

ABSTRACT

Tracing Accessibility over Time: Two Swiss Case Studies

Transport systems have primarily been built to enlarge the geographical range of activities for both people and industry. One measure of the resulting change in the spatial system is the change in accessibility. Thus, two main components must be considered. First, what can be reached, and second, how much effort is necessary to get there. Accessibility is the primary product of transport infrastructure as well as the link between transport infrastructure and land use.

Accessibility is seen as being concerned with the opportunity available to an individual or type of person at a given location to take part in a particular activity or set of activities. However various other interpretations of the term accessibility have been made and in order to survey the range of indices to which the term accessibility measure has been applied it is necessary to consider also the range of definitions that have been given to the term accessibility. No single 'best' measure is identified; rather the choice depends on the type of problem being studied and the resources available. Some consideration is given also to the areas of study in which accessibility may be a useful concept.

While absolute accessibility of a region is important, comparison of accessibility across time and regions is more interesting in understanding transport system change. This master thesis tries to find the proper accessibility measure that enables that analysis. The work will have to adapt to the resources available that are somehow limited by the broad scope of the study. From that the proper measures could be defined.

As an application of the research above aforementioned the present thesis analyses the change in private car traffic accessibility in two different ways:

1. The losses in accessibility in private car traffic in Switzerland due to a virtual removal of freeways to reflect network sizes in 1950, 1960, 1970, 1980 and 1990.
2. The development of accessibility in private car traffic for the complete road network of the canton Graubünden from 1950 through 2000 in 10 years steps.

In order to calculate accessibility, isochronic and gravity mode approaches are the ones used after an evaluation of the available data. On one side, the number of activity points reachable in a given time (i.e. 1 or 2 hours) is determined, with an isochrone defined as a set of points with the same travel time from a given place.

Alternatively, a gravity measure is used to calculate accessibility by means of a potential function. To establish the possible activity or opportunity locations, the community-level population data are used. A data base is implemented for every decade. In determining travel time, an assignment model is implemented to calculate the time-effort (which is defined as the travel cost) required for passenger trips by car with a travel time matrix for the approximate 3000 municipalities. That is managed with the help of a traffic software (VISSUM). The level of service of the road network, from which the travel time between different nodes is established, is calculated considering permitted speeds and capacities through the time. Those data come from the revision in old publications and manuals. Finally, accessibility is calculated as the travel time weighted sums of opportunities by means of a statistical program that allows programming and a good manage of large databases (SAS). The results from these calculations are hard to visualize. In order to manage that, Arch View software is used

The analyses of the results will give indications as to which areas benefited from the improvements of the road network and how the distribution of accessibility for all municipalities has changed over time.