# Quick, but not dirty

## The role of quick scan tools in traffic and transport research

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# QUICK, BUT NOT DIRTY: THE ROLE OF QUICK SCAN TOOLS IN TRAFFIC AND TRANSPORT RESEARCH

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## 1. INTRODUCING QUICK SCAN TOOLS

Policy makers, from small municipalities to (inter)national government agencies, consult transport models output in order to enrich their decision-making process with as much information as possible. This makes the demand for specific and promptly available modelling data often bigger than actually can be met within the available personnel or budget. For this reason, quick scan tools are used in various stages of policy making. These tools shortcut the modelling process by employing less data, less calibration and less theoretically underpinned modelling approaches than proper transport models. Obviously, such tools cannot provide the same detail and quality than full transport models, and are therefore often dismissed in the community of traffic models as negligible at best, but most often are characterized as misleading and harmful to the decision-making process if applied beyond their scope.

However, the need for these tools is high and they are used in practice despite their reputation. Quick scan tools therefore can play an important role in the decision-making process. However, so far the quality of such tools and their role in the process of evaluating transport policy schemes is a topic that has gained little to no attention in the scientific community researching transport models. By rejecting the whole concept of quick scan tools, the chance has been missed to actually assess such tools with the necessary (scientific) scrutiny, in order to ensure that they are in the best shape they can be. As a result, at the moment, there is no common understanding on what these tools are or should be, what the minimum quality standards of such tools should be, and how they should be used in the different phases of transport planning.

This paper aims to discuss the pros and cons when it comes to working with quick scan tools, in the hope to kick-start a broader discussion about how to employ such tools in the best way possible. We discuss the challenges that come with making a tool that supports its users to perform meaningful analyses while limiting the possible interactions with the data/tool to an acceptable minimum. We address these issues by describing the design principles and procedural arrangements we apply to the quick scan tool owned by the Dutch Ministry of Infrastructure and Water Management, the ‘Mobiliteitsscan’ (Mobility Scan).

The remainder of this paper is structured as follows: in section 2, a definition of quick scan tools is given, in section 3, the 'Mobiliteitsscan' is described, highlighting its users and usage, in section 4 we discuss the challenges surrounding designing and providing a quick scan tool for transport planning and in section 5 we start the discussion around good practice regarding the development and employment of quick scan tools.

## 2. WHAT ARE QUICK SCAN TOOLS AND WHAT ARE THEY USED FOR?

### 2.1 Definition of quick scan tools by comparison

In the ecosystem of transport models lives a whole range of tools that cannot be considered transport models themselves, but which still play a role in making model output more palatable to policy users, citizens and other stakeholders who are not experts in the field. These can be tools purely used for visualising model data or translating modelling results into meaningful indicators, often referred to as 'viewers', or 'dashboards'. There are also tools that go beyond the visualisation, enabling the user to perform simple calculations in order to analyse the effects of certain measures. These tools are referred to 'quick scan tools', 'sketch-planning tools', 'platforms' or 'instruments'. There are many approaches to build and use such tools, which makes it difficult to collectively define them based on what they are. It is much easier to define them in comparison to what they are not: transport models.

In order to define quick scan tools by negation, we compare them to the components of the classic trip or tour-based models and activity-based models. Castiglione *et al*. (2014) compared various transport model types, including quick scan tools and sketch planning tools, on a couple of features regarding the effort to make, maintain and use the models, resulting in the table below (Table 1). Based on this comparison, it is clear that quick scan tools are the tools which require the lowest efforts in these regards.

*Table 1: Comparison of model types by Castiglione et al., 2014.,*

| Model type | Spatial/ Temporal Detail | Person/ Household Detail | Policy Sensitivity | Run time | Cost |
|---|---|---|---|---|---|
| ***Sketch planning*** | Low | Low | Low | Low | Low |
| ***Strategic planning*** | Low-Moderate | Low-High | Moderate-High | Low | Low |
| ***Trip-Based*** | Low-Moderate | Moderate | Moderate | Moderate | Moderate |
| ***Activity-Based*** | Moderate-High | High | Moderate-High | Moderate | Moderate |

Quick scan tools can achieve this low level of required effort by taking some short cuts in comparison to more elaborate transport models. These can be summarised as follows:

- **Relative change**: quick scan tools calculate the difference between a "before" and "after" scenario, that represents a policy idea, by calculating the absolute or relative delta in travel times or travel costs and translating that difference directly into a shift in modal shift and/or route assignments. The number and distribution of trips are often taken as a boundary condition in quick scan tools and do not change in the calculation process. Quick scan calculations can therefore only be compared to each other when based on the same source data.
- **No behavioural explanation**: Quick scan tools cannot calculate effects for scenarios without source data that serves as ground truth for the modal split and/or network loads. There are no advanced behavioural explanations incorporated in quick scan tools, they rely on the data from transport models to contain this information. The quick scan methods often draw from concepts such as generic distance decay curves or generic elasticity factors, and indicators are derived by adding generic index factors. In order to achieve consistency with the source model, the outcome of the quick scan calculations is often bound to the source data by numeric methods after the effects are calculated, limiting and smoothing out the results in order to show plausible effects. Because of this, the results of quick scan tools are not explanatory by nature and can only point into the possible direction of expected effects within a certain range of magnitude.
- **Aggregated data**: in order to speed up the calculation process, quick scan tools often only work with a subset of the source model data, aggregate zones of the source model data and/or focus on a certain area of the network.
- **Focus on traffic and its impact**: transport models aim at modelling the whole chain from land use to network use – often in a simultaneous modelling effort, while quick scan tools put the focus on calculating the "end results", namely effects on the network loads and the resulting impact on other areas by translating mode choice and/or traffic intensities into indicators for mobility, accessibility, productivity, sustainability etc.
- **No or only few iterations**: the working of transport models is based on iterative processes that strive for balance in spatial distribution, demand, travel times etc., while quick scan tools calculate each step only once. Within a quick scan calculation step, one can often find some iterative and balancing elements, but there is no or only very limited balancing between the steps in order to speed up the calculation process.
- **Fast and comprehensible outcome**: the processing time of a complete transport model run can take hours, often days. The results of these calculations are most often elaborate matrices, tables, spread sheets and shape files. Quick scan calculations on the other hand take between a couple of seconds to minutes. The

results are presented as a tangible indicator that speaks to a policy maker by indicating of a policy idea sufficiently supports a policy goal or not.

In figure 1 we provide a schematic flow of the data and calculation steps that form a transport model (for the sake of simplicity only for a classic 4/5-step model, similar steps are taken in activity/agent-based models), in comparison to the data and calculation steps that form a typical quick scan tool.

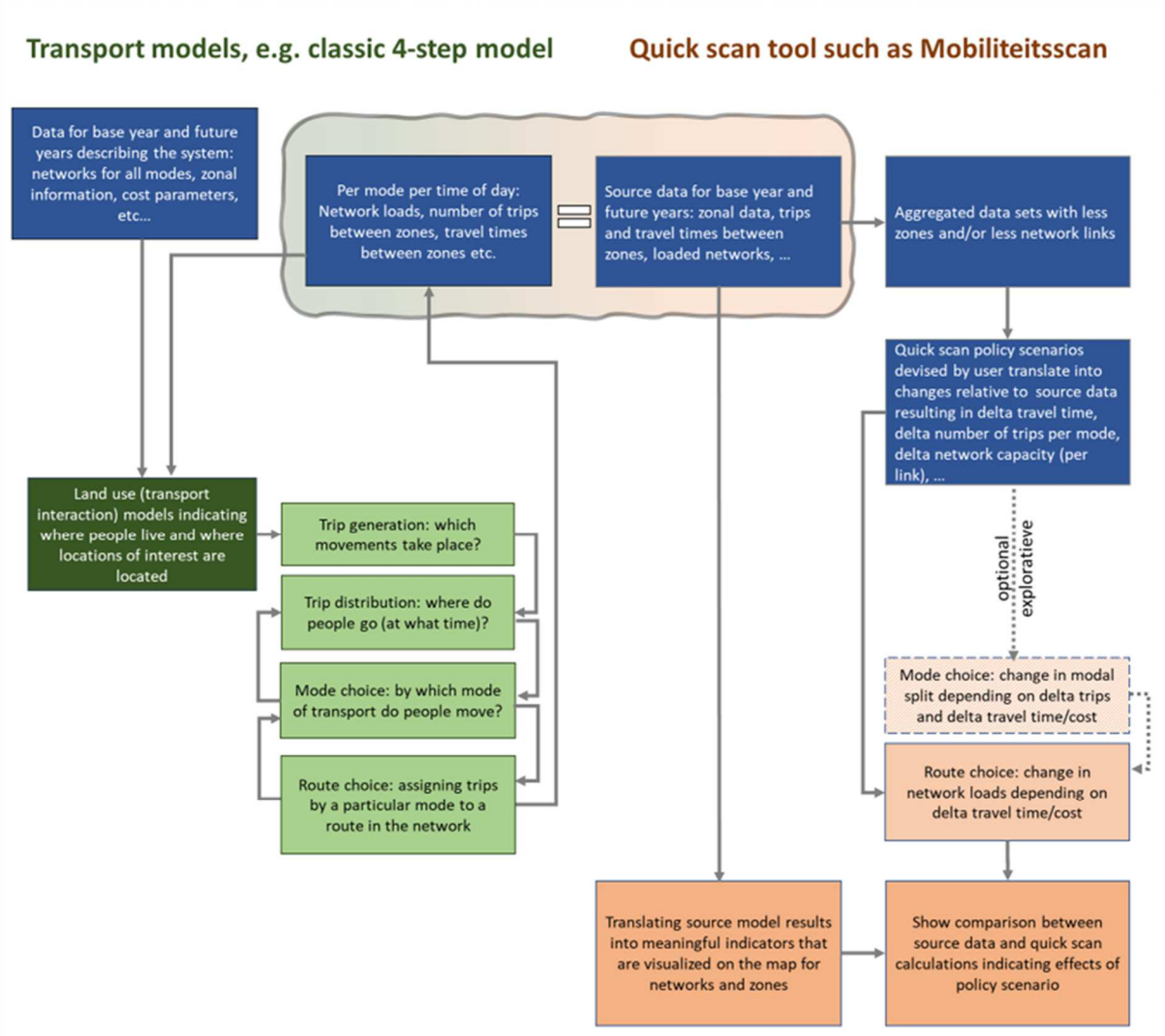



*Figure 1: Schematic representation of the data (blue) and calculation steps for transport models (left side) and quick scan tools (right side)*

## 2.2 The scope of quick scan tools

Quick scan tools are applied when rough estimates of travel demand are sufficient in order to get information on the order of magnitude (Castiglione *et al.*, 2014, Taale

and Pel, 2019). They are used for assessing quickly a long list of policy ideas in regard to how much value each idea contributes, in order to determine the candidate ideas that a worthy to investigate further (Henscher *et al*., 2020, Meurs *et al*., 2013). Quick scan tools are used for a specific target analysis, based on changes between a before and after situation translated into specific indicators. They cannot support decision making on large-scale longer-term policy and investment (Castiglione *et al*., 2014). Because the tools are set up this way, they can support the decision-making process in a very early phase, in which policy ideas are not described or designed in detail yet (Meurs *et al*. 2013, Borst, J., 2011). Once these preliminary policy ideas are evaluated positively, there should always be a follow-up in which the possible effects are explored in more depth with a more advanced transport model (Rijkswaterstaat, 2024a).

Various commercial and non-commercial quick scan tools are available to policymakers, all promising easy-to-grasp analyses of source data and the possibility to perform tentative effect studies in the early planning phase. The setup time for a policy study from scratch depends on the degree of dependence on pre-installed transport model data or open-source data, as well as the requirements regarding consistency between quick scan and transport model results. This can range between a couple of minutes for tools that come with a pre-installed transport model data (Rijkswaterstaat, 2024b) to a couple of days or weeks for models that need to generate case-specific source data (Aimsun, 2024; PTV, 2024). Therefore, these tools are not only fast in calculating multiple policy scenarios, but also much cheaper and quicker to set up for a specific scenario than a full transport model. This is advantageous in cases where no local transport model is available, or where transport policies extend beyond the scope of the local model. In such situations, quick scan tools are sometimes used to support decision-making without a thorough follow-up analysis using transport models. This is where it can get a bit tricky regarding the scope of these tools: if no other information is available, a quick scan tool may aid the decision-making process, even if applied in a way that departs from the principle that their results must always be confirmed with a transport model. However, if more appropriate tooling is available to quantify policy effects further, this should always be the preferred option for devising policy decisions. Defining the scope of quick scan tools is therefore dependent on the availability of other tools.

The definition of the scope of quick scan tools is often blurry, which can be confusing to policy makers who lack a strong background in transport modeling techniques. We argue that this is the root of the bad reputation that quick scan tools sometimes have within the transport modeling community, as they have been used, deliberately or not, in situations where they should not have been the sole source of information. This paper aims to contribute to the discussion on best practices for developing and applying quick scan tools, as well as how to effectively communicate with users about the tools' scope and limitations.

## 3. THE MOBILITEITSSCAN: SCOPE, DESCRIPTION, AND USAGE

### 3.1 Scope of the Mobiliteitsscan

The Mobiliteitsscan is an online application provided since 2018 by the Dutch Ministry of Infrastructure and Water Management, and which is managed by the executive branch of the ministry, Rijkswaterstaat. This quick scan tool is used for spatial analyses and traffic planning in a twofold way: (1) for visualizing data from traffic models and (2) to assess mobility and sustainability impacts of possible policy schemes.

The first area of application is visualizing and analysing transport model data on a regional scale and across various modes of transport over a broad spectrum of indicators. The Mobiliteitsscan is particularly suitable for the following types of visualizations and analyses:

- Visualization of networks as used in traffic models, including information on link level on travel speeds, traffic volumes/passengers (on the road network filtered to passenger cars and freight vehicles);
- Visualization of model outcomes such as number of trips between origin and destination zones, travel times between zones, social-economic characteristics of a zone;
- Analysis of model data using commonly used indicators such as travel time factor, selected link analysis, travel time isochrones, accessibility of a zone;
- Comparative analysis of indicators for the three main modes of transport: car, public transport, and bicycle;
- Comparative analysis of indicators for different directions (arrivals, departures).

The Mobiliteitsscan contains modules to analyse transport model data in four categories: (a) infrastructure and traffic management, which focus on the network data; (b) spatial and accessibility, which primarily focus on zonal data from an accessibility point of view; (c) mobility, which focus mainly on the number of trips between zones, and (d) sustainability, which translate link volumes in emission data. Modules often offer various filter options that allow the user to generate a specific indicator.

No expert knowledge is required to perform visual analyses with the Mobiliteitsscan General knowledge of the transportation domain and a basic understanding of transport model data are sufficient. The quality of the displayed data and its suitability for analytical purposes depends primarily on the appropriateness of the model data selected by the user.

A second area of application is exploring the impact of potential policy measures based on quick-scan calculations in order to derive a short-list of promising possible transport schemes by comparing "what-if" scenarios in the early stages of exploration

of different solutions/approaches. The goal is to quickly visualize a large number of possible solutions. The Mobiliteitsscan can support the analysis of the following policy ideas/schemes:

- Comparison of various infrastructure measures for one mode of transport addressing the question if this will result in longer or shorter travel times;
- Comparison of the effects on the road network from different spatial measures: adding new housing, changing the number of car trips for a zone, addressing the question if this will result in changes in the usage of the network.

The Mobiliteitsscan contains modules to formulate transport schemes and visually compare the effects in order of magnitude and direction in the same four categories as the analyse modules.

The implementation and effect analysis of policy schemes must be done with location-specific expertise. There is definitely some expert knowledge required when analysing the impacts of various schemes. While schemes should always be compared with the baseline and/or with each other, they should not be used to generate absolute, numerical data. The quality of the displayed data and its suitability for analytical purposes depends on the choices made by the user and the calculations made by the Mobiliteitsscan. The calculation of the effects of schemes in the Mobiliteitsscan can never replace the calculation by a traffic or transport model.

### 3.2 Purpose of the Mobiliteitsscan

The idea behind providing the Mobiliteitsscan is to offer a free tool that can be accessed by policymakers, or consultants working on their behalf, enabling the use of a uniform tool based on various transport model data. One of the original applications was the use in infrastructure projects in an explorative phase. In these projects various stakeholders search for the optimal solution for spatial solutions by funnelling from a broad spectrum of ideas to the most suitable solution. The goal of this explorative phase is to derive a short-list of candidate ideas that are worth exploring further in the next step. This is where the Mobiliteitsscan shows its strength: with policy scheme calculations taking only a few minutes, a wide range of ideas can be quickly explored, even in live sessions with stakeholders if desired. In this explorative phase it is not crucial to oversee all implications of an envisioned policy scheme, instead it is sufficient to rank ideas based on initial indications of direction and magnitude for selected Key Performance Indicators (KPI) which show that one idea is more promising than the other.

Over the past years however, the Mobiliteitsscan has been used in a much broader way. First and foremost, the Mobiliteitsscan has been used to analyse transport model data. Policy makers in the Netherlands often make use of the various analysis modules of the Mobiliteitsscan presenting KPIs for present and future transport networks in a visual manner on a map. They do so throughout the daily policymaking process,

sometimes to gain a better understanding of the current situation, and other times to visualize future bottlenecks or accessibility issues. Some policy makers also use the quick scan possibilities of the Mobiliteitsscan to experiment with specific policy schemes, though this is a much smaller group. Specifying and comparing policy schemes within the Mobiliteitsscan is more commonly done by consultants working on behalf of policymakers. The apparent demand for a tool that visualizes transport model data and converts it to commonly used KPIs has led to an official expansion of the Mobiliteitsscan's purpose, and in 2024 the tool was designated as the official viewer for the Dutch national transport model LMS/NRM.

### 3.3 Description of the Mobiliteitsscan

*Data in the Mobiliteitsscan*
The Mobiliteitsscan is a platform open to Dutch transport modelling data on all levels. Currently there are datasets from 15 different transport models imported to its database. Of these models, there are 5 on a municipal level, 3 on a provincial level, 6 on a regional level and 1 on a national level. Most of the models are inserted for a specific base year and various future years/scenarios. For some models only one version is available, while others, such as the national model, get updated every year and consists of a base year linked to at least four future scenarios. All in all, there are currently 163 datasets imported, each representing a complete model run.

Each dataset contains at least the following components:
- a loaded car network (as a shapefile) with link categories, link speeds (free flow and congested), link capacities and link volumes for personal vehicles (freight vehicles are optional);
- zones (as a shape file indicating at least centroids, better are zonal shapes);
- OD-matrix for car trips within a specific timeframe;
- Travel time matrix for car trips between each zone;
- Socio-economic data per zone: number of inhabitants, number of work placements;
- Metadata describing the dataset.

The transport model data can be uploaded for the morning peak, the evening peak and/or a complete day – the users specify the time frame the model data describes. Several time frames can be uploaded within one data set.

Additionally, the following data can be uploaded linked to a data set:
- Loaded networks for bike and public transport;
- OD-matrices and travel time-matrices for freight, public transport and bike;
- Travel distance matrices for bike and public transport;
- Delays at crossroads for cars;
- Other socio-economic data per zone such as income level, number of students, number of households or the number of registered cars, etc.

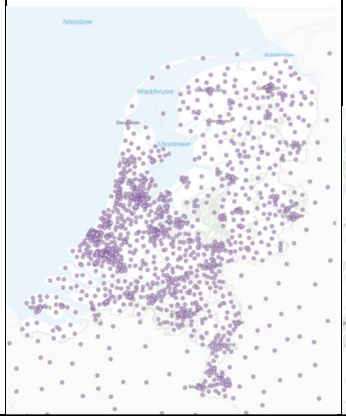
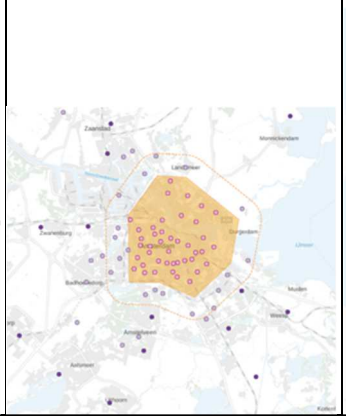
Any expert user can import model data, and there is no limit to the number of model runs that can be imported per user. The model data has to be in a specific format, the description of the format is published online (Rijkswaterstaat, 2024c). It can be a tedious process to transform the data of a transport model into the required geographical projection, which can be an obstacle to model data owners. However, once the data has the right format, the upload process itself is fully automated and, within less than an hour, the data can be accessed by the owner of the data and any user he/she wants to share the data with.

Within the Mobiliteitsscan, the imported transport model data is treated as the source model for all further analyses and quick scan calculations. Source models often consist of thousands of zones. To ensure the quick scan tool runs smoothly as an online application, it is necessary to condense the source model data into a much smaller dataset. For this reason, users can create so-called “base scenarios”, for which the Mobiliteitsscan aggregates the source model into a dataset with normally 250 zones. This aggregation process takes into account the area of interest of a project as specified by a user– the further away a zone is located to the area of interest, the more likely the zone is to be aggregated with neighboring zones. Based on a predefined heuristic (Rijkswaterstaat, 2024d), the Mobiliteitsscan determines how many zones should be located within the area of interest, how many zones should be within a buffer of 30 km around the area of interest, and how many zones should be located beyond those borders ensure that the user can create a base scenario in accordance with the project specific requirements. For base scenarios, the trip-and travel time matrices (skim-matrices) are aggregated as well for the aggregated zones.

In order to enable the enable to analyze source model data the user as much as possible, we introduced an option for source model owners to pre-calculate base scenario’s without zonal aggregation. The source model owner can share these scenarios with selected users.

*Table 2: Example of the transformation of source data into a Mobiliteitsscan base scenario given a user specific area of interest*

| | **Source model** | **Area of interest** | **Base scenario** |
|---|---|---|---|
| Source | Uploaded by owner of the transport model data, in this case Rijkswaterstaat | Defined by user | Aggregation of zones by Mobiliteitsscan, based on settings chosen by user |
| Example | Most recent version of the Dutch national model (LMS-RP24): 1407 zones within the Netherlands | City of Amsterdam: 42 non-aggregated zones within the chosen area of interest | 61 non-aggregated zones surrounding the area of interest and 145 aggregated zones within the Netherlands |

| | | | |
|---|---|---|---|
| Example: Visualization of zones (represented by centroids) |  |  |  |

*Modules and indicators in the Mobiliteitsscan*
The Mobiliteitsscan consists of currently 30 analyses modules, 18 policy modules and 20 effect analyses modules accessible to the users with a normal licence. All modules are described in detail in Dutch online (Rijkswaterstaat, 2024e).

The modules are grouped in 4 topics that help the user to navigate through the large number of modules:

- Infrastructure and Traffic Management: these modules focus on the network performance and possible infrastructural changes. There are 9 analyse modules, 8 policy modules and 4 effect modules that fall into this category.
- Space and Accessibility: these modules focus on the travel time between zones, and how many people or places of work can be reached per zone. There are 13 analyse modules, 3 policy modules and 4 effect modules addressing this topic.
- Mobility: these modules focus on the number of trips between zones, and the modal split between zones. There are 5 analyse modules, 6 policy modules and 2 effect modules addressing this topic.
- Sustainability: these modules translate the road traffic volumes into emissions. There are 3 analyse modules, 1 policy modules and 2 effect modules available.

Within an analysis module, users interact with source data where possible and base scenario data where necessary. Each module shows at least one indicator, often more. Most indicators can be customized by the users by a couple of selection options. The policy modules enable to user to make alterations to a scenario, either altering one of the networks or altering the skim matrices of a base scenario, the altered data is then saved as a policy scenario. The effect modules allow to analyse the differences between the base scenario and policy scenario, or show the comparison between two policy scenario's. In order to illustrate how the indicators are devised and how the modules work, we will focus in the following on few exemplary modules in more detail by following the usual work flow in the Mobiliteitsscan: (1) data analysis - (2) policy division – (3) effect study.

First, we start with an analysis of the base scenario in order to acquaint ourselves with the source data. Below we illustrate two modules, *"Potential accessibility"* and "*Road network characteristics*". Within a module, the user can make the following selections (see also Figure 2 and 3):

(A) Should the indicator be shown for one or two maps? If a 2nd map is shown, should the indicator be shown for the same scenario on both maps, or two different scenarios on the left and on the right?

(B) How should the indicator be shown? For example, the potential accessibility can be shown for the number of people living in a zone (economic potential) or the number of jobs per zone (employment potential), and the road network can be characterized by the link capacity, link speed, link loads, or a combination of link speed and link capacity (IC-ratio).

(C) More detailed focus of the indicators, for example should the potential accessibility be shown for car or public transport?

(D) Presentation of the indicators: the user can for example define the network levels that are shown, or determine if zones be shown as shapes, centroids of both.

(E) In case a second map is visible: should the comparison be shown in absolute or relative values?

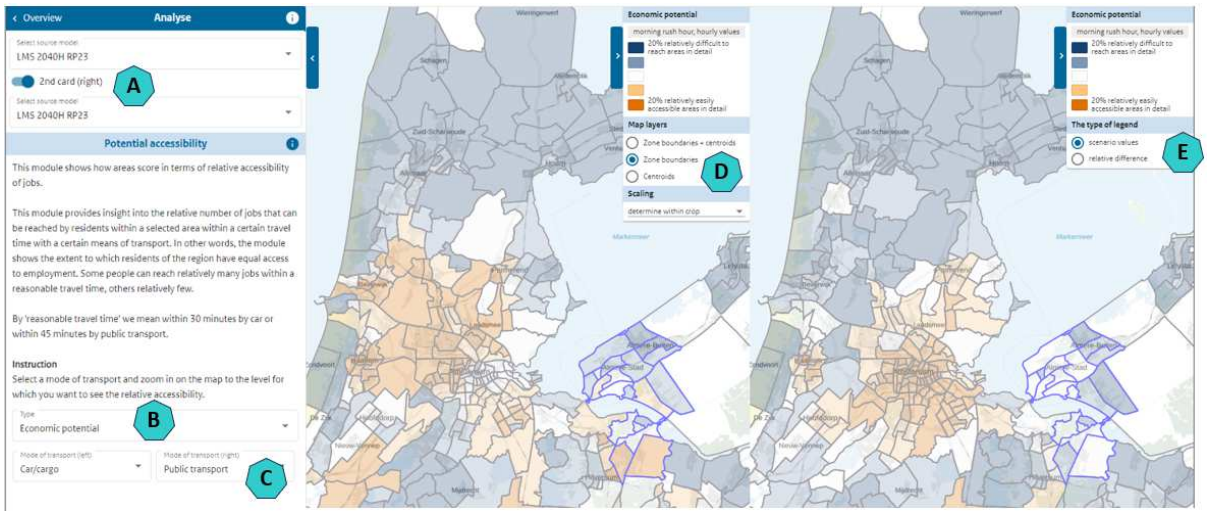



*Figure 2: Example of an analysis module in the Mobiliteitsscan - "Potential accessibility". The user can customize the indicator shown on the map. For this screenshot, the instruction text has been translated from Dutch to English directly in the browser by a translating add-on (Google Translate).*


*Figure 3: Example of an analysis module in the Mobiliteitsscan - ” Road network characteristics”. The user can customize the indicator shown on the map.*

After having analyzed the source data for all relevant dimensions, we devise a policy scenario, which is essentially a copy of the base scenario. Within the policy scenario, we close of a bridge temporarily with the help of the policy module “*Close road section*” (see Figure 4). Within a policy module, the user can perform the following actions:

(F) Choose elements such as links, public transport stops or zones on the map by clicking.
(G) For selecting items on the map, various selection tools are available.
(H) Describing the altercations in a note which is saved in the scenario log.
(I) Save the altercations to the scenario.

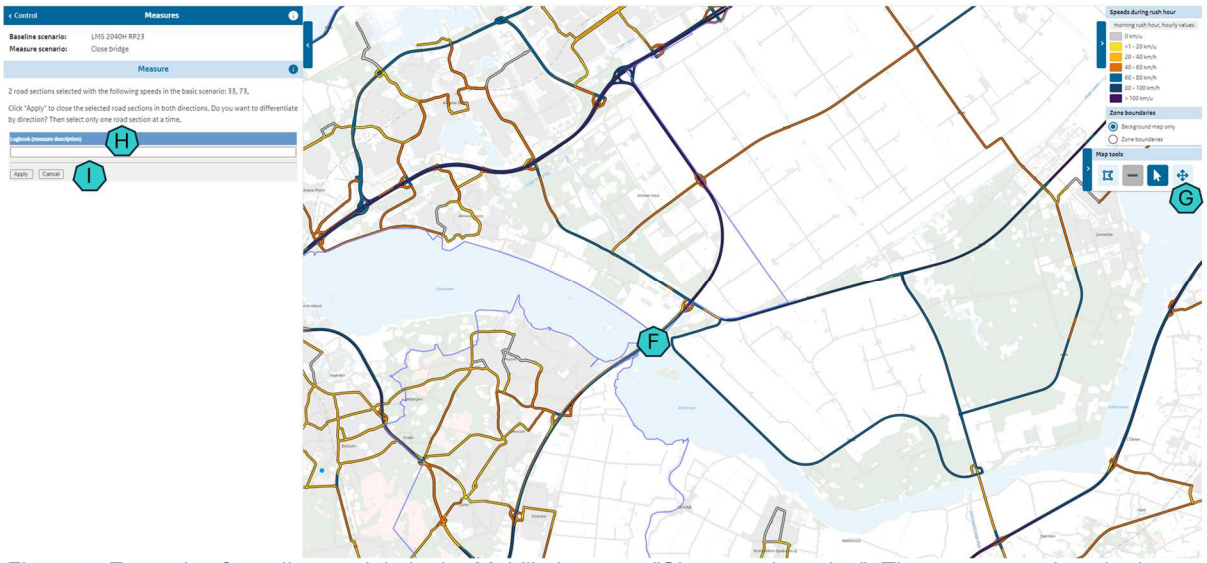



*Figure 4: Example of a policy module in the Mobiliteitsscan - "Close road section". The user can select the items that need to be altercated on the map.*

After having devised all necessary changes to the networks and the skim matrices, the user can trigger the calculation of their effects (see chapter 4 for the underlying calculation methods). After a couple of minutes, these can be analyzed with the help of the analysis modules. Analysis modules always presents the data in a comparative manner. Their structure is similar to the one of the analysis modules, the user can make the following selections (see also Figure 5 for an example of the effect module "Travel speeds from/to a zone"):

(J) Select which two scenarios should be compared. This must be either a base scenario and a policy scenario, or two policy scenarios linked to the same base scenario.

(K) Specify how the indicator should be shown, for example for which mode or which direction (from or to a zone, or the sum of both).

(L) Presentation of the indicators: The user can for example define the network levels that are shown, or determine if zones be shown as shapes, centroids of both.

(M) Should the comparison be shown in absolute or relative values?

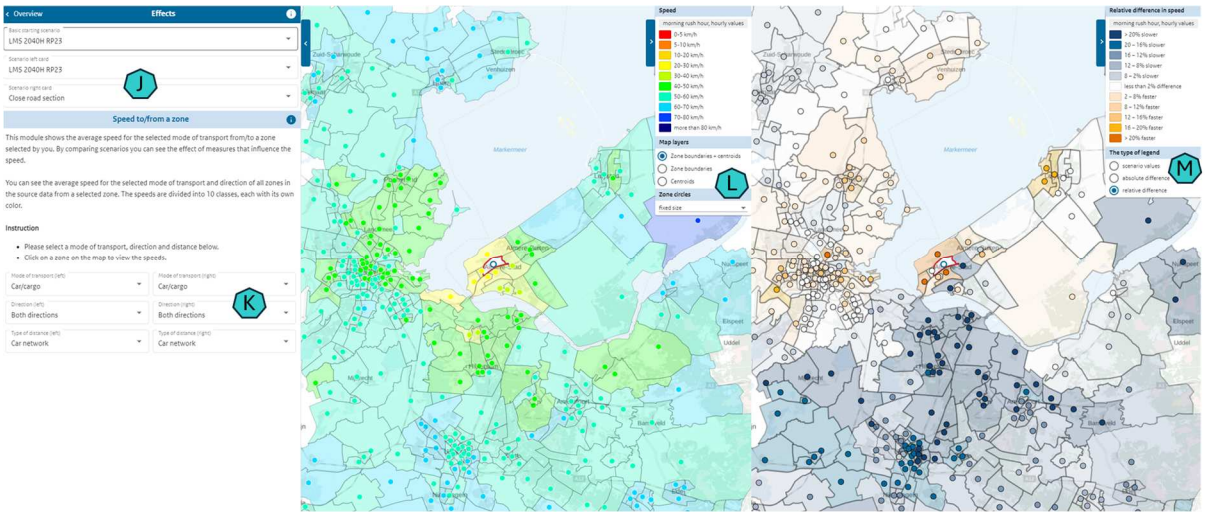



*Figure 5: Example of a policy module in the Mobiliteitsscan - "Speed from/to a zone". The user can select the items that need to be altercated on the map.*

## 3.4 Usage and users

Since its launch in 2018, more than 500 licenced Mobiliteitsscan accounts have been distributed. At the moment of writing this paper, there are 330 active user accounts. Some of these are institutional accounts, providing access to a larger group of users. For this reason, the usage of the Mobiliteitsscan is reported in the count of licences/accounts, not users.

Of the active accounts, 22% are used by consultancies, 15% are educational licences, 21% are used by municipalities, 8% by regional governments, 23% by national government agencies, and 8% of the licences are not further specified. In total two thirds of the active accounts are used by civil servants (See Figure 6).

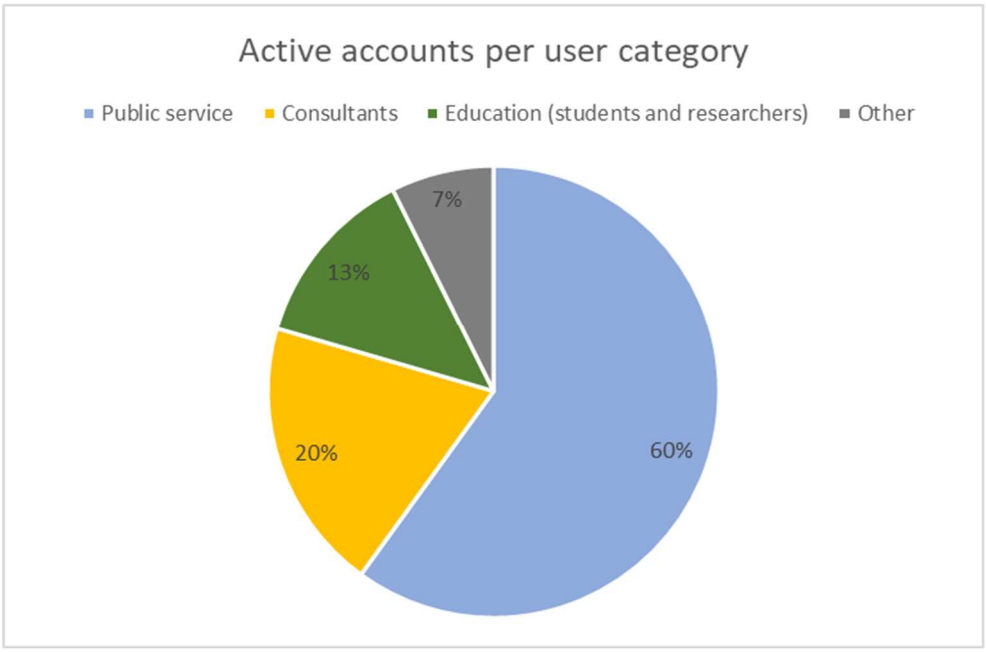



*Figure 6: Shares of user groups having access to the Mobiliteitsscan*

The usage of the Mobiliteitsscan has been growing over the years (see Figure 7). In 2023 there were 235 accounts making use of the tool, with an average of 8 log-ins per account in that year, leading to a total of 1796 sessions, while in 2020 only 120 accounts logged into the tool. Also, the engagement time with the tool increased over the last years from an average of 33 minutes per session in 2020 to 93 minutes per session in 2023.

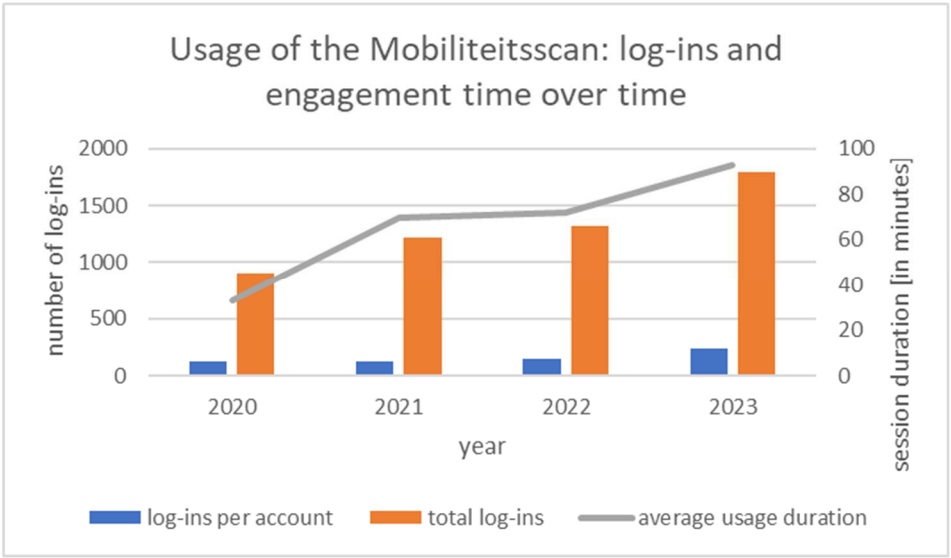



*Figure 7: Usage of the Mobiliteitsscan between 2020-2023: number of log-ins and engagement time*

The increase in usage of the Mobiliteitsscan indicates that this tool gaining an important role in in providing Dutch civil servants with access to transport model data in a visual and interactive manner.

## 4. SHARING THE MANAGEMENT PERSPECTIVE

### 4.1 Design choices supporting the user by limiting the possibilities

The Mobiliteitsscan is used by users with various degrees of experience and expertise when it comes to working with transport model data. This places a significant responsibility on the provider of the tool regarding the visualization of the transport model data, the guidance provided to users in the process of devising policy schemes, and the effects that are calculated. As the owners and managers of this tool, we strive to accommodate the users' desire to explore diverse ideas and analyses, while also maintaining the integrity of the source data and limiting the results of an effects study to "direction and magnitude" in order to avoid misplaced precision. Over the years, we have established various design principles that we believe help us achieve this balance.

1. The **source model data is leading**, and is treated as the ground truth:
   a. As a result, we show source data wherever possible in analyses modules. For analyse modules that require a base scenario, because they show a pre-calculated indicator, we encourage the use of the non-aggregated base scenario's.
   b. If a source model does not contain certain data categories (for example if bike data or certain zonal data are missing), the Mobiliteitsscan makes modules that show indicators based on these data categories unavailable. This is a new approach for the Mobiliteitsscan, in the early years of the Mobiliteitsscan was missing data often replenished with default values or approximations. While this made the use of the tool more seamless for the user, it also was less accurate.
   c. Effects calculated by the Mobiliteitsscan are shown as a delta value between a base scenario and the policy scenario, projected on the source model data. In the effect modules, users always see the source model zones, not the aggregated zones.

2. The **user is responsible** for a solid case study, the data owner is responsible for accurate source model data:
   a. The Mobiliteitsscan is a platform on which owners of transport model data can upload and share the data. They are responsible for the soundness of the data, as well as the parameter settings linked to source model data.
   b. Owner of source model data can provide disclaimers that explain the origin of the data and possible limitations of the data.

c. The Mobiliteitsscan provides default values for all parameters, but encourages data owners and users to overrule these values wherever they see fit. This flexibility is necessary when being open to transport models on all regional levels.
d. If the user compares source model data from two different origins, pop-ups are shown to the user explaining that the data on the left and on the right map might not be compatible. It is up to the user to actively decide whether a comparison of two different source models makes sense.

3. The Mobiliteitsscan **does not seek balance** as a system:
   a. The individual steps of traditional transport models can be approximated in a quick scan-manner by including a couple of iterations per step, but in order to be able to provide fast results, the Mobiliteitsscan does not provide the balancing nature of an iterative system looping over different steps.
   b. The build-up of the Mobiliteitsscan works in the opposite direction than a traditional transport model, with the source data as the starting point. The focus is thus put on the fourth step, route choice (Taale and Pel, 2019). The third step, modal choice, and the second step, location choice, can be triggered by the user by defining this explicitly within a policy scenario, but is currently not part of the standard work flow of the Mobiliteitsscan. Achieving consistency between the route assignment of a source model and the route assignment of a quick scan model is complex enough, as of yet any further steps down the traditional transport model cannot be performed in a consistent manner.
   c. Given that the focus is put on route choice, effect calculations are purely based on travel time. Any trade-off with other influential factors such as costs has to be translated into travel time as a penalty or a factor such as the value of travel time (VOTT).

4. Data is shown on an **aggregated level**
   a. Data on the map is displayed in large brackets, with a maximum of 9 categories. Most indicators are shown in 5 brackets.
   b. Detailed data can only be shown one link or one zone at a time. This information is provided for transparency, but cannot be downloaded or used for structural analyses.
   c. Not all indicators provided in the analysis modules are available for effect studies. Indicators are only included in effect modules if the quick scan calculations provide reasonable results.

**5.** Calculations must be **transparent** and **reproducible**
   a. The choices a user makes regarding the parameter settings of a base scenario are a fixed part of the base scenario and all affiliated policy scenarios. They cannot be altered.
   b. All parameters and settings are logged per scenario and transparently shown to the user.

c. Any key figures such as emission data or the VOTT provided within the Mobiliteitsscan are also linked to a scenario.
d. Scenarios can be shared with other users, even if they do not have access to the source data which a scenario is based on. This enables for example the data exchange between consultants and their clients, who then can trace which assumptions have been made for the division of a specific policy scenario.
e. All calculation steps are explained in full detail on a publicly accessible manual (www.mobiliteitsscan-info.nl).

6. The Mobiliteitsscan must provide **useful indicators and policy options**
   a. Originally, the focus was put purely on car oriented policy scenario's. However, a tool supporting policy makers must be flexible enough to compare policy approaches for all modes. For this reason a lot of effort has been made to include public transport and bike networks and skim matrices in the Mobiliteitsscan, accompanied by the introduction of dedicated analysis and policy modules focusing on these modes.
   b. Users have a say in which modules are developed and how the data is presented to them (see chapter 4.2).

## 4.2 Communication within and around the tool

Communicating with users of the Mobiliteitsscan is one of our highest priorities, as we aim to ensure the tool is useful to policymakers and used appropriately. The following communication methods are employed to inform users about the tool's functionality:

- Users can access a publicly accessible manual by clicking on the information icon on each page of the tool. The manual mirrors the structure of the Mobiliteitsscan, with separate webpages explaining each module and calculation step, allowing users to quickly find the information they need.
- Within the tool, we leverage pop-ups to communicate additional information about modules, data availability warnings, error notifications, and details on the calculation processes.
- For each scenario, we provide a scenario log that documents the data used, any data-related disclaimers, the selected settings, and all changes made by the user within a policy scenario. This transparent documentation ensures that any base scenario or policy scenario is reproducible.
- We maintain release notes that document changes to the software and new features of the tool, which are then shared with all users.
- We hold a user meeting at least once per year, where we present our plans for new modules or features, invite users to showcase recent applications of the Mobiliteitsscan, and discuss any questions and requests with the attendees.
- At least once annually, we facilitate a free-for-all online course for beginners, in which we provide instruction on the fundamentals of the Mobiliteitsscan.

- Furthermore, we send a newsletter at least twice per year, to which anyone can subscribe.
- The project maintains a helpdesk that provides technical assistance and guidance to users regarding the available data and the appropriate use of the Mobiliteitsscan for specific inquiries.
- When issuing licenses to students or consultants, we inquire about the purpose for which they intend to utilize the Mobiliteitsscan. If we have any reservations regarding the user's experience or the appropriateness of the project for the Mobiliteitsscan, we follow up by offering additional support through e-mail or telephone communications.

Overall, we strive to communicate about the Mobiliteitsscan in a transparent manner, openly acknowledging any weaknesses or limitations in its scope.

### 4.3 The grey area: Dealing with usage beyond the scope

On the Mobiliteitsscan website, we outline the tool's scope. We explicitly state that the tool or its data should only be used within this defined scope. However, in many cases, users have questions that fall outside this scope, in a grey area where the tool could provide some insights, but only if the results are viewed from a certain perspective or with a certain level of aggregation.

Often enough, the sole reason for using quick scan tools is that policy makers have questions that cannot be quantified by the tested and trusted transport models available to them. In such cases, they start looking elsewhere for tools that are less rigid or require less data insight, tools that rely on assumptions and a high level of simplification.

We are aware of the responsibilities inherent in using a tool beyond its intended scope when advising policymakers. However, we recognize that a restrictive attitude towards applications of the Mobiliteitsscan in the grey area does not enhance the quality of advice provided to policymakers. They may instead turn to other tools with less stringent access rules or revert to qualitative approaches in the process of shaping and selecting policy options.

For this reason, we allow the use of the Mobiliteitsscan for projects in the grey area in certain exceptional cases:

- Students are free to use the tools in any way they wish, as long as their results are not used for policy advice.
- Civil servants, as well as consultants working on their behalf, from municipalities or regions without their own transport models, may use the Mobiliteitsscan's regional model data to analyse local policy schemes. Even though the data aggregation level does not support quantitative effect studies, they can use the Mobiliteitsscan to compare different schemes in terms of direction and magnitude. This helps them

better understand the devised policy schemes in general. In such cases we provide advice that these insights may not be specific to the local circumstances.

- Policy schemes that lie far beyond the scope of traditional transport models can be inserted into the Mobiliteitsscan in an exploratory manner. The Mobiliteitsscan explicitly asks users to input their expectations for the first three steps of a traditional transport model analysis, making it clear that the resulting effect analyses reflect these user-provided expectations rather than model-derived results. For example, if policymakers want an initial understanding of the potential impact of a new mode of transport like the hyperloop, the Mobiliteitsscan can be a useful tool to begin the conversation about what to expect from such a major change in the mobility system. By prompting users to specify their expectations for ridership in traditional public transport or changes in travel times to and from a zone, the Mobiliteitsscan allows policymakers to gain a better sense of what to anticipate, both locally and nationally, in a visual manner without misplaced precision.
- Civil servants outside the transport and mobility community may also use the Mobiliteitsscan and its data if they cannot find a more suitable tool within their budget constraints. For example, we assisted a national agency with an accessibility analysis of their training centres for sustainable transport options. While the zonal data in the Mobiliteitsscan is not refined enough to provide insights into the location of specific buildings, we communicated this limitation upfront to the user and discussed other data and tool constraints. Together, we developed a plan to use the Mobiliteitsscan in combination with other available data sources and tools, which the agency then used for cross-referencing and more detailed analysis.

The Mobiliteitsscan is not intended for commercial use, verifying the effects of implemented policy schemes, or shortcutting modelling procedures that should be carried out with a transport model. The Mobiliteitsscan is meant to be used in an early exploratory phase to help narrow down a list of promising policy options. Applications that do not adhere to this intended use are not supported and are addressed as an example of bad practice, if encountered.

## 5. DISCUSSING THE USEFULNESS AND NECESSITY OF QUICK SCAN TOOLS

At the Dutch ministry of transport, we firmly believe that quick scan tools can play a useful role in supporting policy makers with evidence based indicators in simple comparative what-if scenarios supporting the process of converting to meaningful policy schemes. But we also know how easy it is to misuse such tools, involuntary or not. Being responsible for maintaining such a tool and ensuring that it is used responsibly leaves with us with many questions for the traffic and transport model community:

One of the main unsolved puzzles for us is ensuring the consistency between source model data and quick scan calculations for a platform like the Mobiliteitsscan as we progress through the steps of transport models. We are fairly confident in the way we mimic the network assignments for cars and bikes, but to claim the same level of confidence in our freight traffic assignment or calculating the route choice of public transport passengers using the quick scan approach, is a development for the future.

Furthermore, policymakers challenge us to take the next steps towards mode choice, destination choice, or trip choice to implement more meaningful policy scenarios containing multimodal trips that leverage hubs, parking policies, smart mobility options, and policies promoting mobility-as-a-service, etc. A quick scan tool may suffice if it enables the ranking of candidate solutions based on a wide range of indicators. Nonetheless, the quick scan calculations must maintain consistency with the transport model-derived source data in terms of the magnitude and directional effects. There remain significant research questions in the domain of quick scan modelling that merit further exploration.

In addition to the question of how to further develop the tool, we also face questions regarding best practices for using them. Practitioners need to discuss how to address the grey areas and ensure that users are fully informed without being overwhelmed by the information provided in the context of transparency. While it is a noble goal to separate consultancy advice from the tools used to substantiate that advice, this is easier said than done. Good advice can be based on insufficient tools, and poor advice can be based on fully validated and trusted transport models. So who is to blame if quick scan tools are used in situations where they should not have been used? We argue that the issue lies not with the tool, but with the lack of standards defining best practices surrounding the use of these tools and the lack of knowledge applying them.

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