for a particular measure in a specified location, road safety being one of several justifications. The government's planning directive lacks adapted, quantitative road safety targets, and even lacks a definition of 'serious injury' based on existing statistics. This would make it possible regionally and locally, to follow up implemented road safety initiatives, but can also affect the level of interest in prioritizing effective safety measures in the plans (Swedish Transport Administration, 2018; Berg et al., 2016; Wegman et al., 2015)

The choice of road safety is also influenced by what options for action that exist for the counties. The different measures that are available to choose between are not specified in all the aspects expressed in the transport goal

clarifications, and relevant socioeconomic calculations only exist for a limited number of measures and aspects (Andersson et al., 2018; Thoresson, 2011). The drawing up of a safe design for new road standards is primarily done on the basis of needed improvements in the national road network (Bergh et al., 2016), and only later is applied to the regional road network. Cost-effective solutions specifically tailored to a safe regional road network are fewer in number, which is likely to also lead to lower prioritization of road safety in the plans (Bax et al., 2014).

The government's overall management of the regional planning process

The results of the study demonstrate that there are conflicts of interests between the functional goal that prioritise accessibility and the goal of consideration, but there are also conflicts within the consideration goal. The consideration goal includes Vision Zero, which will contribute to improved public health by decreased number of fatalities and seriously injured road users in road traffic. This is in conflict with the functional goal but also with the National Public Health Act's objective of contributing to an increased physical activity in the population through, among other things, walking and cycling (Svensson, 2018; Public Health Agency of Sweden, 2018; Belin & Tillgren, 2012; Rombach, 1991). Pedestrians and cyclists are unprotected road users and are more vulnerable than car occupants. A transformation from motoring to more active transport may result in more fatalities and seriously injured pedestrians and cyclists especially in urban areas (Methorst et al., 2016; Värnild et al., 2016).

The study shows that the government's demand that the functional and consideration goals should have equal status is not being met, in the sense that counties' choices of justifications are dominated by the functional goal. The size of the budgetary frameworks for the counties is determined after the government's review of the counties' planning proposals, in which the government evaluates whether the transport policy goals are addressed, and the socioeconomic effectiveness of the chosen measures comprises a part of the government's grounds for setting the budgetary frameworks (Swedish Government, 2012b). Because the counties' preliminary frameworks have been set, it is clear that the government has decided that the plans' target achievement is adequate, despite the fact that the requirement that the goals be of equal status has not been met when it comes to road improvements.

The government's clarifications concerning accessibility and public transport, walking and cycling dominate the counties' justifications for measures. The latter area is especially emphasized in the government directives, stating that increased use of public transport and more walking and cycling are beneficial for individuals, the business community, and society as a whole (Swedish Government, 2012b). The government's emphasis on these measures may have affected the counties' prioritization of these justifications for measures in their plans.

In 2012, when the directives for the planning process were drafted, there were very limited statistics on where cyclists and pedestrians were injured, and in its directives the government does not clarify how responsibility for these types of measures should be divided between the state and the municipalities. In Sweden, the municipalities' road safety work is not part of a hierarchical state

organizational structure linked to a national road safety target (Swedish Government, 2012b; Hertting & Vedung, 2009; Rombach, 1991), while the counties, despite having different types of decision makers, are hierarchically subordinated to the government when it comes to the planning task. This may have affected target achievement for serious injuries, because about half of all seriously injured road users are bicyclists, most of whom are injured in urban settings where the municipalities are responsible for road safety (Swedish Transport Administration, 2018; Methorst et al., 2016; Värnild et al., 2016). Seriously injured pedestrians in single accidents are excluded from the Swedish road safety goal, but they make up over 40% of all seriously injured road users. This is a question that has received attention previously, in connection with follow up assessments of the target (Swedish Transport Administration, 2018; Berg et al., 2016).

The counties' lack of analysis of their local traffic situation may affect how much resources they set aside for state grants and how the grants are justified and clarified for the municipalities. Of the three decision-making bodies within the regional planning process, it is the county councils that allocated the largest amounts for smaller-scale road safety measures. One reason for this prioritization may be that the county councils are responsible for health-care provision in Sweden (Tillgren & Stier, 2016).

In its directives (Swedish Government, 2012b), the government also emphasizes the counties' important role of coordinating initiatives from various sectors and actors at different levels to generate sustainable growth and development. In the regional planning process, in addition to transport goals, the counties have included goals from up to five different programme types such as growth programmes, public transport programmes and various strategic programmes for transport development, which also may affect the counties' prioritization of the transport system's accessibility, as well as of public transport, walking and cycling, as the foremost justifications for the choice of measures in the plans (Svensson, 2018; Belin & Tillgren, 2012). Increased influence of regional and local networks can strengthen the effect of earmarked economic resources from the state, for instance when different regional actors contribute by jointly funding new and safer road infrastructure (Baum, 2016; Sørensen and Tofting, 2009). The results of the study show that collaboration of this kind occurs both within and between counties, and between different public and private actors.

The regional planning process and its effects on road safety and health

In the planning process, the counties primarily prioritize accessibility, along with public transport, walking and cycling. Both of these clarifications of the functional goal stand in a contradictory relationship to road safety in the consideration goal, especially in cases where increased accessibility is achieved by raising speed limits rather than by reducing travel distances. Raising speed limits to reduce travel time leads to more injuries in traffic if the safety of the road environment is not increased enough to compensate the greater speed (Kim et al., 2017; Elvik et al., 2009;). Goals can have side effects and thereby negatively affect other disregarded goals (Rombach, 1991).

The justification of developing infrastructure to increase the proportion of pedestrians and cyclists for reasons of public health (Baum, 2016) also affects the road safety goal. Theoretical calculations have been done for creating a more compact urban environment with a 10% reduction of trips by car, which are replaced by a corresponding increase in walking and cycling. The study shows that this would promote health, but that there also would be a small increase in injuries to cyclists and pedestrians (Stevenson et al., 2016). Calculations of the development in an existing city for the period 2013–2026 show similar results (Zapata-Diomedes et al., 2017). In Sweden during the years 2006–2016 the amount of active transport in the form of walking or cycling at least 30 minutes per day decreased among the adult population (18–84 years) from 22% to 16%, while the proportion of children (6–17 years) who use active forms of transport for at least 60 minutes is less than 4% (Swedish government agency for transport policy analysis, 2018). An increase in active transport primarily involves increased walking and cycling in urban environments, where the municipalities are responsible for road safety and where the number of seriously injured cyclists and pedestrians is higher than in rural environments (Swedish Transport Administration, 2018; Methorst et al., 2016; Värnild et al., 2016). Like the counties, the municipalities lack adapted road safety goals. The state grants in the regional plans to support development of safe infrastructure are limited in scope. Achieving a transition from passive to more active forms of transport requires safer infrastructure, if Vision Zero and its targets are to be achieved.

Methodological considerations and potential limitations

The content analysis (Hsieh & Shannon, 2005) was performed on a strategic sample of CPRTs ($n = 10$) linked to the criterion of being extreme/deviant plans (plans allocating sums for road safety measures for both state and municipal roads) (Kvale & Brinkman, 2014; Flyvbjerg, 2006). Obviously, the findings in this study might be considered as biased towards counties that tend to prioritize road safety. However, if each investigated plan is regarded as a separate case (Kvale & Brinkman, 2014; Flyvbjerg, 2006) the identified general low presence of road-safety related issues can be interpreted as indicating that road safety per se is not a priority issue for the counties. The counties' priorities are accessibility, public transport, walking and cycling. Because it is assumed that the excluded plans probably contain even less road-safety related content than the strategic sample of plans, the authors believe that theoretical generalizations can be made from the findings in this study (Kvale & Brinkman, 2014; Flyvbjerg, 2006).

Several measures have been taken to ensure good scientific quality and a valid analytic process in every step in this study. A feasibility study was conducted and evaluated by the group of authors to ensure that the analysis was conducted in a consistent manner. The use of quotations from the plans is also considered to strengthen the results and to give a truthful and fair view of the plans' contents and direction. Nevertheless, due to the nature of the investigated data there is always the possibility that some passages have been misrepresented or overlooked. However, the use of software has provided an easily accessible overview of the emerging results and continuously facilitated the peer reviews within the group of authors. Furthermore, the final re-analysis of all selected

plans has further ensured that results correspond to the plans' contents and provide an empirically supported conclusion overall.

Future research

The method used in this study can be applied to a new generation of CPRTs (every four years there is a new planning process) to compare the influence of road safety in different planning processes, or it can be adapted to study the planning process at the national level. The analytical method has been used to analyse the reality that politicians and public servants have to deal with when weighing a diversity of goals in relation to clarifications from a goal-deciding organization (Svensson, 2018; Belin & Tillgren, 2012). The method ought also to be applicable within other societal domains than the transport sector.

It is also of interest to gain in-depth knowledge about different stakeholders' interest in road safety priorities compared with other aspects of the Swedish transport goals through interviews. Interviews with national, regional and local policy makers involved in design of CPRTs will develop the knowledge about these priorities and decisions.

Conclusion

The study shows that road safety is of limited relevance as a justification for measures in the counties' regional infrastructure plans. Instead, such things as accessibility and public transport, walking and cycling, are primarily cited as justifications for measures. The counties follow the government's directives, but the government's management by objectives of road safety on the basis of a national road safety goal is difficult to put in relation to the local planning task at county level. The counties primarily have knowledge about road safety aspects of particular places, while comprehensive analyses of the road safety situation are lacking in most counties. The requirement that the counties weigh the road safety target against the government's other clarifications demands complicated trade-offs with regard to the overall goal structure of transport policy, in which the government itself has chosen to express more clarifications of the functional goal than of the consideration goal. Achieving a national road safety target presupposes well-adapted sub-targets that are broadly accepted among concerned organizations. It is likely that the imbalance between the functional goal and the consideration goal reflects a lack of governance by the Vision Zero road safety policy.

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