Paper III

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Assessing the interaction between transport policy targets and policy implementation—A Finnish case study

Anu Tuominen[a,*], Veli Himanen[b]

[a]VTT Technical Research Centre of Finland, P.O. Box 1000, FIN-02044 VTT, Finland
[b]Relate Partnership, Skräddarsintie 38, FIN-10230 Inkoo as., Finland

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Abstract

This article explores the potential of a target analysis method in acting as a link between policy objectives, targets, measures and their implementation in order to intensify the policy process. The context is the information-abundant policy environment where feasibility conditions keep constantly changing. The policy process frameworks for bounded rationality and experiential incrementalism are used as a basis for exploration and complemented with our target analysis, which is tested with a case of Finnish transport policy targets. We argue that by studying synergies and conflicts as well as other dependencies between the targets presented in policy statements and also by examining the possible support or opposition of main stakeholder groups for the policy measures to meet the targets, we can appraise the potential success of the transport policy implementation. Our case study, the Finnish transport policy, presented targets with quite a clear direction, with a lot of weak synergies and only a few serious conflicts. The implementation of the policy measures, presented to meet these targets will, however, be demanding because of several reasons related to the challenges to governance that are emerging from the complex and continually changing linkages between and among transport (policy) problems, targets and their consequences. The method we presented and tested proved to be useful in bringing transport policy targets closer to policy implementation by considering policy measures to meet the targets and their acceptance as a part of the target or objective analysis process. The findings suggest that linking these often detached parts of the policy process together the co-ordination will be improved and the process hence intensified. The target analysis presented could act as an originator for a more open, interactive and particularly systematic process in transport policy formulation, leading through social learning into a more successful implementation of policies.

Keywords: Transport policy; Policy targets; Policy implementation; Policy assessment; Framework; Interaction

1. Introduction

1.1. Background

The striking features of contemporary policy making, business and essentially our whole society are change and complexity. Changes may be physical, organisational, psychological, or they may be manifested in financial, biological, political or other forms. They appear in regulation, political conditions, customers, technology, competitors, collaborators, and so on, making our living and working environments more and more complex. Digital information technology and its inexorable march through global communication networks, its current ubiquitous nature, can be seen as the main enabler for the emergence of change and complexity (e.g. Hagel and Brown, 2005; Himanen and Castells, 2002; Tuomi, 2001, 2003). It seems that the world is becoming a turbulent, information based "knowledge society", faster than the structures of private and public organisations or even private lives are becoming resilient (e.g. Brown and Eisenhardt, 1998; Blickstein and Hanson, 2001; Hamel and Välikangas, 2003; Meadows et al., 2005; Åkerman and Höjer, 2006). However, when remembering the two world wars, we can see that the failure of governing is not a new phenomenon.

Changes and complexity are setting new kind of pressures to policy processes as well, in particular to policy formulation in diverse domains. Tuomi (2001, 2003) for

*Corresponding author. Tel.: +358 20 722 4976; fax: +358 20 722 7065.
E-mail address: anu.tuominen@vtt.fi (A. Tuominen).

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example, has defined the three research domains of "knowledge society" that are linked to core developments in the ongoing transformation or change. These domains are: institutions and culture, everyday life and systems of production. The transport system lies in the intersection of those domains, which naturally puts pressure on the transport sector to stay as sensitive to changes in society as the other domains. Knowing the public role of the transport sector, the flexibility for change in policy formulation, as well as in organisational structures has not, however, been one of its typical features.

Within the development of the "knowledge society", the use of targets to assess the performance of, and report on, different aspects of government has become increasingly widespread within the public sector (NAO, 2001). At the same time, also the concept of sustainable mobility and defining objectives and targets for it within different societal contexts has become one of the essential tasks both for the present and the future. It seems, however, that targets and related indicators are often too loosely linked to concurrently introduced policy measures and their implementation. Too often targets describe only the good (economic) performance of different bodies involved within the policy process. The achievement of the sustainability of the system itself, introduced in the targets, gets quite little attention (see e.g. Zografos et al., 2004; Hidas and Black, 2002), especially from the perspective of the end users. Massive amounts of empirical data are collected (e.g. sustainability indicators), but systematic methods for exploring the normative frameworks which give these data meaning are lacking.

In the changing knowledge society traditional rational methods for target formulation do not fit for purpose because of the constant changes and information overflow. Preferences and proper decisions change over time and it is necessary to evolve the policy and implementation with these changes (Pressman and Wildavsky, 1984). That is to say, deeper understanding is needed of the behaviours that targets induce in the public sector. Also, the relation between the targets and the key outcomes that need to be achieved through policy implementation (cp. Himanen, 2002; Marsden and Bonsall, 2006) needs closer examination. New integrated frameworks or activities are required to act as mediators between policy targets, measures and their implementation in order to intensify the policy process. Dodgson et al. (2005) for example, have presented a following framework which we find fitting within transport context as well. The authors distinguish between three generic technologies in the future: Information and Communication Technology (ICT) will be the enabling technology for innovations, Operations and manufacturing technologies and processes (OMT) will enable the implementation of innovations or making them operational, a new kind of a technology called Innovation technology (IvT), including simulation, modelling and assessment tools, virtual reality, etc., will provide the means by which people are technologically assisted in their innovation tasks. Changes associated with the introduction and linkages of these technologies will lead to the intensification of innovation processes.

In this article, we aim to test the potential of a target analysis method in acting as a link between policy objectives, targets, measures and their implementation in order to intensify the policy process in an information abundant policy environment where feasibility conditions constantly keep changing. The policy process frameworks for bounded rationality and experiential incrementalism (Birkland, 2001; Talvitie, 2006; Khisty and Arslan, 2005) are used as a basis for exploration and complemented with our target analysis, which is tested with a case of Finnish transport policy targets. Furthermore, we examine how to incorporate the new knowledge of the problems, causes, consequences, and stakeholders revealed by this interaction into the design process of a sustainable transport policy.

The article is structured as follows: We start by summarising the relevant literature on models for policy process focusing on the link between policy targets and implementation, in relation to research done in the area of transport policy design. Then we present the case study and the framework for target analysis. Moving on to the results, we show that interactions between policy targets together with the acceptance of policy measures to meet the targets can be used as an indicator reflecting the potential success of policy implementation. We conclude with a discussion of the relevance of our findings in relation to the current transport policy design process.

1.2. Previous work

A policy is a statement by a government of what it intends to do or not to do. At an early stage in the policy design process, decision makers must explicitly consider five elements of policy design, namely (Birkland, 2001): (1) The objectives or goals of the policy, (2) the causal model, (3) the tools of the policy, (4) the targets of the policy and (5) the implementation of the policy. Given the difficulties caused by ambiguous terminology in the field of policy studies, we first define the terminology adopted in this paper (see Table 1).

Traditional rational models for policy design and decision making, based on the best available information, and stage-based proceeding have, however, for decades been seen as unrealistic in tackling the problems of goal consensus, information processing and the nature of information itself within the changing environment (e.g. Alexander, 1984; Alexander and Beimborn, 1987; Christensen, 1985; Himanen, 1987; Hukkinen, 1999; Birkland, 2001; Talvitie, 2006). Especially the separation of the two final stages, policy targets from implementation, has been considered problematic. As early as in 1971, Pressman and Wildavsky pointed out that implementation should not be divorced from policy, because there is no point having good ideas if they cannot be carried out. The authors recognised a need to view policy implementation as more

Table 1
The terminology used in policy issues

Term	Definition
Policy area	Very wide and can be stable over a very long period of time (e.g. education, transport, health)
Policy theme	Several policythemes can be found within one policy area. Themes can emerge and evolve over long periods of time (years/decades) (e.g. sustainability, competitiveness of freight transport)
Policy issue	A more specific, concrete, immediate "problem"; in each policy theme, there will be several policy issues, which may emerge or change over a short time (a few years or even months). The line between "theme" and "issue" can sometimes be difficult to draw.
Policy objective/ goal	What the policy is trying to achieve, the overall goal; often quite abstract and qualitative.
Policy target	More specific and quantitative than an objective or goal (e.g. 10% less emissions of air pollutants within 5 years). The target points out a clear sense of direction for policy measures.
Causal model	What causes a policy problem and how would particular responses alleviate the problem? Do we know that model? If we do not know, how can we find it?
Policy tools/ measures/ instruments	The means/methods that are chosen to meet the targets and objectives
Policy implementation	The process by which the policies enacted by government are put into effect by the relevant agencies.

of an evolution than revolution. Furthermore, they pointed out that the policy process is not solely about getting what you once wanted, but rather about getting what you have learned to prefer.

The traditional planning model recognises that the implementation may fail because the original plan was infeasible. Many constraints, however, can be hidden in the planning stage and discovered only during the implementation (Pressman and Wildavsky, 1984). The traditional model with fixed stages is not able to use the new information as a basis for policy design, since first, the ends are isolated, and then the means to achieve them are sought out. Furthermore, feasibility conditions keep changing over time: old constraints disappear or are overcome, while new ones emerge. The solution space undergoes continuous transformations, shrinking in one direction, expanding in another. Consequently the designer's left hand should constantly be probing the feasibility boundary, while his/her right hand tries to assemble the various programme or policy process components (Birkland, 2001; Pressman and Wildavsky, 1984). This sort of approach is a far cry from the traditional procedures suggested by the traditional planning model.

An approach to tackle the above problems is presented by March and Simon (1958), applied by Lindblom (1959) and called bounded rationality (incremental decision making). To be boundedly rational means that one behaves as rationally as one can within certain bounds or limits, including limited time, limited information, and our limited human ability to recognise every feature and pattern of every problem (Birkland, 2001). In addition, Lindblom argues that people make decisions in relatively small increments, rather than in big leaps. As opposed to the rational method for decision making, which is always starting from the "root" and using the approach of means-ends analysis, incremental decision making uses and builds on what is already known, without reanalysing what is currently being done. The typical features for incremental decision making can be summarised in the five points presented in the second column of Table 2.

In the transport sector, Talvitie (2006, 1997) and Khisty and Arslan (2005) have introduced approaches based on the concept of bounded rationality, to develop the transport policy process. Talvitie presents the concept of experiential incrementalism, which alleviates the shortcomings of the rational policy model with nine propositions. Talvitie extends his approach to also cover the aspect of organisational learning, thus linking it closer to implementation. Khisty and Arslan (2005) propose five interlinked strategies for steering the process of transportation planning in the face of bounded rationality and unbounded uncertainty. All three approaches seem to reflect quite similar issues which can be presented under five categories (first column in Table 2). None of the approaches, however, presents a systematic method to complement and operationalise the approaches.

1.3. Research gaps revealed

The importance of linking policy targets to implementation relates to the general question of relating facts to values, which has been identified as one of the most important and long-standing discussions in the modern social sciences. Massive amounts of empirical data are collected, but systematic methods for exploring the normative frameworks which give these data meaning are lacking. This problem has been documented by countless examples, especially during periods of rapid and turbulent change (e.g. Fisher, 1997; Vedung, 2000). Marsden and Bonsall (2006) refer to the same issue in the transport sector by arguing that transport policy targets often do not reflect the totality of the issues. A lot of data have been collected, e.g. about indicators for or measures towards a sustainable transport system, but frameworks for how to use these data and link targets to measure their implementation, in favour of sustainable policy development, are missing. Accelerated changes in our living and working environments, with overwhelming amounts of information are unfortunately not alleviating the process.

In the following chapters, we present a method for target analysis, which complements the bounded rationality approaches (see Chapter 1.2) and highlights the link between transport policy targets and implementation. Our approach aims to act as a link between policy

Table 2
The approaches of bounded rationality

Category	Incremental decision making	Experiential incrementalism	Bounded rationality and unbounded uncertainty
1. Big picture	• Objectives, values and empirical analysis are closely intertwined • Means-ends analysis limited	• Look for the big problem	• Understand the concept of systemicity • Expand the current planning paradigm
2. Stakeholder participation	• "Good" policy = direct agreement on policy by the stakeholders and the analysts	• See planning as an experiment, involve people from start to finish • Explore successes and failures and adjust	• Introduce soft systems thinking
3. Simplifying	• Limited analysis of outcomes, alternative policies, affected values	• Do not focus on results and outcomes	• Reduce the complexity
4. Mixing	• Reliance on theory is low	• Change is caused by emotional communication, rarely by "scientific" facts • Behind everything (paradoxically) there must be a scientific explanation	• Use abductive inferencing
5. Learning		• Help develop a competent planning organisation • Help the organisation to learn about itself and others • Explore successes and failures and adjust	

objectives, targets, measures and their implementation in order to intensify the policy process. We argue that by studying synergies and conflicts as well as other dependencies between the targets presented in the policy statements and also by examining the possible support or opposition of main stakeholder groups for the policy measures to meet the targets, we can appraise the potential success of the transport policy implementation. Furthermore, we can simultaneously intensify the process by incorporating new knowledge into it about the problems, causes, consequences, stakeholders, etc., emerging and changing, within the transport system. After the policy measures have been implemented, the evaluation of impacts naturally provides another important source of information for the policy process, but here, it is left for the agenda of further research. As a case study, to test our method, we use documents for a long-term transport policy in Finland.

2. The research context

2.1. The setting

The role of the Ministry of Transport and Communications in Finland (MinTC) is to formulate and implement a transport and communications policy (MinTC, 2000, 2005; The Finnish Government, 2003) based on targets accepted by all stakeholders. It also monitors the functionality of the transport and communications system and promotes their balanced development. In policy formulation, the ministry co-operates with other ministries (e.g., Finance, Environment, Labour and Interior), modal transport administrations and other stakeholders in the transport sector. Within the ministry, the policy preparation and implementation is dispersed between the minister, the Permanent Secretary and the three departments (General Affairs, Transport Policy and Communications). In transport policy target setting and policy formulation, the role of the Transport Policy Department is essential.

2.2. The vision of intelligent and sustainable transport

The empirical data used in this paper stem from two national research projects financed by the Ministry of Transport and Communications, Finland and VTT Technical Research Centre of Finland in 2004 and 2005. The projects aimed to improve the transport policy formulation process within the Ministry of Transport and Communications. The data about transport policy targets and measures are derived from a long-term Finnish transport policy document titled: "Towards Intelligent and Sustainable Transport 2025" (MinTC, 2000). The document presents a vision for a sustainable transport system 2025, its objectives, targets and also policy measures to meet the objectives.

The aim of Finland's transport policy is "An intelligent and sustainable transportation system that properly addresses all the economic, ecological, social and cultural considerations" (MinTC, 2000, 2005; The Finnish Government, 2003). A reliable, high-quality transport infrastructure is seen as essential for ensuring that the society can operate on a basis that is efficient, regionally and socially equitable and internationally competitive. The policy aims

to ensure that the long-term maintenance and development needs of the country's transport infrastructure are met. Other transport policy objectives and targets are to improve the operating conditions for public transport and the service it provides, to promote traffic safety, to safeguard the standard of service provided by merchant shipping, and to safeguard the competitiveness of merchant shipping in comparison to Finland's main competitor countries. In implementing the transport policy, the Ministry of Transport and Communications aims to enhance the well being of the public at large and to improve the operating environment for businesses by ensuring access to high-quality transport facilities and maintaining well-functioning transport markets in a way that balances the needs of the country's different regions and population groups.

3. Target analysis

The method for the target analysis applied in this paper and presented below, was first developed in the project called: Strategic Assessment Methodology for the Interaction of CTP-Instruments (SAMI), funded by the European Commission under the Transport RTD programme of the fourth Framework Programme (see Himanen et al., 2000). The method's fitness-for-purpose as a tool supporting the real policy process was not, however, tested.

The target analysis has the following five steps: First, relevant policy targets and measures to meet them (see definitions in Table 1) are screened from the policy documents. A distinction is made between two types of targets: (a) expansive targets, where the aim is for an ever increasing level of availability of something considered good and (b) defensive targets, where the goal is to reach or maintain the current position with respect to some variable in a range considered satisfactory. In most cases, stakeholders will be more open to accept compromise over expansive targets (e.g. short delays in action, reductions in the speed of progress, etc.) than over defensive targets, where the present positions are considered entitlements and any movement might be perceived as withdrawal. This is why identification and assessment of the position of each stakeholder group, i.e. social groups who would support or oppose those transport policies or policy measures, is important (see also step four in the target analysis).

Second, a framework is presented for the assessment of interactions between transport policy targets. The framework considers the forms and types of interactions according to six characteristics presented in Table 3.

The basic form of interaction between policy targets is determined by three characteristics: direction, intensity and precedence. The direction tells whether the interaction is synergetic, i.e. pursuing one target will be helpful for the improvement of the other or in the case of a conflict pursuing one target would make the situation worse with respect to the other. The intensity describes the power of the interaction. If there is no intensity, there is no interaction between the targets. The precedence implies which one of the targets generates a reaction in the other. This is necessary information because in many cases interactions between targets are not symmetrical, even though symmetrical cases do exist, i.e. either target can generate a reaction on the other.

In addition to form, also the type of interaction, characterised by structural, circumstantial and instrumental dimensions, is important. Structural interaction is considered permanent, independent of the current positions and point of view, as well as of the orientations adopted for action in pursuit of those targets. One of the major factors contributing to structural interaction is a strong commonality of the stakeholders engaged (positively or negatively) in the two targets (being) considered. Circumstantial interaction refers to the situation where a change of position in one of the targets would lead to changes in the direction and intensity of the interaction. Instrumental interaction means that the interaction between targets is likely to depend on the instruments or policy orientations adopted for their pursuit.

Third, the dependence of the targets is defined based on the number of precedence arrows identified in the second step of the analysis. In case the analysis shows that a target is not dependent on others (i.e. the number of precedence arrows is low), it is naturally easier to meet. That does not, however, necessarily mean that the target is more important, only that it is less dependent on actions aimed at other targets. This also means that the policy measures aimed towards less depending targets are, in principle, easier to accomplish.

Fourth, the acceptability of the policy measures presented to meet the targets is assessed by approaching potential stakeholders about their views on the policy measures and their implementation (see also step one in the target analysis). Finally, the expected outcomes of the

Table 3
Forms and types of interactions between the transport policy targets

Form of interaction			Type of interaction		
Direction	Intensity	Precedence	Structural	Circumstantial	Instrumental
synergy (+); conflict (−)	weak (+) or (−); strong (++) or (−−)	>, < or <>	Permanent (S)	Depends on actual circumstances (C)	Depends on the selected instruments (I)

policy measures are assessed against the targets identified in the first step of the analysis.

4. Results

In the following sections we present the results of our assessment, i.e. the potential of our target analysis method in linking policy objectives, targets, measures and their acceptance in order to intensify the policy process as a whole. The results are discussed through a Finnish case study.

4.1. Screening of relevant transport policy targets

The policy document "Towards Intelligent and Sustainable Transport 2025" by the MinTC presents a wide and somewhat confusing mixture of policy themes, objectives, targets and measures. We have drawn three different tiers of targets from it and compressed them into three groups with a total of 10 targets. Furthermore, we have identified five main policy measures to meet the targets.

The first tier in the policy document includes five policy themes, each with two to six policy objectives, a total of 18 objectives (see Table 4). These objectives are all, with one exception, expansive and have a general character. They describe a vision of an adequate Finnish transport system for the year 2025. Whether the situation is better or worse compared to the current state of transport system, is not considered. That is to say, no clear direction for policy measures is pointed out. Consequently, these objectives cannot be recognised targets in a sense presented in Table 1. The exception is objective 2 from the health and safety policy theme: "Nobody should have to die or suffer serious injuries in traffic". This objective also gives the policy measures a direction, since nearly 400 people die and even more get injured in traffic in Finland every year. So, by the year 2025, the situation should change substantially. This objective is extremely demanding, because it presents a clear, quantitative and very ambitious claim.

The second tier addresses nine policy issues, namely: (1) Passenger transport, (2) Freight transport, (3) Level of service in transport networks, (4) Finland's links with the outside world, (5) Environment, (6) Traffic safety, (7) Regional development, (8) Transport economics, and (9) Social equity. These issues are not linked to the above policy objectives. Instead, two to five policy objectives, targets or measures are presented under each of the policy issues. In some of them, the desired direction for development is also identified, which allows us to consider them as targets in a sense presented in Table 1.

The third tier also addresses the nine policy issues above by proposing a number (1–19) of policy objectives and measures addressed to organisations under the purview of MinTC. These are not directly linked to the policy themes or objectives presented in Table 4, either, rather, they form a new, third entity. The presented policy objectives and measures basically describe the current duties and good practices within the purview of MinTC.

Table 4
Objectives for intelligent and sustainable transport

Policy themes	Objective
Service level and costs of the transport system	• The movement of people and goods should be safe, moderately priced and of high quality • All regions should enjoy the same basic level of mobility. Both domestic and international passenger and freight services should be reliable and smooth • The transport information should be reliable, easy-to-use and up-to-date • The transport system should be developed and maintained in a cost-effective manner • The passenger and freight transport markets should be efficient and open to competition • The Finnish transport sector should be competitive both on the domestic and international markets
Health and safety	• The transport system as a whole should support improvements in peoples' health • Nobody should have to die or suffer serious injuries in traffic
Social sustainability	• The benefits and negative impacts of transport should be fairly distributed amongst different population groups • Special consideration should be given to the needs of vulnerable groups • Individual citizens should be able to participate in and influence the traffic planning process
Regional and urban development	• Regional land use targets set at the national level and the regions own development strategies should be supported by the transport system • The targets concerning urban structure and cityscape should be supported by the transport system • The transport planning and land use planning processes should be compatible and consistent with each other • The traffic environments should be pleasant and safe • The cityscape and the cultural and historic landscape should not be altered unless there are strong reasons to do so
Negative impacts on the natural environment	• Both global and local negative impacts on the natural environment should be minimized • The use of natural resources (such as energy, soil materials and land) should be minimized

From the above mixture of policy themes, issues, objectives and targets, we have identified 10 policy targets, which we see to give the transport policy a clear sense of direction. These targets and related policy measures are identified to solve three general transport policy problems, namely: (1) accessibility and mobility in general, (2) local environmental and safety problems due to traffic, (3) global environmental problems. Table 5 presents the 10 identified targets grouped under the three policy problems.

Table 5
Policy problems and targets

Policy problem	Policy target
Accessibility and mobility in general	1. The most serious bottlenecks of the public road network will be eliminated 2. Problems caused by frost damage on the low intensity road network will be minimised 3. A basic level of public transport will be provided for people in rural areas 4. The modal share of public transport in inter-city services will be increased by improving the rail network to introduce high-speed trains 5. The modal shares of walking and cycling will be increased by expanding the network of cycle and pedestrian routes and continuing their effective maintenance 6. The freight transport will be intensified by upgrading the rail network to take more trains with a 25-tonne axle load 7. The freight transport will be intensified by opening rail traffic to competition
Local environmental and safety problems due to traffic	8. The number of fatalities on the road network will be reduced in the long run, to no more than 100 a year 9. There will be no accidents involving passengers on railways, in commercial air traffic, nor in merchant shipping
Global environmental problems	10. Greenhouse gas emissions from transport in 2010 will not exceed the level of the year 1990

4.2. Analysis of interaction and the structure of transport policy targets

We started by cross tabulating the transport policy targets identified into Table 6. Secondly, we analysed the interactions of each of the targets with all of the other targets through the framework described in Chapter 3 (see also Table 3). We found a total of 45 interactions between them. Each analysis (interaction) result was placed into a cell in Table 6 indicating the intersection of the two targets under analysis. One must, however, keep in mind that interactions may be identified differently by different actors. Consequently, the identification should preferably be carried out collaboratively by a group of stakeholders with different backgrounds and expertise.

- In 21 cases, we found the interaction synergetic. 10 of those were structural or permanent (+S), 10 circumstantial (+C), and one dependent (++I) on the instruments adopted.
- In 17 cases, we could not identify any interaction (0).
- In five cases, we identified conflicts between targets. One of them was structural or permanent (−S) and four circumstantial (−/−−C).
- In two cases, we found the interaction either synergetic or conflicting depending on the external circumstances.

The analysis indicated that most of the targets complement each other, i.e. there is synergy between them. On the other hand, the interaction between targets is often weak, i.e. also the synergy is weak. Only three of the interactions are strong. Two of them describe conflicts between sub-targets for rail transport, and one the synergy between eliminating the serious bottlenecks and reducing the number of fatalities on the public road network. The targets with the most synergies are: (i) to eliminate the most serious bottlenecks on the public road network, (ii) to reduce the number of fatalities on the road network, and (iii) to limit greenhouse gas emissions from transport to the level of year 1990. Achieving these three targets is, however, dependent on the achievement of several other (5–7) targets, which will complicate the selection and implementation of policy measures to reach them. Only in the first case, the interactions are structural (permanent), pointing out a large potential to reach the target.

4.3. Dependence of transport policy targets

When analysing the interactions between the targets, we noticed that there exists a hierarchy between targets. We defined this dependence or hierarchy of the targets (see the last column of Table 6) with the help of precedence arrows introduced in Table 3. For example, in the row of target 6 in Table 6, the one arrow pointing left indicates that target 6 depends on target 7. Equally, on column 6, there is an arrow pointing right, indicating that target 6 also depends on target 4, although negatively. The arrows also indicate that problems caused by frost damage on a low-intensity road network (target 2) can be prevented independently from other targets. One should, however, keep in mind that most of the interactions here were recognised as weak, which suggests that also the dependences are weak. For example, the "elimination of most serious bottlenecks on the public road network" is supported by many other targets, but their summarised influence remains weak.

4.4. Transport policy measures to meet the targets and their acceptance

Firstly, we discuss the possibility of the above 10 policy targets to get accepted by various stakeholders. The examination is applied here on policy measures presented to meet the targets, since policy objectives and targets can usually be agreed on, but only the measures put the future into specific terms, creating differences in opinions. In our screening, we found five policy measures that can be used to achieve the policy targets (Table 6) from the Finnish policy document:

1. Slight increases in investments in the road network (main and low intensity road networks).
2. Increased subventions in public transport on rural areas.

Table 6
The forms and types of target interaction and the dependence of targets

No	Transport policy targets	2	3	4	5	6	7	8	9	10	Number of depending targets
1	The most serious bottlenecks of the public road network will be eliminated	0	+S <	+S <	+S <	+S <	+S <	++I >	+S >	+−C >	5
2	Problems caused by frost damage on the low-intensity road network will be minimised	x	+C >	0	0	0	0	+C >	0	+C >	0
3	A basic level of public transport will be provided for people in rural areas		x	+S >	−C >	0	0	+C >	0	+C >	1
4	The modal share of public transport in inter-city services will be increased by improving the rail network to introduce high-speed trains			x	0 >	−−C >	−−C >	+C >	−C >	+C >	1
5	The modal shares of walking and cycling will be increased by expanding the network of cycle and pedestrian routes and continuing their effective maintenance				x	0	0	+−C >	0	+S >	1
6	The freight transport will be intensified by upgrading the rail network to take more trains with a 25-tonne axle load					x	+C <	+S >	0	+C >	2
7	The freight transport will be intensified by opening rail traffic to competition						x	+C >	−S >	+S >	1
8	The number of fatalities on the road network in the long run will be reduced to no more than 100 a year							x	0	0	7
9	There will be no accidents involving passengers on railways, in commercial air traffic, nor in merchant shipping								x	0	4
10	The greenhouse gas emissions from transport in 2010 will not exceed the level of the year 1990									x	7

Symbols: +(weak) ++ (strong) synergy, −(weak) −−(strong) conflict, > < precedence (which one of the targets generates a reaction), S structural interaction, C circumstantial interaction, I interaction depends on selected instrument, 0 no interaction.

3. Investments in the main rail lines to introduce high-speed trains.
4. Investments to upgrade the rail network to take more trains with a 25-tonne axle load.
5. Investments to eliminate level crossings from major railway lines carrying passengers and/or dangerous goods.

Basically, the potential of the policy measures should be assessed against the needs of the end users of the system in question. In the transport system things become more complicated because almost everybody may be considered a user, but at the same time they do not feel directly involved with some parts of the system, i.e. those that they do not use or are affected by. We tackled that problem by next identifying the most potential stakeholders in relation to our policy measures presented to meet the targets (Table 7). Their positions towards proposed policy measures should be included in Table 7. Our case does not, however, present a real policy formulation case with opinions from various stakeholders. Consequently, we have not included any symbols indicating support or resistance by the stakeholders into Table 7. The table is, however, included as an illustrative example of our method.

Table 7
Stakeholders and their positions towards proposed policy measures

Policy measures/stakeholders	1. Investments in the road network	2. Subventions in public transport in rural areas	3. Investments in main rail lines/ high-speed trains	4. Investments to upgrade the rail network/ 25-tonne axle load	5. Investments to eliminate rail level crossings
Vehicle manufacturing, fuels, components, etc.					
Construction industry					
Bus transport operators					
Lorry and van operators					
Rail transport operators					
Private car drivers					
Public transport passengers					
Industry					
Environmental groups					

Strong support (++), moderate support (+), indifference (0), moderate rejection (−), strong rejection (−−).

Thirdly, in order to demonstrate our approach, we have made advanced guesses on the possible support and resistance that above five policy measures could get:

1. Large investments in the main road network may face strong resistance from environmental but also other organised groups, strongly in favour of rail transport. Upgrading the low-intensity road network will probably not raise such an opposition.
2. Subventions for public transport could have strong support and raise little resistance. On the other hand, the supporters are not that well organised.
3. Investing in the main rail lines to introduce high-speed trains may get wide support, but bus (and air) transport operators as well as the industry using rail transportation (but not high-speed trains) may show resistance. Objectors are, however, not well clustered behind their case.
4. Investments to upgrade the rail network to take more trains with a 25-tonne axle load could probably get wide support; only road transport operators might be opposed to them, but not actively.
5. Investments to eliminate the level crossings from the major railway lines, similarly to road safety measures without any traffic restrictions, could possibly have the widest support.

5. Discussion

Our analysis revealed that the transport policy of MinTC Finland presents the continuum for a policy introduced as early as in 1960s, highlighting the development of public, non-motorised and especially railway transport and restraining the growth of the road transport. Traditionally, taxes directed towards the purchase of cars and fuels as well as car use have been the main instruments to encumber car traffic in Finland. Public funds have been used to support passenger transport by rail as well as coach transport in rural areas. Municipal taxes have been the instrument to maintain the public transport in cities and partly also in rural areas.

Policy measures presented in the policy paper and summarised in Chapter 4.4 all, more or less, contribute to meet not one, but several policy targets at a time, which is a natural consequence of the wide synergic interactions of the targets. The policy measures could have wide support from potential stakeholders and the measures could be executed in case there were resources available. If not (as is often the case) the measures will need to be prioritised. Subventions in/of public transport in rural areas, as well as increases in investments in the low-intensity road network require fewer resources compared to the development of the main road network and the railway network, and therefore the discussion is focused here on the latter measures and their possibilities as means to meet the targets.

The potential of the transport policy measures is next assessed against the three generic transport policy problems under which the targets are categorised in Chapter 4.1.

(1) *Accessibility and mobility in general*: Due to the investments in the upgrading of the main road network, the congestion will not exceed the current situation. Directing car taxes relatively more towards car use rejuvenates the car fleet and consequently, improves the comfort of driving. The government will not subsidize the public transport of the biggest cities in the future either, and therefore the quality and wideness of public transport will still depend on the allocation of municipal tax revenues. High-speed trains will decrease the travel time for long-distance passengers.
(2) *Local environmental and safety problems related to transport*: Directing car taxes relatively more towards car use will rejuvenate the car fleet and consequently decrease the amount of exhaust gas emissions from road traffic. Newer cars will contribute to the decrease of deaths and serious injuries on the roads thanks to technical improvements, e.g. in brakes and coachworks.

So far (in the 5 years since the publication of the policy paper), the taxation for new cars has not eased off significantly, but the taxation for imported used cars has been lightened. Measures towards this particular policy target have, thus, not been implemented. Of the policy measures presented, only the upgrading of the main road network has a considerable impact on the road traffic accidents, even though not all measures can be seen to increase (the) safety. Due to limited resources the upgrading cannot, however, reach the extent which could bring the number of accidents even close to the presented target. In rail transport, higher speeds and open competition will require new methods for risk management, but on the other hand, eliminating level crossings will reduce risks.

(3) *Global environmental problems*: CO_2 targets set by the MinTC cannot possibly be reached with the policy measures presented. In general, the transport policy measures available for Finland are in many respects already in use and quite limited, if Finland continues to keep/stay together with the other countries of the European Union. In addition, one has to remember that the global environmental problems cannot be solved with measures inside the transport sector, since they are based on or are consequences of more fundamental issues like population growth and changes in consumption patterns and mobility.

The Finnish transport policy presents targets with a quite clear direction, with a lot of weak synergies and only a few serious conflicts. The implementation of the policy measures presented to meet these targets will, however, be demanding, because of at least the following reasons: (i) some of the targets are too ambitious to be reached; (ii) some of the targets are conflicting and consequently, measures to meet them cannot easily get agreed upon by various stakeholders; (iii) the possibility to meet the targets depends in several cases on other targets and policy measures selected, which complicates the implementation context; (iv) there are not resources available for the implementation of all the measures and consequently, prioritisation is needed, which again puts pressure finding consensus among stakeholders.

6. Conclusions

The bounded rationality approaches presented in Section 1 suggest considering policy implementation in the changing environment as more of evolution than revolution. Leaning on that thought, this study examined the potential of our target analysis method to act as a mediator between policy targets, measures and their implementation in order to intensify the policy process in a complex knowledge-based environment. The method we presented and tested with a Finnish case study proved to be useful in bringing transport policy targets closer to policy implementation by considering policy measures to meet the targets and their acceptance as a part of the target or objective analysis process. The findings suggest that linking those often detached parts of the policy process together the co-ordination will be improved and the process hence intensified. Simultaneously new knowledge is incorporated into the transport policy process. The method covers all five categories of the concept of bounded rationality (Table 8, see also Table 2).

Table 8
Target analysis within the context of bounded rationality

Bounded rationality category	Target analysis
1. Big picture	The big picture is acquired by assessing the interactions between the targets as well as the potential of policy measures as means to meet the targets.
2. Stakeholder participation	The acceptance of the stakeholders towards the policy measures is included into the process from the beginning.
3. Simplifying	Simplicity is attained by identifying the "relevant" policy targets and measures in the beginning of the analysis.
4. Mixing	Theory and practice is mixed in the detailed analysis of policy targets and measures in cooperation with various stakeholders.
5. Learning	Knowledge of the interaction between policy targets and the implementation of policy measures presented to meet these targets is gained and circulated among stakeholders during the assessment process.

At all levels, from local to global, governments are currently faced with the need to set sustainable transport policy targets, to be sensitive to changes in the surrounding society and also to anticipate the indirect and long-term effects of their actions. The target analysis presented could act as an originator for a more open, interactive and particularly systematic process in transport policy formulation, leading through social learning into a more successful implementation of policies.

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