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Upgrading the city: Enabling intermodal travel behaviour

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ABSTRACT

Cities are increasingly being challenged by traffic congestion and pollution. Enabling greater use of intermodal travel among inhabitants can be a way for a city to proactively meet these challenges. Currently, however, city planners are faced with an incomplete understanding of 1) what holds inhabitants back from intermodal travelling as well as 2) what could motivate inhabitants to adopt intermodal travel behaviours. Toward answering such questions, this study presents and evaluates research propositions regarding the shifting of city travellers' behaviours to intermodal travel. The extant literature, data from government and industry sources along with extensive qualitative primary data from eight in-depth expert interviews and twelve city traveller interviews are then drawn upon, analysed, and discussed in terms of policy and implementation considerations. Special attention is given to the role of information as a key contributor to overcoming change resistance and a potential behavioural motivator to engage in intermodal travel. Among the findings is the identified need for collaboration among mobility service providers to reduce perceived mode barriers and provide transparent information. Moreover, policy makers will need to focus on attractive incentives more than coercion mechanisms in order to sustainably motivate intermodal travelling. Tailoring the interventions and communication to different city inhabitant segments will also be the key to policy effectiveness. Overall, the study finds substantial support for the introduction of an online integrated intermodal information platform.

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1. Introduction

On 23 May 2012, Sao Paulo's underground and commuter train system drivers were on strike, thus blocking the public transport system for a whole day. As a consequence, a world record traffic jam of 249 km developed, because buses were overcrowded and people were using more private cars for driving [1]. Due to rapidly growing populations and even stronger urbanization in emerging countries such as Brazil or India and China, the example serves to illustrate the adverse consequences of the increasingly serious problem of city traffic congestion. But also in developed countries, urbanization creates increasing problems such as water and energy

supply as well as congestion and traffic infrastructure capacity overload [2]. One approach to address these issues is to use existing city infrastructure more efficiently and enhance existing capacities where required. Yet, some city planners, infrastructure providers and their technology partners have adopted the view that better public transport or more environmentally friendly cars alone won't be sufficient enough to solve future traffic and congestion problems in cities [3,4]. Rather, they believe in a better integration of public and private transport facilities so that city travellers can select the optimal facility in order to reduce congestion and use provided infrastructure more efficiently [4–6]. Switching traffic modes during one journey, e.g. bike, bus, subway or private car, is called multi- or intermodal travelling [7,8].

To achieve such a goal, it is important not only to focus on technical feasibilities, but also to analyse the end-consumer's attitude and needs carefully beforehand [9]. Once it is understood what factors would change consumer's behaviour

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towards intermodal travelling, governments, city planners and transport service providers can develop the most appropriate products and services. One example would be the development of an integrated online information and transaction platform where intermodal travellers could plan their journey, book their tickets and access real-time information during the journey about delays and alternative route suggestions.

The initial motivation to conduct this research was given by Siemens, Business Unit Road & City Mobility, Germany, who wanted to increase their understanding of city travellers' behaviour and motivations to travel intermodal. In particular the aims of the present research are to identify and critically evaluate factors that hinder consumers currently to use different transportation modes and identify and evaluate options to motivate them to use more congestion-efficient ways of transport in the future. Special emphasis is placed on the role of information in order to understand the impact of the suggested integrated IT information platform on consumer's behaviour. In short, the research aims to identify factors that hinder and initiatives that motivate consumers to change their travel behaviour in cities, and identify opportunities of an integrated online information and transaction platform for intermodal travelling. Toward these ends, this study contributes by 1) improving our understanding of existing roadblocks to effective and efficient intermodal travelling, 2) providing insights on how we can improve the harmonization of transportation facilities, and 3) finally influencing city travellers' future intermodal travel behaviours. Individuals in public and private institutions and organisations alike can then draw upon such knowledge with the aim of collectively contributing to the overarching goal of efficiently and effectively upgrading city infrastructures. Moreover, the research can help technology providers to further improve their own offerings, e.g., through innovative software development for an online information and transaction platform for intermodal travelling that Siemens is currently undertaking.

2. Intermodal travel behaviour: key considerations from the broader literature on consumer behaviour

Intermodal travelling is currently being promoted by many governments, transport service providers and their business partners. The aim is to reduce congestion and decrease environmental pollution. Hence, intermodal travelling can be understood as one aspect contributing to an overarching social goal of healthier and more efficient living in cities.

For this reason, a comprehensive literature review must necessarily start with an analysis of social marketing implications. While it is acknowledged that effective marketing of social causes is similar to traditional product marketing where McCarthy's "4 Ps – Product, Price, Place and Promotion" [10] are fundamental to design desirable products [11], understanding consumer's attitudes, needs and behaviours is also considered to be crucial in social marketing to gain acceptance and adaptation from consumers [11]. Accordingly, we can consider the 4 Ps framework in relation to intermodal mobility.

Product: Kotler and Zaltman [11] point out that there is one overarching social core-goal, which needs to be divided into tangible and buyable sub-products supporting the core-goal. In the case of intermodal mobility the social core-goal is to reduce

congestion and environmental pollution to contribute to healthier, sustainable living in cities. Currently, people can contribute to this goal through purchases of e.g. public transport facilities, car- and bike-sharing modes, special road tolls or emission-dependent fees for cars. Siemens, for example, is working on an integrated platform that informs city travellers about available travel modes, fares, departures etc., suggests alternative routes in case of delays and enables the traveller to make ticket transactions. This service would be another element of buyable sub-products contributing to the overall social goal. The relatively long list of sub-products serving the same social goal also indicates that different intermodal product or service providers should understand themselves as interdependent partners rather than substitutes, e.g. car-sharing vs. traditional public transport, all contributing to one overarching goal.

Promotion: The aim of promotion activities is to increase awareness of the need, enhance familiarity and finally gain desire and acceptance of the offered sub-products [11]. Potential mechanisms to achieve these goals range from advertising to personal selling, sales promotions to publicity and word-of-mouth.

Place (distribution): According to Kotler and Zaltman [11] a barrier to effective social goal achievements can be missing transparency of the "place" where people can transfer their motivation into actions. Furthermore, Kotler and Zaltman [11] recommend that one 'change agency' should coordinate all activities and prioritise number, size and location of appropriate places where people can obtain the contributing social products. This statement supports the idea of interdependent intermodal service providers and partners that act ultimately with one product strategy to reduce confusion for potential intermodal travellers. Governments could act as the overall change agencies as well as one organisation that coordinates all activities to offer one integrated solution to city travellers.

Price: Besides money required to purchase the tangible sub-products, opportunity costs, energy efforts to get active and psychological concerns about the outcome effectiveness are also elements of the sub-product's price [11]. Public transport supporters often criticise that consumers do not consider the full costs of car usage compared to public transport facilities. However, the above mentioned price definition indicates that intermodal service providers and their partners also do not consider the whole costs of their offerings as they usually only compare ticket prices. Complete price transparency is essential to travellers, because they conceptualise their behaviour with a cost-benefit-analysis of the potential action and only if this analysis is positive, people will take actions that serve the social goal [11].

Accordingly, while price constitutes the monetary cost of adopting a social product or offering with a tangible base, the total costs of adopting extends beyond the monetary cost and must necessarily include non-financial costs. One of these might be added time costs (such as travel time to destination and waiting time) while other areas, including added safety or access concerns and inconvenience, might be considered perceived risks (physical, social, and psychological) that potential intermodal travel adopters would see themselves having to face. Price setting must therefore take into account both monetary costs as well as all actual and/or perceived non-monetary costs to be incurred by the potential intermodal travel adopter. Yet, to the extent that intermodal travel delivers tangible benefits including

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