

Location-based marketing

Citation for published version (APA):

Schmitt, H. S. (2023). Location-based marketing: Six evidence-based narratives on the future of hypertargeting in cities. [Doctoral Thesis, Maastricht University]. Maastricht University. https://doi.org/10.26481/dis.20230227hs

Document status and date: Published: 01/01/2023

DOI: 10.26481/dis.20230227hs

Document Version: Publisher's PDF, also known as Version of record

Please check the document version of this publication:

 A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.

• The final author version and the galley proof are versions of the publication after peer review.

 The final published version features the final layout of the paper including the volume, issue and page numbers.

Link to publication

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Summary

City-Based Marketing –

Six evidence-based Narratives on the Future of Hyper-Targeting

To deliver specific advertising for products, services and events in their city to potential customers and to increase customer experience with the brand, companies are starting to engage in hyper-targeting. Developing these super-specific, curated marketing offers works best with much information from multiple data sources. Thereby, location information is an impactful component, especially for local events and geographically bounded deals. Consequently, firms can use location-based marketing to sharpen their hyper-targeting efforts and spatial marketing analytics can shape the future of hyper-targeting research and practice. However, current literature on location-based marketing mainly stems from computer science and engineering, even though social science and management is home to this field. Few marketing studies use spatial data from proxemics technologies and we know little about its worth and the technicalities how to include such data in marketing research. In this dissertation, I address this research gap in six distinct chapters.

In the first chapter, "Location-Based Marketing as an Iceberg – Jumping into Unknown Waters to Look beyond the Surface", I review previously published work on locationbased marketing to get an understanding of the topic from the business domain and to filter out why marketers tend to be dissatisfied with their location-based marketing effort. I conclude that the current scope is much too limited, because it focuses on static consumer positioning observed via geo-fencing and online behavior. As a mitigation, I introduce examples of geographic data and elaborate on techniques that allow integrating these datasets into marketing research. Such spatial data and respective methods constitute the foundation of the following five chapters where I add physical context and in particular the dynamic perspective to location-based marketing.

In the second chapter, "Sketching the City Space I – A Multi-Layer Approach to Preparing for Future Urban Air Mobility (UAM) Services", I demonstrate that the built environment is one core location aspect and that it enables us to understand the city as a servicescape better. Based on information about all buildings in the city of Maastricht and the physical infrastructure network of roads, I run a building interconnectivity analysis and I uncover service gaps in the current public transport service landscape of the city. Urban Air Mobility is an uprising concept in the transport industry that is said to soon fill this service gap in large metropolitan areas, but some problems still need to be solved before its implementation. Using a multi-layer approach, I show how cities can figure out ideal placements of vertical take-off and landing sites for air vehicles and exemplary I indicate where these spots would be in Maastricht and why.

In the third chapter, "Sketching the City Space II – Using spatial data to model infrastructure influences on location popularity", I add more factors than buildings and their interconnectivity to determine what makes a location attractive to citizens. I hypothesize that the circumstances at the destination, i.e. density of an area, the dominant function of an area, the competition between businesses of the same category and the

availability of public transport solutions influence location popularity and that the circumstance at trip origin moderate this effect. Using a regression model, I provide evidence that (a) all factors have a direct effect on the location popularity, (b) public transport availability increases location popularity of some destination functions and (c) that certain origin-destination function combinations impact popularity.

In the fourth chapter, "Let the Pictures Talk – A data Visualization Approach for Revealing Dynamics in Complex Urban Datasets and Movement Structures", I move the citizens into the focus of the analysis. Moreover, I step away from looking at the built environment and other static infrastructure features. Instead, I analyze human trajectory data of Maastricht's citizens to uncover urban dynamics. Working with a variety of data visualization tools, I show that this approach is an excellent complement to traditional computational methods, especially when working with complex datasets. Temporal distribution graphs or heat maps provide a nice overview of the data, while flow analyses or hotspot analysis allow deeper insights. For example, in a flow analysis, I use colors and glyphs on a map to show where traffic during different times of the day originates and terminates and how that is related to building function at destination. Moreover, I am able to differentiate urban dynamics by transport mode and draw valuable conclusions for public authorities.

In the fifth chapter, "Bridging the Data Privacy Gap – An Attempt to Reverse Engineer Trip Purpose from Smartphone-Based GPS Trajectories", I present an attempt to bridge the gap that researchers face because of data privacy regulations. Personal privacy is one of the highest goods and thus, restrictions are important. Still, they limit research in using the ideal data sources and especially in combining sources. Through a combination of multiple non-critical datasets and clever feature engineering that preserves all personal privacy, I demonstrate that unsupervised machine learning techniques can assist researchers to reverse engineer unobservable aspects about the phenomenon. In particular, I am able to reverse engineer the trip purpose from human trajectory data clustered into twelve distinct purposes, which I group into four broader categories.

In the sixth chapter, "City-Based Marketing for Behavioral Change – A Holistic Approach to Consumers' Activity-Based Mode-of-Transport Choice Patterns", I draw on aspects of the previous five chapter to provide a holistic and detailed picture of consumer's behavior and decision-making in urban contexts. I incorporate the dimension of transport mode into activity-based travel behavior by hypothesizing that people's mode choices depend on their activities at trip destinations. In a complementary survey conducted together with the tracking data collection, I observe respondents' transport-mode choices for specific activities. I use the resulting data matrix, in combination with additional consumer information, to cluster consumers with similar mode-activity patterns into four distinct groups. Between these identified groups, I find differences in transport mode choice for various activities, but also differences in personality or lifestyle. I also derive implications for business and sustainable transport policy makers and conclude how these insights can improve hyper-targeting in the future.