In the process of transportation planning, travel demand forecast is one of the most important analysis instruments to evaluate various policy measures aiming at influencing travel supply and demand. In past decades, increasing environmental awareness and the generally accepted policy paradigm of sustainable development made transportation policy measures shift from facilitation to reduction and control. Objectives of such Travel Demand Management (TDM) measures are to alter Travel Behavior without necessarily embarking on large-scale infrastructure expansion projects, to encourage better use of available transport resources and to avoid the negative consequences of continued unrestrained growth in private mobility. As this policy approach is shifting from rather simple supply-oriented measures to more complex TDM measures, the need to effectively analyze, evaluate and implement a range of policy scenarios is giving rise to the awareness that an improved understanding of individual travel choices and behavior is essential to accomplish reliable and policy responsive forecasts. Therefore, the advanced travel demand models need to embody a realistic representation and understanding of the travel context and the decision-making process of individuals in order to mimic their sensitivity to a wider range of transport policy measures.

Mental representation is a simplified and subjective reconstruction of the reality. It is for that reason critical to understand how individuals construct these representations to mentally simulate possible decisions and choices under specific expected situational conditions. Because individuals hold their mental representations in working memory, and the capacity of that memory is restricted, individuals will experience restrictions on the amount of information that can be represented. So, mental representations will in general engage a major overview of reality. The term Cognitive Map refers to the internal mental representation of environmental information. Cognitive mapping is essential for spatial behavior and decision-making whether traveling across a continent or traversing an urban area. The principal purpose of cognitive mapping is to facilitate individuals to make choices related to the spatial environment. Some transportation researchers have begun to engage with cognitive mapping to a restricted scale, acknowledging that travel and transportation systems are influenced by and they influence spatial cognition. To this point, much of the focus in transportation research has been positioned on how cognitive mapping influences path selection, the routes selected by travelers.

However, the relationship between travel and spatial cognition extends beyond route choice. Cognitive mapping encompasses individuals’ knowledge not only of potential travel routes but also of destinations themselves, as well as their proximity, purpose, desirability, and familiarity as such, spatial cognition shapes each person’s access to opportunities in the urban environment. Modeling approaches have shifted from trip and tour based models of travel demand to activity based models in which the context of daily travel (i.e. the need to perform activities, household interactions, etc.) is accounted for. At the same time, a dramatic increase in computational capacity has enabled modeling techniques to evolve from aggregated approaches to large scale microsimulation of individual travel behavior. In order to transfer and transform the knowledge source from individual minds to some explicit knowledge representation, usually denoted as Knowledge Base (KB), that enables the effective use of the knowledge, it is necessary to explore knowledge acquisition methods in organized approaches, to extract from persons a better understanding of the complex relationships between spatial cognition, travel, and other factors, such as socio-economic status, culture, and individual abilities. All of this with the intention of helping to guide transportation policymakers, seeking to improve accessibility to important resources such as jobs, healthcare, and other amenities. It is essential to capture true individual decision mechanisms in order to improve behavioral realism of these models.