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Assessing cyclists' perceptions, motivations and behaviors: an exploratory study in Brazil

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Abstract

This work aims to investigate the motivations, behaviours and perceptions of people who use the bicycle to go to work in a Brazilian city. A 39-item questionnaire was designed to measure the concordance level of 502 employees concerning the items. Advertising and promotion of safety cycling; places reserved for parking the bicycle; the integration of cycling with other modes of transport; and; support and encouragement of the company where the cyclist works are relevant issues. Adverse weather conditions, security issues and the need to transport large packages and people can influence on cycling.

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1. Introduction

The high level of car use at present has had many negative effects on the environment, due to the emission of green-house gases (GHG) and other air pollutants, the huge consumption of oil and energy, the loss of urban ecological amenities and noise pollution [1]. The country's economic growth has been closely linked to the rise in GHG emissions and half of all CO₂ emissions in cities come from transport and this sector's emissions continue to rise, particularly in developing countries [2]. Further, productivity losses are associated with time spent in traffic jams and also with social and environmental costs of the problems of urban mobility and its dependence on car [3].

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However, 80% of road traffic deaths occur in middle-income countries, which account for 72% of the world's population, but only 52% of the world's registered vehicles. This indicates that these countries bear a disproportionately high burden of road traffic deaths relative to their level of motorization [4]. In Brazil, the total spending on externalities related to motorized individual transport were US\$ 5.7 billion, of which US\$ 3.8 billion with accidents [5]. To reduce the terrible consequences of the increasing motorization rate, studies have been endorsed the importance of promoting non-motorized transportation and have identified barriers and facilitators to cycling in different countries, as well as policies of cycling promotion. Nevertheless, factors as different socio-economic [6]–[8], cultural tradition [9], [10], topography [11]–[13] and cycling levels [14], [15] in those countries may play a particular role which make the comparison of the results of the studies not to be a simple activity.

As information about cycling in Brazil is still incomplete and there is little research on the factors that influence the attitudes and behavior of cyclists, this work presents an exploratory study which aims to investigate motivations, behaviors and perceptions of people who use a bicycle as transportation mode to go to work in a Brazilian municipality. Based on scientific studies, a 39-item questionnaire was designed and a 5-point Likert scale was used to measure the cyclists' concordance level concerning the items.

This paper is organized as follows: section 2 presents a literature review about cycling; section 3 presents the research design for this paper; section 4 presents the results of the study; and section 5 presents the conclusions.

2. Literature review

Cycling is the most sustainable urban transportation mode [16], excluding walking [17]. Cycling cost is extremely low [9], and this is one reason why commuters choose to cycle [18].

Distance is the main factor in the decision to cycle [19] since distance, commuting distance or the distance between activities, is almost always taken into consideration when investigating an individual's choice to cycle or to use other transport modes [20]. Distances up to 5.0 km are ideal for cycle use and over distances of up to 6.0 km cycling may even be the quickest way of travelling [21]. However, cycling may be a less attractive mode of transportation than walking when the travel distance is inferior to 2.0 km [22]. In Netherlands, Denmark, and Germany most of the bicycle trips are inferior to 6.5 km [14], [16]. In Indian cities travel distances vary with population size from 2.1 km to 11.9 km [23], whereas in small cities, the average bicycle trips ranges from 1.9 km to 3.1 km and in medium and large cities from of 3.1 km to 4.5 km [24]. The cycling travel distances can overcome the most common parameter of 5 km and increase over time along with the economic development of the region. For example, the average cycling travel distance in Beijing (China) was 6 km in 1986, 8km in 2000, and 9.3km in 2005 [25]. Thus, it is observed that there is no consensus about the distance from which there is a barrier to cycling.

Travel time depends on the spatial structure of municipalities; the adequacy of cycling infra-structure; whether or not detours have to be made; waiting time at crossings, etc. [10]. The habitual perception is that cycling involves sacrificing time, but this is not necessarily the case, given that bicycles are usually able to avoid or maneuver around traffic jam which normally delays motorists [9]. Hence for cyclists, the provision of direct routes and a small number of stops clearly contribute to the attractiveness of the bicycle as a transport mode [10]. Despite of the possibility of exercising be an important factor for cycling [18], the perceived convenience of a trip declines with an increase in the travel time, since longer travel times and having to spend more effort would lead to less interest in cycling [12]. Further, physical disabilities and bad fitness may limit the bicycle use for some individuals.

Potential risks may exist in circumstantial situations inherent in decision-making or attitudes. The perception of risk is a subjective issue that it is not always correlated with actual risk [11]. The reckless and careless attitudes of drivers are exceptionally detrimental to the cyclists' perceived safety [26], as well as reckless attitudes of cyclists can create risk situations. The perception of cycling as an unsafe mode of travel is a significant obstacle in increasing the use of bicycles in a city [27] and people's concern regarding the risk of cycling near traffic [28]. However, some cyclists are indifferent to cycling nearby cars and physically separated from traffic [29]. The shared traffic is not restricted to cyclists and motor vehicles. On sidewalks, cyclists mixed with pedestrians result in conflicts and, when these issues are not dealt with properly, cyclists both bother and suffer from the presence of street vendors, kiosks, street furniture and lamp posts [30]. The same occurs when pedestrians, electric bicycles and motorcycles travel along routes reserved for cyclists. The use of safety accessories is not associated with an improvement in perception of safety among cyclists [27].

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