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Urban Logistics Concepts - An Empirical Survey on Public Acceptance

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1 Introduction

1.1 Relevance and Motivation

Urban logistics has changed significantly over the last three decades. Global megatrends such as urbanization, the digitalization of retail (i.e., e-commerce) and the demographic change are bringing logistics and transport management in urban areas increasingly to the edge of capacity. With the growing population and traffic density, concerns about the social and environmental impacts of urban freight transport are constantly growing. The bottleneck is that transport and freight are indispensable for urban life and the diversity of use of urban areas, but at the same time significantly burden the environment and improve the quality of life and living environment in the very same. Awareness for sustainable urban development and the coordination of transport and logistics is increasing, but more efficient and effective freight transport concepts are urgently needed to ensure the mobility, livability and sustainability of cities.

A further approach in this context is that of the players involved from industry. For example, retailers and industrial enterprises in conurbations and logistics service providers of various types are mentioned here. Infrastructure links, i.e. access to production factors and sales markets for goods and services, turn cities into production locations and important markets. At the same time, the densification of freight traffic places high demands on logistical services. Systems for freight transport. Traffic jams, waiting times and delays in delivery are cost factors, which in (inter-) national competition are increasing in intensity from being disadvantageous or at least being able to influence the success of the company adversely (Erd, 2015). Therefore, urban stakeholders from politics and industry are striving for an economically, ecologically and socially sustainable city environment, while at the same time, especially through the flourishing e-retailing market, billions of parcel deliveries per year on the last mile contribute to congested streets, noise nuisance and environmental pollution (Taniguchi et al., 2016). Political decision-makers in the EU and in Germany in particular, have set goals in this regard to significantly promote sustainability in cities and are taking various measures to achieve this goal. The EU has recently set limits and targets in the transport sector, where decarbonization is planned until 2050, aiming at 80% reduction in CO₂ emissions from light-duty vehicles. Furthermore, current more radical measures at local level have recently been enforced in Hamburg to reduce air pollution by nitrogen oxides and more cities could follow. Such measures also have a direct impact on logistics and transport companies operating mainly on the last mile. The use of more environmentally friendly delivery vehicles and delivery methods is therefore unavoidable in order to survive in the supply market in the long term.

The expansion of online commerce has led to a significant increase in urban transport volumes. The development of the *Courier, Express and Parcel* (CEP) market is exemplary for the still growing interest of the population to buy goods online and have them delivered. CEP services' parcel deliveries almost doubled between 2000 and 2017 and totaled more than 3 billion deliveries last year. (cf. Figure 1). These developments are profitable and burdensome for the companies involved, because especially in densely populated cities, the principle of home delivery is increasingly becoming a challenge and inefficient (Moroz and Polkowski, 2016). That can be seen as a cause of the rapid e-commerce growth, leading to further expansion in home deliveries, which is increasing the social and environmental costs. This is due to so-called *last mile issues* (Punakivi et al., 2001). Delivery issues on the last mile are caused by the absence of the recipients, multiple delivery attempts, and highly frequented small consignments with inefficient utilization of the vehicles, which both causes resentment among consumers due to decreasing delivery reliability and city accessibility and contributes to traffic congestion and air pollution (Schnedlitz et al., 2013). For this reason, city residents are not only frustrated by the increasing inefficiency of deliveries, but also worried about the mobility, livability and sustainability of their city (Quak, 2008).

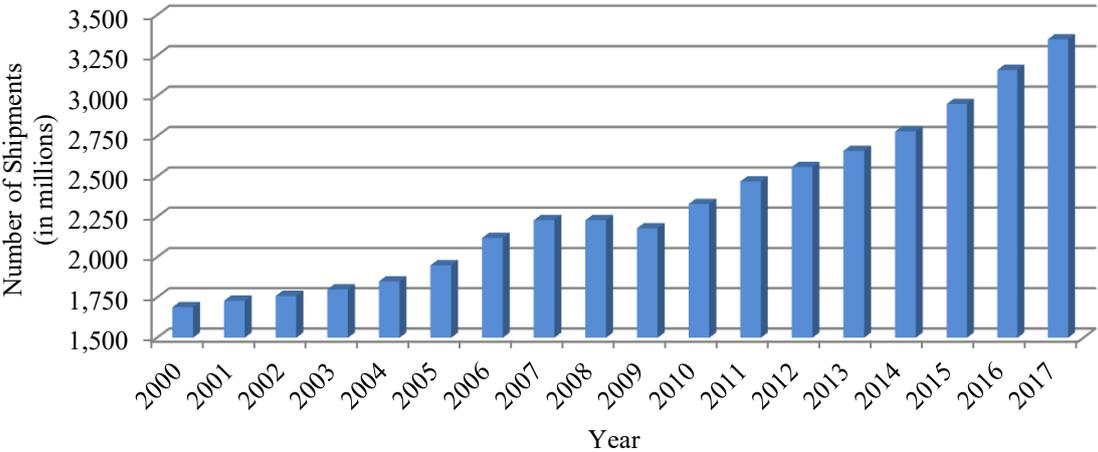


Figure 1: Shipment volume in the German CEP market (Source: BIEK, 2018)

Against the background of e-commerce growth, it can be anticipated that the behavior of residents and consumers will lead to and have already led to significant changes in retailing and urban logistics. For this reason, the wishes, requirements and expectations of city dwellers, in particular, play an important role in the development of innovative logistics and delivery concepts for optimizing urban freight transport. Consumers are demanding ever greater convenience, time savings and flexibility when buying products and services online. Higher requirements and expectations not only affect online retailers but also logistics service providers, who also have to meet these expectations. Delivery service providers are always under pres-

sure due to the fact that they have to offer service quality, efficient and sustainable, but at the same time also cost-effective deliveries to the customers.

Online food retailing (or e-food retailing) may also pose a further challenge in the future. In recent years, it has become apparent, particularly in other European countries, that consumers are increasingly ordering food online. This development has not yet been observed in Germany to the same extent as in France or Great Britain (Saskia et al., 2016). Experts disagree on how the German market will develop in the future.

However, if e-food retailing achieves a breakthrough in growth in the near future, this could lead to additional congestion for logistics service providers and urban delivery traffic through additional amount of delivery vehicle on the city roads. In fact, due to its convenience to customers, home delivery has already become dominant delivery choice (Campbell and Savelsbergh, 2006). Therefore, online food retailers are increasingly confronted by the need for other convenient, more efficient e-food delivery concepts, while considering special food-related consumer needs. However, last mile delivery could be the logistical key element for a breakthrough in e-food retailing, if retailer can remove possible doubts and worries from consumers through reliable and efficient delivery processes and thus create greater acceptance (Durand and Gonzalez-Feliu, 2012). In this regard, this study aims to identify the relevant influencing factors of consumers' acceptance on e-food delivery concepts and to investigate if sustainability expectations contribute to consumers' adoption behavior.

Regarding this, the first section of this study carves out the research gap and formulates two respective research questions, which are answered in the course of this work. Section 2 provides theoretical backgrounds. Regarding this, a systematic literature review is performed to extract most relevant research topics in the respective fields, e-food business models and delivery concepts that have already been applied of e-food retailers. Further it is intended to identify previous acceptance research approaches in urban logistics, e-commerce and e-food retailing. Thereafter, section 3 covers the creation of a research model and the associated formulation of proposed hypotheses, based on the findings of the literature review, working out the relationships between potentially influencing factors of consumers' acceptance on certain e-food concepts. Section 4 deals with the research design and methodologies of the quantitative research conducted in this thesis. Hence, the results of the survey will be presented. Furthermore, the implementation of the questionnaire and model testing will be specified. On this foundation, data analysis and evaluation results, will be presented in section 5, whereby the measurement and structural model assessments, as well as the hypotheses testing will be conducted. Afterwards, the overall results will be discussed in the given context and recommendations for practice will be provided in section 6. Lastly, the study will be complemented by clarifying limitations that may occur and by making suggestions for future research. A short conclusion will finally summarize the overall findings of the present work.

1.2 Research Gap and Questions

While adoption behavior of consumers in online retailing has already been investigated intensively, the e-food retailing market is barely growing in Germany compared to other segments in e-commerce. It is therefore likely that e-food retailing is subject to other laws relating to consumer adoption behavior and is based on different requirements. This reveals a research gap with respect to consumer acceptance and adoption behavior in the field of the emerging e-food industry. Consequently, the main focus of this paper is to examine which factors have the greatest influence on the acceptance of e-food services and delivery concepts on the last mile from a consumer perspective. Therefore, the first central research question is as follows:

RQ (1): Which factors drive consumers' acceptance on the intention to use e-food delivery concepts and the actual usage?

Against the background of the growing concern about the negative effects of urban *Business-to-consumer* (B2C) delivery traffic and increased environmental awareness in politics and business, it is also important for e-food retailers to generate knowledge about consumer acceptance of more sustainable delivery methods. In this work, it will be further intended to determine to what extent consumer expectations of the sustainability potential of e-food retailing services influence consumer behavior. For example, it could conceivably be the case that the general increase in environmental awareness is influencing consumer acceptance and purchasing behavior, especially in urban areas. Consumers could, therefore, be less tempted to opt for services or products in the e-food business if they assume that e-food delivery concepts contribute little or nothing to environmental protection. Both multichannel and pure online players could derive valuable information from this and adapt their delivery services on the basis of consumer interests in order to generate additional competitive advantages. Therefore, a further question is of central importance for the following study:

RQ (2): How do consumers' expectations on the contribution potential of e-food delivery concepts to ecological sustainability effect consumers' intention to use them?

8 Conclusion

The underlying study aimed at detecting relevant factors influencing consumers' acceptance on four e-food delivery concepts. More precisely, the goal was to identify factors that influence the behavioral intention to use and the actual usage behavior of consumers with regard to the acceptance of e-food delivery concepts. Furthermore, against the background of growing negative social, economic and ecological environmental influences due to the increasing B2C freight traffic in urban areas promoted by e-commerce, especially on the last mile, it was to be investigated whether the consumers' expectations concerning sustainability potentials of considered e-food delivery concepts affect their intention to use them.

In the first part of this thesis an extensive literature review after Webster and Watson (2003) was designed to identify relevant studies and to provide an overview of the status quo of the research area under study. Building on the findings of the literature review, key terms, essential for an in-depth understanding of the underlying research were detected and extensively explained by providing substantial theoretical background information. On the basis of this, a research model was conducted by applying UTAUT/ UTAUT2. Conclusively, a survey was created to empirically test the hypotheses previously established. By evaluating and discussing the findings of the empirical analysis, possible explanations for the observed influences could be identified.

This thesis has provided insights into the factors influencing consumer acceptance in a new context, enabling e-food retail companies to target these factors, develop measures and make adjustments to their products and (supply) services to elevate their business in the long term. It was also found that food shopping in general is likely to be strongly influenced by consumers' habits and that it is therefore more difficult for pure online players to be perceived in the market and to gain the trust of consumers. It can therefore be concluded that today's e-food businesses must first and foremost create trust and actively communicate the advantages of their online food supply concepts.

It can further be concluded that consumers may have an interest in more sustainable products and service option in the e-food business. The present research revealed that e-food retailers who can credibly establish communicate their contribution to an ecologically sustainable urban environment, e.g. by providing more sustainable delivery services and options, may be able to stimulate consumer acceptance regarding their e-food business. Thus, online food retailers now have an incentive to actively contribute to livability, mobility and sustainability in urban areas.

Therefore, in summary, this study can be considered as an initial empirical approach into the area of sustainability expectancies influencing behavioral intentions in the context of e-food delivery concepts and services. Therefore, some progress has been made in this regard, specifying important insights and leaving some interesting opportunities to pursue for future research.

In addition to the achievements of this research on the determinants of consumer acceptance on e-food delivery concepts, this work also has high relevance for general UTAUT research. This has so far mainly taken place in the field of ICT and has not yet been applied in connection with delivery services. Due to the high predictive accuracy of the investigated UTAUT models, this work contributes to the development of UTAUT/ UTAUT2 from an ICT-focused theory to a universal, cross-technology and service acceptance model.