ASSESSING TRANSPORT DISADVANTAGE AND TRANSPORT-RELATED SOCIAL EXCLUSION FOR INCLUSIVE TRANSPORTATION PLANNING: A REVIEW OF METHODOLOGY

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Abstract

It has long been recognized that transport has a significant effect on the occurrence of social exclusion. The absence or lack of access to transport can cause a person or group in difficulty to participate in various activities, such as difficulty of getting jobs, education, health care, and difficulty participating in arts and cultural activities. Individuals or groups that hampered his participation due to lack of access to transport is stated in literatures as experiencing transport-related social exclusion (TRSE). Other term to explain what happened to the person or the group is transport or mobility disadvantage, although the two terms are not always synonymous. Transport-related social exclusion is usually experienced by the poorest people (which are only able to live in a place with limited accessibility) and those who are socially disadvantaged such as people with disabilities, the elderly, women and people from ethnic minorities. For inclusive transportation planning, accommodating the interests of each group, including marginalized groups is critical. In this regard, this paper aims to examine the various methods that have been developed to identify the occurrence of transport-related social exclusion as an input for an inclusive transportation planning. The method used in this paper is literature review. Based on the review, there are three methods used in assessing transport disadvantage and TRSE, which are GIS, modelling and statistical analysis, and qualitative analysis. These three methods have its own advantage and disadvantage and could complement each other. There are also some issues in utilizing these methods in Indonesia, which are: data availability and cultural barriers.

Keywords: transport-related social exclusion, inclusive planning, methodology

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1. Introduction

Inclusive planning is become a discourse in Indonesia development planning at this moment. This happens especially after the enactment of Presidential Instruction (Inpres) No. 3 of 2010 about Equitable Development Program (Program Pembangunan Berkeadilan). One of the programs is called Justice for All programs. This program included: justice for children, women, employment, legal aid, legal and judicial reform, as well as justice programs for the poor and marginalized. However, among the programs included, it is still largely focused on the provision of social assistance. In this case the role of planning, in particular transportation planning, in improving the inclusiveness of marginalized groups still not be accommodated through the Instruction.

Meanwhile, the role of transport in the occurrence of social exclusion has long been recognising in research in developed countries. The absence or lack of access to transport can cause a person or group in difficulty to participate in various activities, such as difficulty of getting jobs, education, health care, and difficulty participating in arts and cultural activities (SEU, 2001; Currie, 2009; Johnson, Currie and Stanley, 2011). Individuals or groups that hampered his participation due to lack of access to transport is stated in literatures as experiencing transport-related social exclusion (TRSE).

It is important, therefore, to understand the method that can be used to assess transport disadvantage and TRSE in Indonesia in order to accommodate the different interest of marginalised group. In this regard, this paper aims to examine the various methods that have been developed to identify the occurrence of transport-related social exclusion as an input for an inclusive transportation planning. For this purpose, the paper starts with short review of literature examining the concept of transport disadvantage and TRSE. This is followed by explanation of different methodological approach in assessing transport disadvantage and TRSE. It is then concluded by methodological challenges in accessing transport disadvantage and TRSE in Indonesian context.

1. Transport Disadvantage and Transport-related Social Exclusion

The link between social exclusion and transport began to attract attention in the last ten years (Delbosch and Currie, 2011: 556). However, the social impact of transport is the least discussed aspect compared to the economic and social impact (Jones and Lucas, 2012). In transportation field, the issue of social exclusion arises from the understanding that the availability of transportation services can have social impacts on different individuals and certain groups (Banister and Hall, 1981). Individuals and groups, who are not served by existing transportation systems, can suffer social exclusion due to lack of access to opportunities (Preston and Raje, 2007). They are groups or individuals who experience transport-related social exclusion. Other term to explain what happened to the person or the group is transport or mobility disadvantage, although the two terms are not always synonymous (Lucas, 2012). Someone who is experiencing transport disadvantage is
not necessarily experiencing social exclusion, as well as someone who experienced social exclusion is not necessarily caused by transport disadvantage.

In the research on transport and social exclusion, there are two commonly used approaches, namely: category approach and spatial approach (Church, 2000). Category approach relates to the conditions attached to the individual, such as: age, disability, gender, and race (Johnson, 2011; Lucas, 2012) while the spatial approach related to the conditions associated with the area where the individual is living, for example: downtown area, ghetto (Cervero and Tsai, 2003; Cervero, 2004 in Delbosch and Currie, 2011) and suburb (Currie and Delbosch, 2009). Therefore, social exclusion in transport are usually experienced by the poorest people (which is only able to live in a place with limited accessibility) and those who are socially experienced obstacles such as people with disabilities, the elderly, women, and people who came from ethnic minorities (Lucas, 2012). This is in line with research from Preston and Raje (2007) who found that transport-related social exclusion is the result of a combination of the area accessibility, mobility accessibility, and individual mobility.

Social barriers experienced by people or groups who have transport disadvantage are included: difficulty in accessing employment, basic public facilities such as health and education, difficulties in participating in social activities, and the inability to travel out (The Social Policy Research Unit, University of York, 2000). In his writing, Church (2000) classifies mobility limitations experienced by people who are socially excluded into 6 categories:

1. Physical exclusion: occurs when physical limitations hinder the accessibility of the movement of people or certain groups, such as vehicle design, the lack of facilities for the disabled, or the lack of information about the travel schedule,
2. Geographic exclusion: occurs when settlement location prevent someone or some groups from accessing transportation services, for example: the suburbs that have limited accessibility
3. Exclusion of facilities: occurs when the distance and the availability of existing public facilities hinder a person or group of people to access the facility.
4. Economic exclusion: occurs when the cost to travel inhibits a person or group of people to access facilities or work that affects earnings.
5. Exclusion related to time: occurs when the need of time to do other activities such as: raising children, caring for sick family members, reducing the availability of time to travel
6. Exclusion related fear: occurs when the fear of personal safety, inhibits a person to use a public space or public transportation.
7. Exclusion of space: occurs when spatial arrangement inhibits a person or group of people to access public spaces, such as the VIP waiting room at the station.

According to Lucas (2004), there are many variations of the reasons that drive a person is in an excluded condition. The reasons can be grouped into three main factors that affect the accessibility of a person, which in turn affects the transport-related social exclusion. Those factors are: 1) activity factor, which is related to
settlement type, topography, environment, infrastructure conditions, the condition of local service facilities, 2) personal factor, related to age, gender, ethnicity, dependability, responsibility, revenues, and 3) transportation factor, relating to the type, availability, suitability, travel costs, and information (Lucas, 2004: 43). These three factors interact and influence an individual’s decision whether to continue with the activities that have been planned, reschedule or relocate their activities, or leave the event when other options are not available.

Social exclusion problems related to the accessibility factor encouraging research, especially in developed countries, such as UK, USA, and Australia. Discussion of social exclusion associated with transport began in 1998 with the publication of the 1998 UK White Paper on Transport which is one of the contents expressed the need for integration of transport with education policy, health and welfare policy so as to form a more equitable and inclusive community (Church et al, 2000). This statement was followed by numerous studies. One was published in 2003, Making the Connection: Final Report on Transport and Social Exclusion. This report was followed by other studies, both in the UK as well as in other developed countries such as the United States, the Netherlands, Australia and other European countries. The study covers the extent of social exclusion in the transport, how to calculate and to integrate social exclusion issues in transportation policy, and assess the impact of a transport policy on social exclusion. Lucas (2012) stated that one of results of these studies is that transport-related social exclusion depends on the context and circumstances of each individual.

In developing countries, the study of the social impact of the transport system is still not widely practiced. Though the number of the poor and the lack of public transport services in developing countries, transport-related social exclusion is likely to occur. In Bogota, Colombia, the total frequency of trips of residents in the poorest parts of the city only reached 1.5 trips per day, while the cost of transportation reached 20% of the total income. (Bocarejo and Oviedo, 2012). In Indonesia, the population in urban slums in Jakarta, Yogyakarta and Solo, spend 10% of their income on transportation (Renny, 2009). With the low level of public transport services, the poor in these cities also had to have a motorcycle, without thinking of safety and pollution resulting from the vehicle (Renny, 2009). It is thought to also occur on the poor who live in the suburbs, where access to public transport is limited.

For inclusive transportation planning, accommodating the interests of different groups, including marginalized groups is critical. So that, it is important to recognise the possibility of transport disadvantage or TRSE occurred in a particular area or community as an input. In this regards, there are some methods used in the research about transport disadvantage and TRSE. In those researches the term transport disadvantage and TRSE are used alone or together.

The term TRSE cannot be separated from transport disadvantage, although it has been said that the two terms are not always synonymous. In some studies, both terms is defined similarly. For example Stanley and Stanley (2004, p: 14), define transport disadvantage as “a situation where people experience a shortage of transport options, which restricts their mobility and hence their access to goods, services and relationships”. While Warren (2011) in her paper Transport Disadvantage: a significant issue in an unequal society stated that a person or family
considered suffering disadvantage if: they are hampered from opportunity because of the travel problem, including the cost of transportation that is too high for them; or because the transport problem restrict where they can live. Hurni (2006) said that transport disadvantage involves transport disadvantaged areas and transport disadvantaged groups of people. Thus, transport-related social exclusion emerged in the situation where people with transport difficulties (transport disadvantage group) live in transport disadvantaged areas. Therefore transport disadvantage is considered as one of the causes exuberate social exclusion through barriers to important services (Delbosch and Currie, 2011).

2. Methodological approach in assessing transport disadvantage and transport-related social exclusion

Assessing transport disadvantage and transport-related social exclusion can be executed in macro and mezzo level by area-based method; and micro level through person-based method. In assessing transport disadvantage and TRSE using area-based method, public transport performance indicators are usually used. Areas that are lacking or are not served by public transport, considered as areas experiencing transport disadvantage. From various studies conducted for assessing transport disadvantage and TRSE, there are 3 main methods used which are GIS, modelling and statistics, and qualitative analysis. Each of these methods has its own advantages and disadvantages.

In term of scale of the data, analysis of transport disadvantage and TRSE using GIS method needs data in area-based unit analysis. Modelling and statistical method could use area-based and person-based data, while qualitative method needs person-based data. For the analysis using GIS method result in aggregate geographical level of analysis, while using qualitative method enable disaggregate individual or household level of analysis. For analysis using modelling and statistical method, it depends on the scale of the data. If the data used are in area based level that it will result in aggregate level of analysis, but if the scale of the data is person or household level then it could generate analysis in aggregate geographical level or disaggregate group level.

<table>
<thead>
<tr>
<th>Method</th>
<th>Scale of the Data</th>
<th>Type of Analysis</th>
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<tbody>
<tr>
<td>GIS</td>
<td>Area-based</td>
<td>Aggregate (geographical level)</td>
</tr>
<tr>
<td>Modelling and Statistical</td>
<td>Area-based or person-based</td>
<td>Aggregate (geographical level) or dis-aggregate (groups level)</td>
</tr>
<tr>
<td>Qualitative analysis</td>
<td>Person-based</td>
<td>Disaggregate (individual or household level)</td>
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</table>
2.1 Geographic Information System (GIS)

The use of GIS to assess transport disadvantage and transport-related social exclusion allows the combination of various types of spatial information with other information to map the various characteristics of the transport system (Dodson et al., 2004). Analysis made by this method can be carried out starting from the simple to multiple variables.

GIS method often uses in the studies about the level of service of transport service and other public facilities. Example of this kind of analysis can be found in Murray et al. (1998), Hurni (2006), and Miller (2009) studies. In his study, Murray identified suitable public transport access, which is area in South East Queensland that is covered by public transport. For that purpose, Murray used 400m coverage distance from bus, tram, or rail station as a standard for an area to be classified as suitable public transport area. A more complex data of public transport service was used by Hurni. Hurni examined the transport disadvantage area in Western Sydney using proximity to a transport stop data and frequency of service at the stop data. For the proximity to a transport stop, Hurni used 800m buffer standard to define what it called ‘transport disadvantage CDs (Census collection Districts)’ and ‘transport accessible CDs’.

It terms of data, analysing transport disadvantage and TRSE using GIS analysis could incorporate two kinds of data, which are:

1. Public transport service data, such as: location of the bus station, bus stop, and train station, list of rail, bus, or tram routes, bus service level (service frequencies), access distance to each stop/station (the GIS term used is buffers), travel time, and waiting time.
2. Demographic and social economic data, such as: vehicle ownership, income, distribution of people with disabilities, ethnic minorities, household/family status, and age.

The combination of two kinds of data (transport data and social economic data) creates more sophisticated GIS analysis as demonstrated by Miller (2009). In his study, Miller incorporated the data of walk accessibility, bus supply index and overlaid it with socio-economic data.
Figure 1. Miller’s (2009) map of area according to walk accessibility, bus service index, and social level in Wagga Wagga, New South Wales, Australia

The drawback of this method is it requires the availability of adequate spatial data and combinations for a good analysis, which is largely depends on secondary resources. In some area such as in developing country like Indonesia, this kind of data is hardly available. Moreover, assessing transport disadvantage and TRSE using GIS methods cannot look at things that are subjective and specific because it uses area as the unit of analysis, whereas social exclusion is a personal experience.

Modelling and Statistical Method

The simplest assessment of transport disadvantage and TRSE is by using descriptive statistics. Some examples for that is the study from Robinson et.al (2000); Robinson explores the shopping difficulties experienced by low-income shoppers by looking at the frequency distribution of respondent’s answer in the form of percentage. The limitation of using descriptive statistics is it can only give an overview of the current or past condition, without providing tools to look at the correlation with other factors. Moreover, if descriptive statistics is used for data taken from sample, it will only represent the analysis for the sample, not the population.
Studies that using more complex analysis using multivariate statistics was done by Raje (2007), and Bocarejo et.al (2012). Raje used an explanatory study using Q methodology which is an alternate method that offers a way of revealing patterns that is caused by the same attitudes toward something (Raje, 2007) to investigate perceptions of transport’s role in people’s lives. It is an alternate technique from factor analysis, the more common technique in multivariate statistics. The distinguished features of Q is that it does not use concepts or measures that have been pre-specified by researcher, such as gender, age, and other demographic characteristics (Adams and Proops, 2000 in Raje, 2007). By using this method, Raje found four discourse regarding the role of transport’s in someone’s live which are: the contented resident, the multi-mode advocate, the car as escape from local deficiencies, the multi-mode advocate, and the disaffected theorist. Another way of using multivariate analysis is demonstrated by Bocarejo et.al (2012) and Kamruzzaman and Hine (2011). Both of the studies used multiple regression technique to assess transport disadvantage and TRSE. Bocarejo et.al tried to identifying transport disadvantage by calculating accessibility levels to the labour market for different zones of 10 cities in Columbia as a function of travel times and travel expenditures, while Kamruzzaman and Hine used area profile, gender, car-ownership, income, age, occupation as explanatory variables for participation.

Assessing transport disadvantage and TRSE using models and statistical methods as demonstrated by Robinson el. al (2000), Raje (2007), Kamruzzaman and Hine (2011) and Bocarejo and Oviedo (2012) have some advantages. Among them are the results obtained are quantitative so that it is more practical as policy input. According to Dodson (2004), the use of modelling to assess the transport disadvantage meets the 'objective' and 'scientific' qualification so that it is often used politically to justify a policy. In term of data collection, this method could use the data obtained from secondary data sources that already exist. It could be seen as a benefit if the database about transport service and social status of the community are available and up to date. However, it could be a drawback if such data does not exist.

As the purpose of making a model is a simplification of the actual conditions, the weakness of this method in assessing transport and TRSE disadvantage is there is a chance that important variables are not included in the model. As shown in Kamruzzaman and Hine’ study, transport disadvantage as indicate in this study by participation index cannot be explained by the explanatory variables alone. The interaction between the explanatory variables was found to have significant effects in the models, instead. From that it can be inferred that other variables that were not included in the model may also have affect the participation.

In term of level of analysis, the use of modelling and statistical method also allows the aggregate analysis, i.e. assessing the transport disadvantage and TRSE in a single number or index, as well as disaggregates by assessing the occurrence and TRSE transport disadvantage per components. The use of aggregate and disaggregate analysis of this methods can be found in the studies explained above.
2.2 Qualitative Analysis

The advantage of using qualitative methods to assess the occurrence of disadvantage is that it can generate subjective and personal information of individuals who become the target of the research. This is in line with the idea underlying the birth of the concept of social exclusion in the transport, that realize there are certain people or groups who have difficulty doing activities that are considered normal by the surrounding community. In this case the person or group is usually a marginal or minority groups so their interest is often not identified by using the generalist method.

Examples of studies using qualitative method are the studies undertaken by Hine and Mitchell (2001, 2003) and McGrath et.al (2007). In Hine and Mitchell first study (2001), the transportation barriers experienced by transport disadvantage group is explored. Based on the data taken from three projects, this study examines people’s travel experiences in order to develop understanding of the factors that influence an individual’s choice of travel. In all three projects, the data was taken from interview based on the personal characteristics. Sample are taken based on age, gender, disability (visually impaired), and socio-economic status (employment status, low income). In one of the project which involved visually impaired people, the researcher conduct two level of interview, which involved 6 exploratory interviews and further 15 interviews to get a better understanding of the information obtained from the first interview. All of the data is presented in the form of non-quantified statement which represent respondent’s travel experiences. The second study by Hine and Mitchell was conducted to explore the transport need and transport-related social exclusion in urban Scotland. The data gathering involved household’s survey, and interviews. Some of the result of this study presented in the form of descriptive statistics and non-quantified statement from the respondents.

The difficulty in using this method to assess transport disadvantage and TRSE is the need for intensive primary data collection through interviews. To reduce the difficulty in collecting the primary data, some studies (Department for Transport (DETR), 2000; McGrath et.al, 2007) using the combination of interview, questionnaires, focus group and informal group discussion method. With focus group, the information from the respondents can be explored without having to do one by one interview. However, the disadvantage is, there is a possibility that respondents hide some information because of the shame when they have to disclose the topic is considered as a deficiency in front of many people.

3. Methodological challenges in accessing transport disadvantage and transport-related social exclusion in Indonesian context

The review of the methods in assessing transport disadvantage and TRSE shows that every method has its own advantage and disadvantage. For that reason, many of the studies about transport disadvantage and TRSE used combination of two or more methods. As can be seen in Table 1.
Table 1. Methods used in assessing transport disadvantage and TRSE

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<thead>
<tr>
<th>No.</th>
<th>Source</th>
<th>GIS</th>
<th>Modelling and Statistical Method</th>
<th>Qualitative Analysis</th>
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<tbody>
<tr>
<td>1</td>
<td>Bocarejo and Oviedo (2012)</td>
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<td>2</td>
<td>Buchanan, Evans and Dodson (2005)</td>
<td>√</td>
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<td>3</td>
<td>Currie et.al, 2009, Delbosch and Currie (2011),</td>
<td>√</td>
<td>√</td>
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<td>4</td>
<td>Currie and Sendbergs, 2007</td>
<td>√</td>
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<td>5</td>
<td>DETR (2000)</td>
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<td>6</td>
<td>Hine and Mitchell (2001)</td>
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<td>7</td>
<td>Hine and Mitchell (2003)</td>
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<td>8</td>
<td>Hurni (2006)</td>
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<td>9</td>
<td>Kamruzzaman and Hine (2011)</td>
<td>√</td>
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<td>10</td>
<td>McGrath (2007)</td>
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<td>11</td>
<td>Miller (2009)</td>
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<td>12</td>
<td>Murray et.al (1998)</td>
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<td>14</td>
<td>Raje (2007)</td>
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<td>15</td>
<td>Robinson et.al (2000)</td>
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</table>

Although many research has been done about transport disadvantage and TRSE in developed countries, research on the same topics in Indonesia is still limited. One of them is case studies on transport challenges for the poor (Maria, 2009). The study examines the respondents from four slum settlements in Jakarta, Yogyakarta, and Solo. The purpose of the study is to identify the travel pattern of slum dwellers including where they travel to, the distance, transport mode used, and travel cost. In this study, the data was analysed using descriptive statistical methods. The study found travel characteristics by slum-dwellers in 3 major cities. However, this study did not investigate further into the impact of transport to the possibility of social exclusion of the communities.

One of the reasons research on the social impact of transport is still limited in Indonesia is because it is still focusing more on the economical impact. For example in the document of Yogyakarta Transportation Planning (*Tataran Transportasi Wilayah* or *Tatrawil* Yogyakarta), social goals are still not disclosed. Other causes are limited data about public transport service regarding: waiting time, frequency of service, travel time, access time to and from public transport, and more subjective variable such as comfort and safety which is considered as determinant variables in assessing the occurrence of transport disadvantage and TRSE in an area. Therefore assessing the TRSE in Indonesia using GIS or modelling methods that rely on secondary data becomes challenging. For analysis using area-based data such as GIS and modelling, the availability of spatial and temporal datasets are crucial in
accessing the accessibility of public transport service which is one of the important marker in assessing the transport disadvantage and TRSE

Furthermore, social exclusion is a multidimensional issue that requires a deepening of the issue at family/individual level. It requires the collection of data at the level of families or individuals to explore their experiences regarding the transport disadvantage and TRSE. Based on this, the combination of quantitative methods (GIS or modelling/statistical) and qualitative method can be considered to obtain an adequate analysis as an input for inclusive transportation planning. GIS methods can be used to get a broader picture of the areas experiencing transport disadvantage. It could utilize data that is generally available in Indonesia, such as public transport routes and bus stop locations, terminal, or station. From these data, combined with spatial data such as land use, the residential area with no or limited public transport service could be identified as transport disadvantage area. Surely it would be better if the more complete data about public transport service such as the frequency of public transport and waiting times at the stations is available. This could be followed by statistical and qualitative analysis using questionnaire or interview to the residents resides in the area to get a better overview of their experiences in participating in economics, social, and politics activities as an indicator of social exclusion that may happened in the area.

In term of utilizing qualitative method to assess transport disadvantage and TRSE in Indonesia, there is another challenge which is the cultural barrier. Many Indonesians think that revealing the difficulties especially economic distress to non-family or non relative is not appropriate. As a result, negative conditions cannot be explored properly. Besides, the absence of references other than the present condition may also cause respondents tended to give positive response to their experience regarding the transport disadvantage. To overcome this, it is necessary to carefully choose the questions for the interview. A good communication skill of the interviewer is also needed.

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