RESEARCH REPORT 592

# Measuring the value of the movement of peoples and goods to inform the One Network Road Classification functional categories criteria

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## Determining more accurate measures for the economic value of roads

**Research has developed new criteria for measuring the economic value of roads for moving people and goods. The criteria are for use within the One Network Road Classification (ONRC) and will feed into the further development of the ONRC's performance measurement framework over time.**

### Current weaknesses in the ONRC criteria

The ONRC uses criteria to assess various aspects of a road's performance, so the road can be categorised into one of several hierarchical groups. The groups indicate the functional importance of the road.

The ONRC was developed to support:

- consistent and cost-effective asset management and investment decision making among road controlling authorities nationwide
- a consistent 'customer experience' for road users across the country. The intention is that, over time, road users can expect to have similar experiences on roads in the same category, no matter where in the country they are located.

The criteria used in the ONRC to classify roads aim to reflect the roads' roles in moving people and goods around. For example, there are criteria based on a road's annual average daily traffic count, heavy commercial vehicle traffic count, buses per hour and use for active transport modes. The criteria also aim to capture the economic and social role of roads, for example in linking communities and serving ports, airports, tourist locations and hospitals.

However, there are issues with the current criteria used for classifying and measuring the performance of roads.

These issues are due to the criteria's reliance on traffic volume measures. For example, a bus is valued similarly to a car, but may be moving many more people; and empty trucks are counted the same as full trucks, although the economic outputs from these two movements will clearly be different. As a result, the researchers found there was a tendency to understate the importance of public transport corridors in large urban areas, and to overestimate the amount of freight moved in public transport corridors (among other issues).

In addition, the proxies for economic productivity used in the classifications also tended to be indirect and therefore underdeveloped.

### The research

The research team, which drew from PwC and MRCagney, explained in their report that the research aimed to develop measurable criteria with a more direct relationship to economic output.

'We explored indicators which could be used in conjunction with the current ONRC functional classification criteria. For the long term, we developed a framework to assess the absolute productivity of roads, which could be used to replace the current ONRC functional classification criteria,' the report says (p.7).

The framework is designed to capture the inputs and outputs of roads, as a measure of their productivity, which provides the opportunity to compare the performance of different roads.

The research proposes a broad scope of inputs, including fixed costs and variable costs. For outputs, because roads do not produce an economic output, but are themselves an input to economic production, the team proposes that outputs can be measured from the use they are put to, for example in moving commuters and freight.

To capture a more direct relationship between total vehicle movements and the actual economic output the trips generate, the research proposes trips should be weighted, depending on the specific purposes they are made for. So, for example, commuting trips are weighted by the income of the traveller, and freight movements are weighted by the market price of the goods being carried. By weighting the outputs, they provide a more accurate estimate of the economic value (for example, in terms of the value of labour or the goods) that is being enabled by the road.

The researchers recognised that a key challenge in developing new measures for roads was data availability; the desire for accurate and informative new indicators needed to be balanced against the practicality and feasibility of obtaining the data to inform them.

With this in mind, the team combined the output and input measures to develop four new productivity indicators that could be used within the ONRC in future.

$$\text{Freight productivity} = \frac{\text{Freight output measure}}{\text{total road input costs}} = \frac{\text{HCV}}{\text{total road input costs}}$$

$$\text{Public transport productivity} = \frac{\text{PT users}}{\text{total road input costs}}$$

$$\text{Total passenger productivity} = \frac{\text{Vehicle users + PT users +cyclists + pedestrian volumes}}{\text{total road input costs}}$$

$$\text{Commute productivity} = \frac{\text{Commute output indicator}}{\text{total road input costs}}$$

All the productivity indicators are relative, which means they must be compared against a benchmark.

'If the indicators are adopted, we recommend establishing a benchmark database against which the productivity of road segments is compared. These could be used within current ONRC functional classification categories (eg compare roads within the primary collector roads category) to determine whether road segments are 'high relative productivity' or 'low relative productivity', which could be used for road renewals and maintenance purposes, or in transport planning more broadly,' the report says (p.8).

In the report, the authors also highlight their research was focused on the relationship of roads to activities that produce economic outputs and the resources consumed in generating those outputs. None of the indicators take into account other important functions of roads and transport, such as place-making, welfare (for example, through leisure trips) or transport network efficiency (taking into account factors such as throughput, speed, safety, travel times and accessibility).

The authors also stress that the productivity indicators are at an experimental stage. Further research would enable them to be developed further and could guide their implementation within the ONRC. The intention is that the indicators would be implemented over time, while concurrent work was carried out to collect the required data and test their application through case studies.

Overall, though, the researchers concluded in the longer term it would be better to adopt an absolute measure of productivity. This could be achieved using a second-best route approach. Analysing the additional transport costs needed if a road segment was no longer available for use and an alternative route was required represents the opportunity cost of the road.

$$\text{Productivity relative to second best route} = \frac{\text{Cost of moving to second best route}}{\text{total road input costs}}$$

'This is an absolute productivity indicator, which measures the travel time difference between the preferred route and the second best route – it is a measure of the opportunity cost of the road. This has clear direct linkages to performance measurement targets,' the report concludes (p.70).