

# A FRAMEWORK FOR CONDUCTING SPATIAL ANALYSIS TOWARDS SUSTAINABLE TRANSPORTATION

ABSTRACT FORM FOR CUPUM '03 SENDAI

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## **Abstract:**

There has been a growing understanding that efforts towards sustainability have to focus on reaching equilibrium and efficiency on the use of resources. Gradually, various sectors of society (governments, industries, non-governmental organizations, academia, etc) have consciously expressed that future of human kind and planet earth depends on how intelligently available resources are going to be used from now on. Based on this common notion, they have worked on conceiving, organizing, planning, and implementing policies for global, regional and local actions, which are expected to reduce damaging impacts and generate benefits for everybody.

As part of these actions, transportation planning has been acknowledged as a crucial element towards sustainability. In one hand, considerable amount of resources are consumed on providing (design, construction, etc) infrastructure for passengers and goods movements, which are part of socio-economic activities. On the other hand, environment (people and nature) is seriously affected due to intrinsic effects such as pollution (noise, particulate material, etc). Therefore, transportation planners face the difficult task of developing plans that take into consideration needs and impacts. Recently, it has been pointed out that transportation sustainability can be attained by exploring technology and acting on travel demand management.

In this paper, we focus on discussing and proposing a framework for efficiently applying technology in transportation planning activities in order to contribute for sustainability. More specifically, this framework is based on Geographical Information Systems (GIS), which have been extensively applied to solve transportation problems but they have not been exploring its complete potential in terms of processing spatial analysis. We argue that based on the proposed framework new approaches may be developed and they will provide more efficient use of resources dedicated for conducting transportation planning. Therefore, sustainability in terms of transportation planning resources (time, money, etc) could be achieved through the application of the proposed framework, which is mainly based on spatial analysis providing useful and direct information for decision-makers. In addition to the this philosophical and theoretical argumentation, we also apply the framework for conducting five case studies related to accessibility analysis, bus route definition, trip generation modeling, freight terminal location and bicycle network assignment. They all use aerial photographs as the main source of data, which provides considerable amount of geo-spatial information about land use patterns and transportation system. We conclude by analyzing future improvements and discussing prospective areas of application of the proposed framework.