INNOVATING MOBILITY: BLUEPRINT OF A CHARGING ECOSYSTEM FOR ELECTRIC TAXIS – A MOBILITY STUDY

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ABSTRACT

New charging solutions, like fast charging or inductive charging, contribute to smart mobility and help to reduce emissions in inner cities. However, the design and scaling of such solutions require networking of and exchanges between various partner companies in ecosystems, a subject not yet sufficiently researched. Therefore, this paper develops a blueprint for a charging ecosystem, specifically one involving inductive electric taxi charging. The research model is based on a multi-method approach involving a qualitative case study complemented by a quantitative customer acceptance analysis and a potential assessment. The results of this study help researchers and practitioners to successfully build an initial blueprint of an evolving ecosystem to move on to a subsequent phase of optimization and scaling.

Keywords: *Electric Taxis, Charging Ecosystem, Focal Value Proposition, Operating Model, Platform*

1. INTRODUCTION

New charging solutions that contribute to smart mobility are highly desirable and politically promoted, but progress toward adoption of these technologies is nevertheless slow (Funke et al., 2019). These solutions can be offered jointly only by several partnering companies in ecosystems (Adner, 2017; Jacobides et al., 2018), with which high-tech companies (Adner, 2021; Cusumano et al., 2019) have little experience (Proff, 2019). Therefore, this paper presents a blueprint for an inductive charging ecosystem that could power taxi fleets.

Inductive charging for taxis is an important research subject because it is a major obstacle to taxi fleet electrification, and electrification is desirable because of diesel driving bans, which have been enacted to reduce emissions in inner cities (Vaidya and Mouftah, 2020). Despite developments electric vehicle design and charging, special taxi requirements – implemented because these vehicles are in continuous operation – have received little attention to date (Scorrano et al., 2020; Vaidya and Mouftah, 2020). For example, a taxi cannot be connected to a conductive charging station while waiting and advancing in a queue (Sellmair and Hamacher, 2014), which necessitates an automated charging solution. Another problem lies in the design and scaling of the networking and the exchange of different actors (Dattée et al., 2018) in charging technology (Klijn et al., 2010). Scholars in this field have recently examined the use and deployment of electric taxis, the challenges posed by autonomous vehicles, and the optimal distribution and number of charging points (Poulhès and Berrada, 2020). The examination of essential infrastructure, its design, and wireless charging alternatives has been undertaken as well. However, while prior research has extensively investigated specific design aspects and scalability (Jamshidi et al., 2021; Lokhandwala and Cai, 2018), there remains a gap in exploring a comprehensive approach that integrates technical, economic, and collaborative considerations. Therefore, this work presents an investigation of the following research question:

RQ: How can the blueprint of a charging ecosystem for electric taxis be designed to address the challenges of electrification, operational efficiency, and ecosystem collaboration within the context of ecosystems?