Assessment Method for Spatial Planning and Infrastructure Development

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Full Title:	ASSESSMENT METHOD FOR SPATIAL PLANNING AND INFRASTRUCTURE DEVELOPMENT
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ABSTRACT
In Europe, different road authorities have to face the ever increasing pressure to integrate their road network service provision with - often conflicting - different trends and conditions such as congestion, climate change, individualism, urbanization, safety, environmental issues and economic growth. There is also a need to cooperate with different stakeholders, such as interest groups, municipalities, industries, citizens and governments at different levels. Therefore, road authorities are seeking for innovative approaches to collaborate with these stakeholders concerning spatial and infrastructure planning.

To assess the integrated spatial and infrastructure development, the Dutch National Road Authority Rijkswaterstaat has developed a method that analyses the added value of integrated designs and plans to clarify the societal relevance of collaborative planning. The method is a combined approach for multi-modal infrastructure and spatial development, called the 'Assessment Method for Spatial Planning and Infrastructure Development' (AMSPID). In ten steps the method uniformly and integrally takes into account different kinds of measures, including those which impacts cannot be monetized or quantified.

AMSPID comprises an assessment tool which is combined with a digital workshop. With the tool and the workshop all stakeholders can share their view on the different infrastructure or spatial projects or measures and can give their scores on the different relevant aspects. This makes it a valuable addition to the normal planning process and it speeds up the policy making process. Furthermore, when used carefully, the combination is very powerful in drafting new policy measures or creating a new transport policy program.

Keywords: Assessment, Policy Goals, Accessibility, Safety, Sustainability, Digital Workshop

INTRODUCTION

The continuous development and maintenance of the transport system comprise different spatial levels and involve many stakeholders. The transport system is embedded in a larger system that encompasses society, economy, environment, technology, demography, politics and space. It is influenced by key drivers, such as population development, economic development, climate change, congestion, security, technological innovations and political decisions. Nowadays, stakeholders face more and more pressure to collaborate with each other when it comes to planning the future of their specific part of the transport system.

The improvement of the transport system should guarantee the network performance through efficient strategies. To obtain optimal strategies in the transport system, knowledge on broader impacts of transport infrastructure, which are often excluded in cost-benefit analysis, are required. Planning authorities need to cooperate, not only concerning the development of the transport system, but also concerning spatial development. And not only with other planning authorities, but also with stakeholders such as interest groups, citizens and industries. In other words, a collaborative planning of infrastructure and spatial development is needed.

Infrastructure planning and spatial development for different stakeholders are time consuming processes. The different stakeholders involved do not necessarily have a matching planning and nor do they have the same pace. Even within the transport system, infrastructure planning or the planning of other transport policy measures are processes that differ at different scales, even if it concerns the same location or region. This makes collaborative planning complex and challenging.

In Europe different studies, best practices, tools and methods exist to carry out assessments (*1*) and this is not different in the United States (*2*). Some are tailor made, while other tools have a wider range of application. Given the fact that the focus is often upon infrastructure planning and spatial development, it is tempting to use land-use transport interactions models or a combination of transport models. However, these models have their limitations. For example, they do not take social cohesion or health into account. Therefore, for an integrated approach an assessment method is needed with the following characteristics:

1. Identification and involvement of different stakeholders, both suppliers and users of infrastructure;
2. Inclusion of both freight and passenger transport;
3. To be applied on a multi-scale level: local, regional, national and international;
4. Assessing the indirect benefits such as social cohesion, image and environment;
5. Applicable on different time horizons (short, medium and long);
6. Taking account of different types of data or information;
7. Inclusion of weights for different aspects, to take account of priorities and interests of the different stakeholders.

In the Netherlands, Rijkswaterstaat has expressed the need for such an innovative approach and supported the development of a validated assessment method that meets the different requirements and needs (*3*). This method was extended and focuses now upon the added value of integrated plans and designs in order to get an insight in the societal relevance of collaborative planning. The extended assessment method that we describe in this paper is an inclusive method that assesses the costs and benefits of combined infrastructure and spatial development. The method comprises a process and an instrument. In this paper we provide a general insight into the process in the next chapter. Then we will concentrate on the instrument

and describe the method and the tool in consecutive chapters. After that the use of the method for some cases is described and some conclusions are drawn.

ASSESSMENT PROCESS

Evaluation circle

It is not easy to assess transport and mobility measures on their merits. The question how certain measures or packages of measures contribute to policy goals is difficult to answer. Of course evaluation studies can be conducted, using information from other projects, experts, measured data and models. Several methods and tools are available for that, especially for real-life pilots (*4*). We can learn from these studies to make better decisions on investments or further implementation on other locations. Ideally we use the evaluation circle (*5*), which is shown in figure 1.

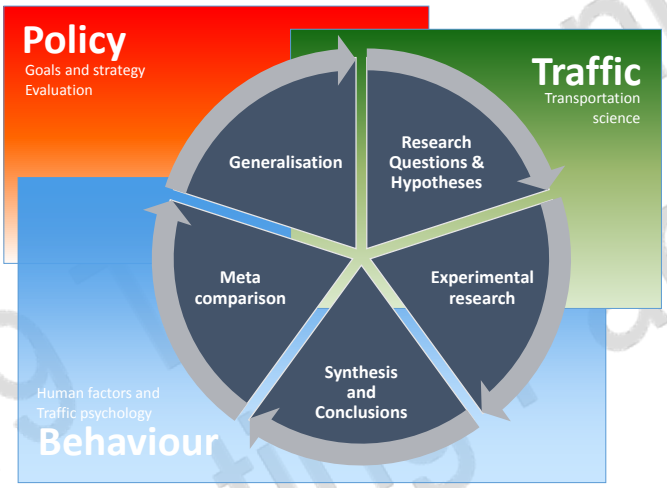

FIGURE 1 Evaluation circle

The principle behind the evaluation circle a simple one: evaluation is a continuous process, which does not stop when a project has ended and an evaluation report is written. Generally speaking, the first three steps (clockwise from the top of the circle: hypotheses, experimental research and conclusions) involve ex post evaluation using either field measurements, surveys or a modelling approach. Typically, these steps are part of the many evaluation studies done today. However, the final two steps (meta comparison and generalization) are often not taken into account in many evaluation studies, although they are very important. The goal of the meta-comparison is to interpret the results in the light of other project results and of the state-of-the-art worldwide. Are there differences with previous results and if so, is it clear what the reason for the differences are? Do the new results add to the knowledge of impacts, for example because the measure is applied in different circumstances, or is it merely a repetition? By taking the location or circumstances into account, we can also think about what will happen if the measure is implemented in another location or under different circumstances. Or even what the impacts will be if a large scale implementation is considered. In this generalization step we derive worst- and best-case scenarios and can identify which critical design issues (related to e.g. technology, methodology and human factors) we need to address in the next round of policy measures.

This cyclic approach involves many other domains which are relevant for evaluations and therefore it is a multi-disciplinary approach. In Figure 1 three (overlapping) domains are shown:

- the policy domain, which includes setting policy goals and decision making;
- the domain of transportation science, which is important, because knowledge about transportation and traffic can be used to assess the impacts beforehand, but to also explain the results from the evaluation;
- the domain of human factors and traffic psychology, to take into account driving and travel behavior.

Of course there can be many more disciplines involved, such as computer and data science, control and automation and communication, to name just a few. And all these domains are helpful to obtain good and reliable results from an evaluation study. However, a certain amount of uncertainty always remains. These can be due to external circumstances, the methods used or the data gathered.

An evaluation becomes even more complicated if measures have to be judged on several policy goals at the same time, or if different types of measures have to be evaluated in the same analysis. Often indicators are different or data is lacking for certain indicators. Sometimes indicators can be monetized, sometimes not. Sometimes a lot of quantitative information is available and sometimes only qualitative, e.g. expert opinion. For an appraisal all types of information can be useful. The question is how to combine all these types of information with different qualities into one single judgement or outcome. This was the reason to think about a integrated approach which combines all relevant aspects.

Integrated assessment method

The integrated assessment method that has been developed can be used in the context of collaborative planning with different stakeholders and with the characteristics mentioned before. The base of the assessment method is on one hand process-related and on the other hand content-related, comprising an instrument to support planning.

Managing processes is very important when carrying out collaborative planning. It forms the base of exchanging views, developing plans and discussions or negotiations. Different stakeholders need to work together in order to plan the future of infrastructure and space. One needs to think of stakeholders such as national and regional governments, municipalities, representatives of urban regions, public transport providers, freight transport service providers and representatives of different interest groups (environmental, citizens, industry, etc.). Collaborative planning potentially gives a very broad range of (opposing) interests and views that need to be taken into account.

Besides the stakeholders, collaborative planning is also about infrastructure planning and spatial development on different spatial levels with different time frames. The planning level may range from local to international, encompassing small measures and large policy packages. The time frame ranges from a one year to more than 20 years ahead. Each stakeholder is involved in his own planning process which usually is not consistent with the processes of other stakeholders. This makes an integrated method for collaborative planning challenging.

Concerning the availability of detailed data or information in planning processes, there are also challenges. At the beginning of a planning process, usually there are no detailed figures, such as costs or characteristics of measures or projects available. Along the planning process this is gradually filled in. At the start of a project, this is often done by using models with different

scenarios and policy strategies. Further on in the process, when the process filters to a final situation, abundant information and detailed cost calculations become available.

The quality of the available data is also an issue. In some planning processes, only transport related data are available, relating to congestion or accessibility. For larger projects such as new motorways also environment and safety is taken into account. However, aspects such as perception or indirect impacts on economy or society are hardly taken into account. If taken into account these are often mentioned but not quantified. The uneven quality of availability data may even lead to less optimal decisions.

The afore mentioned challenges on stakeholders, spatial and temporal levels, availability of data and quality of data, all need to be taken into account when drafting a method for collaborative planning. The method that we present here overcomes these challenges. The integrated approach is based on coordinated steps that include process and content:

1. Stakeholder identification and involvement;
2. Setting up digital workshops for the assessment (packages) of policy measures;
3. Assessment tool for policy measures and packages itself;
4. Discussions about measures and packages between the stakeholders;
5. Drawing conclusions or recommendations for the next steps in the planning process.

1. The identification and involvement of stakeholders

For the planning of infrastructure and spatial development in a certain area the stakeholders first need to be identified. After identification, the stakeholders need to be approached to participate in taking part in the collaborative planning process. This might take some time as in some cases the stakeholders may need to be convinced of the importance of the collaborative planning of space and infrastructure.

As soon as the identified stakeholders agree, then a meeting to get to know each other would be a starting point, along with providing an outline of the rest of the planning process. The involvement requires exchanging information and data about the planning of the different stakeholders. Each stakeholder is asked to provide this input. And these inputs need to be analyzed, resulting in a list of policy measures and policy packages. This concerns measures and packages at all spatial levels and may concern any type of transport. Each stakeholder is responsible for taking on board the right measures.

2. Organization of (a) digital workshop(s)

The analysis in the first step forms the base for the organization of one or more digital workshops, in which the stakeholders will make an assessment of the different policy measures and or packages. The principle of a digital workshop is explained in more detail in the next chapter. A brief presentation of all policy measures needs to be prepared for the attendants of the digital workshop to provide each attendant with enough information in order to be able to make a good assessment.

The workshop will start with these presentations and after that the assessment session will start. The assessment itself uses a tool and application of this tool is part of the workshop. Details of the tool are given below. If the amount of measures is too large, further digital workshops might be needed. Experience shows that it is possible to make an assessment for 20-25 policy measures in one afternoon. If more policy measures need to be assessed, consequently more time is needed.

3. Assessment tool

The assessment tool is part of the assessment method. It is explained in more detail in one of the following chapters. To summarize, the tool assesses policy measures or policy packages on different aspects such as the costs of the measures and the direct impact of the measure on accessibility, environment, safety, quality and the indirect impacts on economy or social value. The tool itself is simple yet powerful in collaborative planning. It comprises a combination of a multi-criteria analysis (MCA) with a cost-benefit analysis (CBA). This combination allows on one hand the use of observed or calculated inputs and on the other hand expert views when data is not available.

The tool can be used in different stages of planning. At the start of a planning process, the tool will more rely on the MCA in combination with expert views. Along the planning process, when more information becomes available, a combination of MCA with CBA becomes more appropriate. The results comprise a ranking of policy measures or packages that can be taken a step further in the planning process. Based upon available budgets the ranking of measures may give an idea where and what to invest in. It has to be considered that the results might be sub-optimal as we have to deal with different stakeholders, each with his own budgets and 'wish lists'

4. Discussion about the policy measures

The outcome of the digital workshop is the basis for further discussions and/or more detailed assessments with other instruments. Different stakeholders have different budgets available which might help to choose the best measures or packages. The discussions should focus upon which measures or packages should be taken, given the optimization. The discussions are best led by an independent organization and the result preferably is a list of policy measures or packages which can be taken into the further steps of collaborative planning. The further process into more detailed planning has to be agreed upon between the stakeholders.

5. Conclusions and recommendations

The results of the digital workshop, assessment tool and the discussion should be wrapped up in a brief document with a vision on the infrastructure planning and the spatial development in a region or daily urban system. The conclusions and recommendations are then presented to the stakeholders. They can use them in their planning processes.

The assessment method stops here or is used in further rounds, when more detailed data or insights become available. This has to be decided by the stakeholders. If needed, a second or third round can be done using the assessment method. This would require another round of step 2 to 5 as is shown in Figure 2.

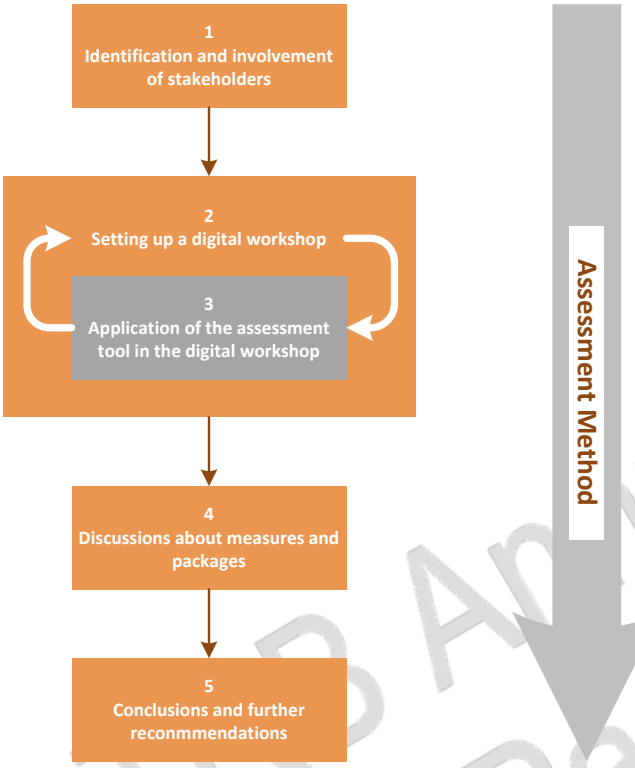

FIGURE 2 Process integrated approach for an collaborative assessment method

DIGITAL WORKSHOP

The discussion on different policy measures or policy packages for infrastructure and spatial planning should be done by all involved stakeholders. However, the question is, how to organize such a discussion. Often, discussions are dominated by a few persons, while others only listen. That could be for different reasons: is their view not interesting enough? Are they reluctant to raise their voice? When it comes to a discussion on measures, once again, those who dominate the discussion will be heard. The measures that they prefer most probably will be ranked higher. A good chairman could lead a discussion in such a way that everyone will be heard. But even with a good chairman, there will be a bias towards persons dominating the discussion. A digital workshop however includes everyone actively and motivates to exchange views and arguments. After all, the arguments of all stakeholders are important in the discussion on different planning topics.

A digital workshop is able to cover discussions in a more democratic way, while at the same time helping to rate items such as the different. This can be done in a relatively short time span (in one day or even in a part of a day). But what is a digital workshop exactly? A digital workshop is an electronic tool supporting the structuring of discussions and brainstorming sessions. It also allows presentations, rating items and provides an automatic documentation of the discussion or brainstorm. A digital workshop is performed by using technical devices such as mobile phones, computers or even remote over the Internet. All attendants use their chosen devices in order to discuss topics, rank items or brainstorm on different issues.

The advantages of a digital workshop over a conventional meeting are:

- Each attendant contributes *actively* to the discussion or brainstorm;
- The discussion becomes more democratic as each attendant has a similar amount of 'speaking time';
- Different attendants can 'speak' at the same time, unlike conventional meetings, for example by writing contributions to discussions or brainstorms, or by rating different topics at the same time. This increases the efficiency of the meeting when it comes to input;
- Questions guide the discussion or brainstorm and keep a focus on the topic;
- Arguments become more clear, views are better exchanged to understand the 'why', 'how' and 'what';
- If necessary, the input given by the attendants is anonymous;
- A report containing the input from different attendants is directly available, no information will get lost;
- Rating items can be part of the questions. Different rating methods are available such as a numerical scale, a rank order, or budget allocation, all including comments.

The digital workshop provides in less time more information and output than possible in conventional meetings. Although the number of attendants can be high, the experience shows that about 10-20 persons gives a good amount of output from the workshop. With this number of people it is still possible to discuss controversial topics briefly. The meetings are intensive, care must be taken that the attendants are not getting tired and refuse further cooperation. Therefore, enough breaks should be taken organized.

In the integrated assessment method, the digital workshop is used to score the different policy measures (if no quantified data is available) on the different aspects such as their contribution to accessibility, environment, safety, quality and economy (the benefits) and their costs for investment and maintenance. The scores help to keep the discussion focused on those aspects that the stakeholders disagree upon. A brief exchange of arguments pro and con help to understand the position of the stakeholders on certain aspects. Finally, it is used to weight the different aspects.

The result of the digital workshop is an overview of what the stakeholders together think about the impacts of policy measures and how they contribute to the improvement of the transport system. Important to mention is that all stakeholders contribute and that the discussions become more to-the-point then in case of a normal workshop or meeting. It helps to make the minds up on the different policy measures and it guides expectation management. Concerning the input from the stakeholders, the method requires attendants with a good background knowledge in infrastructure planning and spatial development. They at least need to be able to assess the impacts of different aspects from the point of view of their background.

ASSESSMENT TOOL

As mentioned before an assessment tool is part of the method and this tool comprises an assessment of projects or policy measures in ten steps. It is based on and combines several aspects of other known methods in the Netherlands (*6*), (*7*), (*8*), (*8*) and (*10*), and in Belgium (*11*). The steps are shown in Figure 3 and are discussed in the following sections. More background and details of the tool can be found in Taale et al. (*12*).

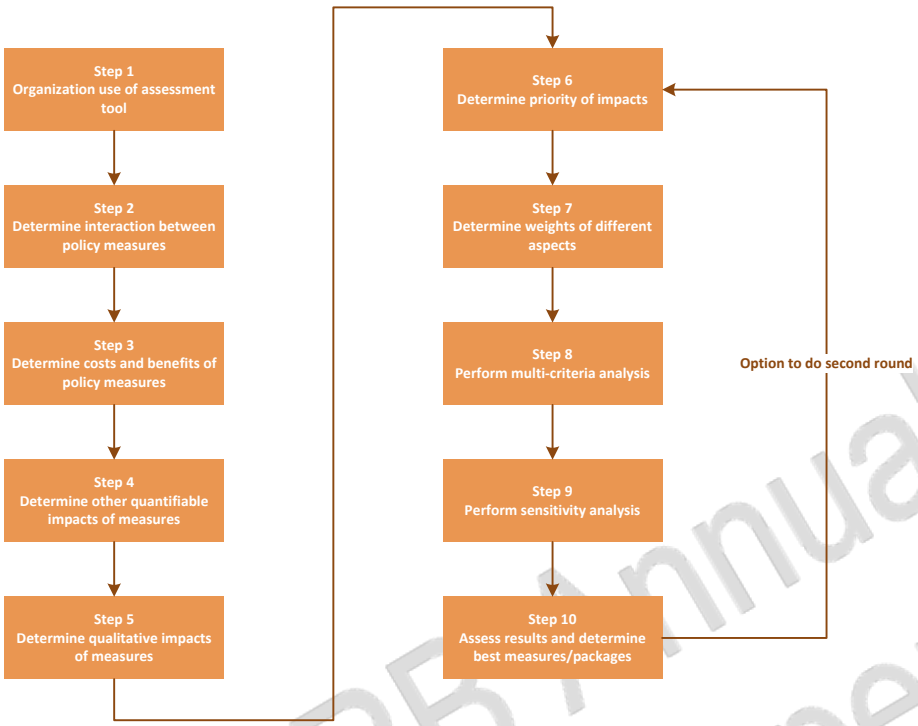

FIGURE 3 Steps in the assessment tool

Step 1 – Organize the use of the assessment tool

The use of the assessment tool is not a goal in itself but a means to an end. It is an instrument with which measures can be assessed and prioritized. The method does not pass judgement on the quality of the measures itself and does not distinguish between good and bad measures. But the way in which the assessment tool is applied is important for the final result. Therefore, some questions have to be answered before the method is applied:

- Why and when is the assessment tool used?
- How will the method be applied?
- Who is using the assessment tool and who is waiting for the results?

A digital workshop helps to speed up the process (see previous chapter). The assessment tool will be used especially at the start of the policymaking or the collaborative planning of a program. If the assessment tool is applied, then it has to be ensured that everyone understands the use of the method. In this way the assessment tool can be very helpful to choose and rank alternatives.

Step 2 – Determine the interaction between the measures

The second step examines to what extent the policy measures influence one another. Practice shows that measures can strengthen or weaken each other. Measures that enforce each other are preferred above measures that weaken each other. Therefore, firstly the interaction of measures should be mapped so that this can be taken into account in the next steps. In this step, all measures are compared with each other. The interaction between measures is usually done by looking at the impact on accessibility and determined by the stakeholders by assigning scores.

The scores are subjective, but if all stakeholders fill in the form, a relative clear picture should emerge, which could be regarded as *inter-subjective*.

Step 3 – Determine costs and benefits
For each measure (in a package) the costs and benefits need to be determined. For this step a lot of information needs to be collected or calculated. For a uniform assessment the benefits need to be monetized whenever possible, for example if the impacts of measures can be determined on key indicators such as distance, time, transportation costs, volume and quality. Other indicators can be derived from these key indicators, such as speed, time losses or emissions. The result of this step is an overview of costs and benefits of each measure.

When at the beginning of the planning process, this step might be skipped if information on the measures is not yet available. In that case, the CBA step is taken out of the tool and the tool will then be a MCA in which experts only provide an indication whether costs and benefits are high or low.

Step 4 – Determine other quantifiable impacts
If monetization of certain impacts (e.g. on safety or the environment) is not desirable or possible, it can be chosen to quantify these effects. For those indicators the partial effect of each measure is put together in absolute terms. Based on the sum of the absolute effects the measures can be ranked on these aspects. If data is not available, which is often the case in the beginning of a planning process, this step can be skipped. In that case the MCA will completely rely on expert views of the different stakeholders.

Step 5 – Determine the unquantifiable impacts
Normally the impact of measures on the different aspects for accessibility, safety and the environment leads to a quantitative result, but not always. Also, certain aspects cannot be quantified such as emotion, comfort, image, social value or the quality of the landscape. Therefore, the impacts are described in scores and this is more subjective in nature. This could lead to discussions about whether an effect is large or small, positive or negative. Asking multiple stakeholders to score these aspects, an *inter-subjective* outcome is created. If necessary, the estimated effects can be held up to the light to determine the reason for the major differences.

Step 6 – Determine the priority order of the impacts
From the previous steps the ranking of the measures on the individual effects can be determined. For each aspect and impact it can be examined how the scores of the measures compare to each other. Within the aspects the scores are totaled so that every aspect has one score. The importance of the interaction between measures (mutual strengthening and weakening of measures) is also included. Mutual strengthening generates extra points and could lead to a different ranking.

Step 7 – Determine the weight for the different aspects
Per region, differences in goals and interests could lead to weigh one aspect (accessibility, safety, environment, quality, social value, economy or interaction) larger or smaller than the others. Therefore, in the seventh step it is possible to assign weights to the various aspects in order to arrive at a well-balanced package of measures. Furthermore, it provides awareness about the extent in which the five aspects contribute to the end result.

Step 8 – Perform a multi-criteria analysis
Based on all the scores and the give weights, a multi-criteria analysis can be performed, including all aspects. With this exercise is becomes clear what measures or combinations of measures are the best and which ones give the least result.

Step 9 – Perform Sensitivity Analysis
Within the available budget, several composed packages of measures are possible. A sensitivity analysis could make that clear. Given the available budget and the cost per measure, the sensitivity of multiple different packages of measures can be determined. Normally, the budget is exhausted, but obviously there is a chance that the budget is exceeded or under-utilized. In addition, the possibility exists that the optimal package of measures in terms of benefits requires extra funding requirements in access of the original budget. In that case the discussion will focus on the question where extra financial sources can be found.

Step 10 – Assess the results and determine the best packages of measures
This step is also included in figure 2. It consists of a brief discussion between the stakeholders on the resulting composite packages and possible the weights defined. The composite packages show, given the cost and the available budget, what measures can be taken together in one package. Discussion in the further steps of the assessment method between the stakeholders must give agreement on which package of policy measures for infrastructure planning and spatial development suits best and should therefore be chosen.

ASSESSMENT USING THE DIGITAL WORKSHOP AND TOOL

Introduction
First attempts to use a digital workshop has shown to be promising. Test cases with different backgrounds helped to gain insights in the usefulness. Not only at the beginning of the policy process, but also later in the process a digital workshop helped to make choices based upon expert views or research outcomes. The test sessions performed showed that the method presented earlier is capable of ranking the policy measures and as such to build policy packages.

This chapter presents four test cases. Each test case has a different background and different policy measures. The test cases are presented below and some conclusions are drawn, related to using the digital workshop approach.

Test cases

Zoetermeer on the Move
‘Zoetermeer on the Move’ aimed at carrying out public-private and private-private transport policy measures to reduce the car use during the peak hours on the A12 motorway between Zoetermeer and The Hague. The goal was to reduce travel delay hours. The policy measures were carried out way before it was tested in the appraisal method. This helped to see the differences between ranking the policy measures beforehand and in our test case environment. In total five, very different, policy measures were implemented and used in the test case:

- More efficient use of the fleet capacity of companies in Zoetermeer;
- Night network for bikes, stimulation using a bike in a safe environment before 7:00 or after 19:00 hrs.;

- Distribution of freight outside peak hours;
- Working differently, stimulating use of bike;
- Peak avoidance.

By means of a digital workshop experts from different backgrounds such as the Municipality of Zoetermeer and Rijkswaterstaat assessed the policy measures through their impact on accessibility, environment, safety and quality. The digital workshop was used to rank the different measures. Immediately after the workshop the outcomes were visible for the experts. The results proved that the digital workshop provided an important support for the ranking of the different measures. Also discussion on the differences could get a good focus, which lead to a better understanding between the experts. Sometimes the question proved to be multi interpretable, while in other cases a different view was possible.

Rijnland route

The Rijnland route was different from the previous case as it concerned an infrastructure project with five variants. The Rijnland route is a new provincial road south of the city of Leiden, connecting the A4 and A44 motorways. The variants differed in route as well as construction. In two cases a tunnel was foreseen.

In the digital workshop the Rijnland route was presented first. Based upon the presentation, the different variants were ranked on costs, accessibility, environment, safety and quality. The experts that ranked the different variants stemmed from Province, Municipality, Citizens and Rijkswaterstaat. Despite the fact that there was a lack of good information, the experts chose the same variant as was also chosen in reality after extensive studies. The digital workshop once more was useful. Discussion on differences in views proved to be valuable, though it did not really change the end conclusion.

A15 Rivierenland

The ‘A15 Rivierenland’ case comprised no less than 25 policy measures, ranging from an extra lane on the A15 motorway to mobility management on industrial parks. The A15, which is an west-east connection from the harbor of Rotterdam to Germany, suffers from congestion and safety issues. In order to reduce congestion and to improve safety different policy measures were developed. By means of a digital workshop the measures were ranked on their impacts. The different policy measures lacked a good amount of information. Therefore, a qualitative CBA by means of an MCA was carried out. The different measures were ranked on their estimated costs, accessibility, environment, safety and quality. In one afternoon, the experts from different backgrounds succeeded in ranking the 25 policy measures. Not surprisingly, the extra capacity of the A15 was ranked first when it comes to its impact on congestion and safety. However, given the budget restraints, this measures was ranked last as the costs proved to be very high. After discussion on the pros and cons of the measures and on the background of the scores of the different stakeholders, the digital workshop led to a broad understanding on motives and context between the stakeholders and finally to a consensus on the list. A motorway traffic management system on the A15 was ranked first: effective and relatively cheap.

Urban nodes

The case of ‘urban nodes’ comprised policy measures that intend to improve the urban transport system along the European TEN-T corridors. Different urban transport policy measures can be

taken. In this project about five infrastructural projects in and around the city of Rotterdam were ranked by experts. These projects comprise public transport by light rail or metro, improvement of the Rotterdam – The Hague airport, improvement of the Greenport and extensions of the A15 and A16 motorways.

The experts had to assess the impacts of the projects by means of a digital workshop. Not only did they rank the accessibility, environment, safety and quality, but also the costs. For example, the improvement of an old railway line into a light rail project scored best on safety, while the improvement of the airport scored least. Figure 5 shows the scores on costs, accessibility, environment, safety, quality and interaction, as well as the final relative score. The participants thought that a new connection between the A16 and A13 motorways is the best for accessibility and improvement of the airport not so good. The subway scores over all policy aspects best. But, as can be seen, the project is not the best on all aspects. For example on interaction is scores the worst. It needs to be stated that this does not mean that projects are bad, they just score less than the best policy option.

Measure	Costs	Accessibility	Environment	Safety	Quality	Interaction		Relative score
Subway Hoekse Lijn	1.7	2.4	1.4	1.3	1.3	0.1		**8.2**
Greenport	1.7	1.7	0.8	1.3	1.3	0.2		**7.1**
RDH Airport	2.2	0.3	0.7	0.1	1.6	0.3		**5.1**
A13-A16	0.2	3.0	0.1	0.1	0.2	0.3		**3.9**
A15	0.7	2.4	0.3	1.3	0.7	0.2		**5.6**

FIGURE 4 Example of the automated documentation on ranking the policy measures

Usefulness of a digital workshop in the test cases

The test cases were all performed in one afternoon. These sessions were intensive and required a lot of focus from the experts. By means of a computer each participant was required to score aspects on lists of policy measures. Some small in size, some lengthy. Nevertheless the people involved succeeded in filling in the lists and scoring all policy measures. Compared to real cases the ranking of the measures was not surprising.

The digital workshops were also useful to get more insights in the quality of the questions and answers. Usually those questions that gave very different views were topic of discussion. Sometimes the question was multi-interpretable, while in other cases people simply had different views. In most cases however, there was not really much difference between the scores.

The advantage of a digital workshop is to provide a mindset beforehand or during the project without studies that take a lot of time and costs. Of course these studies are needed, but the digital workshop could do some expectation management beforehand. Also, by ranking the different policy measures, it will be easier to see which studies or surveys need to be carried out first.

CONCLUSIONS

The assessment of transport policy measures or packages of measures usually follows an evaluation cycle, that comprises a continuous process which does not stop after implementation and evaluation of a project. The evaluation process is often hampered due to the fact that different types of measures in a region have to be evaluated. Especially when it comes to combining policy measures into policy packages, sufficient and/or consistent data is lacking. In the Netherlands, different methods and techniques for appraisal of policy measures are available, often based upon monetarization of the different aspects such as accessibility or safety. However, up to now most of these methods are related to one specific policy or one specific type of measure. Although all these methods have a function, a unified, integrated and comprehensive method to assess different policy measures and to develop packages of policy measures did not exist.

The Assessment Method for Spatial Planning and Infrastructure Development (AMSPID) fills the gap. The assessment method comprises ten steps, which are taken in a digital workshop together with all relevant stakeholders, in order to get a broad support for the selected policy measures or package of policy measures.

To test the AMSPID, four cases have been set up, which were tested by means of a Digital Workshop. The four cases had a different range of policy measures (small to large) and were assessed by experts, scoring the contribution of the different measures to accessibility, environment, safety, quality and interaction of the measures. The results showed that experts were quite well capable of assessing the measures and ranking them. Even an estimation of the costs gave plausible results.

The digital workshop helped in structuring the discussion and in ranking the different policy measures, because the results were immediately available. Scores could be examined and those scores that showed a large variance could be discussed. This gave the discussions the right focus, experts could exchange their views or arguments. The discussions were usually brief, just explaining why a high or low score was given.

It can be concluded that the digital workshop proved to be a valuable contribution. This was also the opinion of the participants The combination of an integrated assessment method to assess different transport policy measures and to rank them, speeds up the policy making process at the start of drafting policies. The advantage over conventional techniques is worthwhile:

- The discussion is focused and to the point, based upon outcomes of the AMSPID;
- The time needed to get a first idea of ranking the measures is short;
- The discussion is more democratic as the meeting is not dominated by few people, everyone contributes;
- The digital workshop provides instantly results, people can see the impacts of all combined contributions;
- The digital workshop provides an automated report at the end of the meeting.

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