GoodTrip application potential for solution of urban logistics problems

Lilian da Silva Santos a, Bruno Vieira Bertocnini b, Ronny Marcelo Aliaga Medrano c, Pastor Willy Gonzales Taco d, Orlando Fontes Lima Jr e

a Logistics and Transportation Learning Lab - University of Campinas, Brazil. E-mail: lilisisa@gmail.com
b Federal University of Ceará, Brazil. E-mail: bruiber@det.ufc.br
c University of Brasilia, Brazil. E-mail: ronnymarcelo.nn@gmail.com
d University of Brasilia, Brazil. E-mail: pastor@unb.br
e Logistics and Transportation Learning Lab - University of Campinas/ Brazil. Email: olifimaj@fec.unicamp.br

Objectives and motivation

The Urban Mobility is the result of the interaction between people and freight movement in the city, and presents itself as one of the main challenges of large cities around the world (Brasil, 2007). When these challenges are analyzed from the viewpoint of City Logistic (Taniguchi et al, 2001), it is possible to see that the problem is the difficulty of understanding the freight transportation demand (which involves movement of goods, parcels etc.) in the urban context and its relationship with the mobility of people. In this context, Lima Jr. (2015) identified four major challenges facing the City Logistic observed during the application of focus groups that the CLUB Centro de Logística Urbana do Brasil (Brazil’s Urban Logistics Center, translated into English) has been doing the last three years in different cities of Latin America, and with greater intensity in Brazilian cities. The first challenge is relate to the Hub Cities that means cities with global participation, usually with large ports and airports, which have a number of specific urban logistics issues relevant to the global connection. This is because the intense freight flow demand through these global cities. The second challenge surpass the specific problems of city centers, especially when some preserve historical heritage. Narrow streets and vibration restrictions limit and hinder the movement of vehicles. The third challenge is the Logistics Clusters, which spreads by different neighborhoods in the city, and create intense logistics activity stais that are degrading the quality of life of their surroundings. Finally, the fourth and perhaps most important challenge is the logistics operations in the slums and communities, which in some cases account for a large portion of the area inhabited in the city. Faced with problems related to urban mobility, researchers have made efforts to develop analytical methods for the proposition of strategies and solutions to the reality in which it is intend to work. One approach toward the understanding of travel demand that has been gaining acceptance of researchers, but not explored in freight transportation studies is the Trip Chain. A Trip Chain is a Travel Behaviour approach that had an origin in the 1970s, from the spatiotemporal nature studies of Hägerstrand (Button, 2005). It is based on a theoretical framework in which the analysis of the demand for travel begins by understanding how and why the activities that motivate them are carried out in a particular time and space (Jones, 1977). It assumes that individual behavior is embedded in a complex system of constraints arising from a range of needs and requirements for human interaction (such as conventions and cultural norms, legal and organizational), which guide its decision to use of their spatiotemporal budget available for the execution of the activity / trip, in a particular environment (Schönfelder and Axhausen, 2010). Boerkamps et al (2010) discussed the application of TripChain to the context of urban transport loads. These researchers proposed a model called GoodTrip, in order to predict flow of goods and vehicles flows and outline a conceptual framework that he considered the market actors and elements of the chain of loads of supplies, with application in the Netherlands. Samimi et al (2009) explain that the GoodTrip provided reliable estimates for flows of freight and vehicles, and was used in other cases to analyze other distribution systems of alternative urban freights (eg de Jong and Ben-Akiva). These studies discussed potential sources of data for the GoodTrip, including additional research and general framework, but did not provide specific conclusions. In this context, this study aims to broaden the discussion on the application potential of GoodTrip, especially as a solution to urban logistics problems.

General description

The study was conducted in three stages. In the first stage, an analysis was made of the application GoodTrip in the literature by applying the methodology (RS) and Meta-synthesis. The RS is a rigorous methodology, usually adopted in health care, which aims to identify studies on a topic in question (De la Torre-Ugarte-Guanilo et al, 2011). It differs from traditional narrative reviews to adopt a replicable, scientific and transparent process that ensures accuracy, integrity and quality of results, providing a path auditable decisions about the authors, the adopted procedures and findings (Tranfield et al, 2003 ). Its implementation is carried out by a procedure consists of five basic steps: (1) Definition of the research problem; (2) Definition of search strategy; (3) Definition of criteria for inclusion or exclusion of work; (4) Selection of articles; (5) analysis of selected articles. In this study, step 5 was developed through Meta-synthesis, method used to develop systematic reviews by synthesis results, while preserving the integrity of each selected study to achieve the highest level of analysis, improving the use of all results of research in practice. Allows reviewers to assess the impact of each study and recognize the theoretical and methodological trends of the studies on a particular phenomenon, and assess the usefulness of the results in practice (De la Torre-Ugarte-Guanilo et al, 2011). The Meta-synthesis was based on the methodological proposal Timms (2001), who developed a philosophical framework to classify methods and estimates of origins and destination arrays using link counts. Thus, the applications of GoodTrip selected were analyzed from four approaches classes: Rationalist, Empiricist neo realist, neo realist and Balanced Balanced subjective. Finally, a discussion of its potential for application of GoodTrip in Latin American cities is presented, considering the four typical problems of logistics city: the Hub Cities, issues related to urban heritage, the Logistics Cluster and slums and communities. The third and final step, future research opportunities on the topic were identified.
Results and conclusions

In the first stage, the research problem "What are the main applications of GodTrip?" was established based in the literature review of GodTrip applications, first step of the RS. In the second step of RS was defined the search strategy. GodTrip was researched in the research bases Emerald, Google Scholar, JSTOR, Science Direct and Scopus. The defined time horizon was 50 years, from 1970, the year of publication of the Hargestrand's article (the main trip chain reference) to 2015 (this year). In the third step of the RS, the papers exclusion criteria were defined: those who were not scientific articles and all repetitive results. From these criteria, the selection of scientific articles was made, by reading the titles and abstracts resulting in 15 scientific papers. In the fifth step of the RS, the analysis of the selected articles was made, in pairs, formed by researchers with experience in the research area of trip chain and city logistics. Regarding the results to be obtained by the RS, the research has limitations. To ensure focus, the authors limited the search to five databases, did not include other types of publications that were not papers (for example, did not consider theses, dissertations and books, among other materials) and was limited to the English language. However, data collection aimed to cover a relevant publications universe on the subject in five relevant databases in the research area. The data obtained by means of meta-synthesis of the results from the classes suggested by Timms (Rationalist, Empiricist neo realist, neo realist and Balanced Subjctive) allowed to provide a summary of the applications related to GodTrip. From this summary, it was possible to draw some directions for future research that seek to incorporate the GoodTrip in the search for solutions to problems of City Logistics (e.g. data collection, data treatment, and trip chain modelling and forecast), taking as example situations / practices observed in Latin American cities.

References

- Timms, P.M. (2001) A philosophical context for methods to estimate origin-destination trip matrices using link counts. Transport Reviews, 21 (3), pp. 269-301. ISSN 1464-5327

Keywords: GoodTrip; City Logistic; Systematic Review; Meta-synthesis; Latin America