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Innovative business models for exploiting green vehicle potential in urban logistics

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Abstract

When viewed through a traditional mindset, the goals of green and the goals of business seem incompatible; however, logistics companies that embrace a green mindset are becoming increasingly successful in today's economy. That is because the focus on green has not come at the expense of profit for these companies who managed to take advantage of key benefits of doing green. To generate value from these kind of benefits, new green business models are needed. This paper investigates the impacts that such business models might have on the effective uptake of green vehicles by the urban logistics industry. Particular emphasis is paid on assessing the level of eco-innovation this might bring and the repercussions it may have for business viability. To facilitate the research an adaptation of Osterwalder's business model ontology is applied to create a shared, formal, and explicit conceptualization of a green business model for logistics companies.

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Keywords: Green business model, urban logistics, green vehicles, business model ontology, alternative fuels

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1. Introduction

Urban freight transportation and goods distribution is a significant issue in the economic, commercial, social and environmental operation of cities. This area of transportation activity is growing faster than other areas of land transportation. However, efficient and effective urban distribution systems are required in logistics in view of increasing levels of traffic congestion, negative impacts on the environment, crashes and higher energy consumption caused by freight vehicle traffic in urban areas. These are complicated and difficult problems that should be solved for the sustainable development of cities by balancing smart economic growth with cleaner, quieter and safer environment in urban areas.

So far, the relevant research has focused on the operations and process management perspective of urban logistics, including the development of route optimization models, technical standards for vehicles and service process coordination. But business concepts such as value exchanged among stakeholders, coordination of business and operations strategies and other business dependencies cannot be tackled with technical specifications. As a consequence, operations and business models become difficult to keep aligned. To address this issue, the current paper focuses on the interaction of business model research and developments in green city logistics with the aim to investigate how green logistics services delivered via a properly designed business model can be used for developing strategies that could turn green urban logistics into profit.

To facilitate this, Osterwalder's (2004) business model ontology is applied to a case involving the use of biodiesel in light delivery trucks for improving customer experience, effective delivery and service. The research shows that the suggested business model can provide the means to coordinate the business and technological dependencies of the last mile logistics while actually promoting its real environmental value and long-term monetization.

The work is organised as follows. First we review the relevant literature in the green city logistics, biofuel technology and business model research fields (section 2), By applying this research on the suggested business concept (section 3) we show how logistics companies can take advantage of useless material such as waste vegetable oil and convert to an alternative fuel for their vehicles. We structure our case according to a theoretical framework adapted from previous research (section 4) to show how such a logistics company can leverage existing service capabilities with alternative fuel strategies to create a "greener" value. The paper ends with concluding remarks (section 5).

2. Literature review

Taniguchi & Thompson (2002) refer to City Logistics as "the process for totally optimizing the logistics and transportation activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, congestion, safety and energy savings within the framework of a market economy". Likewise, Dablanc (2007) considers urban logistics as "any service provision contributing to an optimized management of the movement of goods in cities". Stathopoulos et al. (2012) stress that "City logistics studies the problems relating to freight movement, such as congestion, time-window regulations, on street loading/unloading, parking and environmental emissions caused by freight vehicles".

Green logistics is considered a form of logistics which is environmentally and often socially friendly as well as economically functional (Rodrigues et al, 2001). In their definition, Rodrigues et al consider also the ecological impact of logistics activities—in both forward and reverse flows of products—the information, as well as the services between the point of origin and the point of consumption. Thus, the idea behind green logistics is to create value using a sustainable mix of economic and environmental efficiency.

Most of the problems that arise from of that mixed approach lie mainly in the last stretch—or the 'last mile'—of parcel delivery to the final consignee who receives the goods at home or at a cluster/collection point. The last mile,