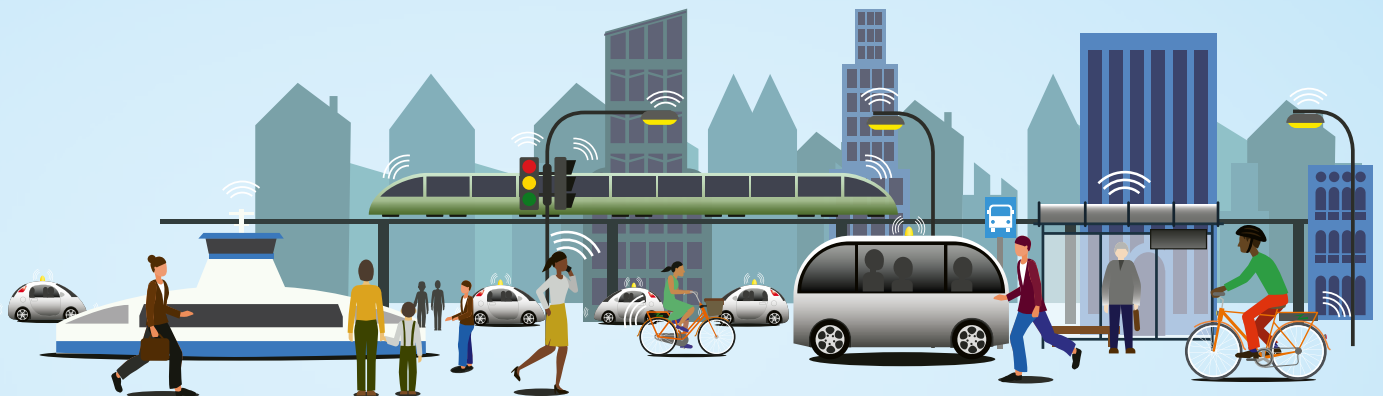


Marketing Review St.Gallen

Smart Mobility Marketing



Schwerpunkt

Flugtaxis – Revolution aus der Luft? –
Ein Interview mit Marcus Hinkel,
Volocopter

New Mobility in Everyday Life –
Perspectives From 20 Households
Examined Over Four Months

How Urban Society Can Benefit
from Inclusive Mobility

Carsharing – Utopia or Real
Gamechanger? – Conceptualising
The Potential of Carsharing
for Tackling Carbon Emissions

Who Would Subscribe for a Car? –
The Influence of Car Ownership,
Environmental Consciousness, Age,
and Place of Living

Conversational Sales for OEM Apps

How to Improve the Continuous
Usage of Mobility Apps –
The Effects of Personalisation and
Privacy on the Use of Mobility
Applications in German Urban Areas

Spektrum

Digital Due Diligence –
Assessment of Digital Growth
Potentials

Personalisierung im Customer
Experience Management



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«Smart Mobility Marketing»

Die Mobilitätsbranche durchlebt eine tiefgreifende Transformation. Nachhaltigkeit hat sich zu einem zentralen Ziel für Staaten, Kommunen und Unternehmen entwickelt. Der Umschwung zur Elektrifizierung individueller Mobilität, eine Flut von neuen Sharing-Angeboten vom Auto über Fahrrad bis hin zum Scooter sowie (intermodale) Mobilitäts-Apps sind u.a. Kennzeichen der Entwicklung. Der Wandel erfordert neben technologischen Innovationen und Fortschritten insbesondere den Veränderungswillen eines jeden Individuums. «Smart Mobility Marketing» stellt den Menschen in den Mittelpunkt und strebt die Vereinbarkeit von ökologischen, ökonomischen und sozialen Zielen an!

Getreu dem Motto von Erich Kästner «Wege entstehen dadurch, dass man sie geht» befasst sich diese Ausgabe der Marketing Review St. Gallen mit Erkenntnissen zu neuen Mobilitätskonzepten aus Sicht von Kundinnen und Kunden. Profilierte Expertinnen und Experten aus Forschung und Praxis untersuchen, welchen Einfluss die soziale Mobilität auf die Gesellschaft haben kann, wie die Menschen zu einem nachhaltigen Mobilitätsverhalten bewegt werden können, welchen Einfluss Carsharing auf die Treibhausgasemissionen besitzt und wie Mobilitäts-Apps und Auto-Abos zu gestalten sind.

Wir wünschen Ihnen viel Freude beim Lesen der Lektüre und hoffen, auch Sie für das «Smart Mobility Marketing» zu begeistern!



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Flugtaxis – Revolution aus der Luft?

Ein Interview mit Marcus Hinkel,
Head of Global Marketing & Brand
Management bei Volocopter

Die Einführung von Flugtaxis hat das Potenzial, die Art und Weise zu verändern, wie wir uns in der Luft fortbewegen. Mit Unternehmen wie Volocopter, die ihre Flugtaxi-Modelle in den nächsten Jahren auf den Markt bringen wollen, stellt sich die Frage: Wie werden Flugtaxis unsere Mobilität in der Luft revolutionieren? In diesem Interview geht Marcus Hinkel, Head of Global Marketing & Brand Management bei Volocopter, auf den Bereich Urban-Air-Mobility (UAM) näher ein und zeigt die Produkte und Geschäftsmodelle von Volocopter auf. Ausserdem skizziert Herr Hinkel erste Anwendungsfälle, Zielgruppen und Herausforderungen sowie die Rolle der Marke und des Marketings bei der Etablierung von Flugtaxis.

Das Interview führt Marvin Greifenstein, Research Assistant and Doctoral Candidate am Institut für Mobilität (IMO-HSG), Universität St. Gallen



Herr Hinkel, elektrische Flugtaxis sind ein Traum zukünftiger Mobilität! Würden Sie Flugtaxis als eine Revolution der Mobilität in der Luft bezeichnen?

Marcus Hinkel

Head of Global
Marketing &
Brand Management
bei Volocopter
volocopter.com

Auf jeden Fall. Und das in mehrfacher Hinsicht. Lassen Sie mich zunächst den etwas irreführenden Begriff «Flugtaxi» näher erklären. Der Begriff «Taxi» suggeriert, dass eine Endkundin oder ein Endkunde an jedem Ort zu jeder Zeit zu- oder aussteigen kann. Dazu wird es vorerst nicht kommen. Es wird kleine Start- und Landeinfrastrukturen, wir nennen sie «VoloPorts», geben. Diese werden an verkehrsstrategisch wichtigen Punkten gebaut. Das kann auf oder an einem Bahnhof, auf einem Hochhaus, einem Einkaufszentrum oder in schwimmender Form auf einem Fluss (z.B. Hudson River) sein. Damit ist der Mobilitätsdienst eher mit einem Shuttle-Service, der eine feste End-to-End-Verbindung hat, als einem Taxi-service zu vergleichen. Mit dieser Form der Start- und Landeinfrastruktur müssen sich die Einwohnerinnen und Einwohner einer Stadt auch keine Sorgen darüber machen, ob zukünftig über ihrem Garten Flugtaxis fliegen und in der Nachbarschaft landen.

Flugtaxis stellen eine Revolution in zweierlei Hinsichten dar:

Erstens technisch: Hier müssen wir zwei Entwicklungen unterscheiden. Den pilotierten Flug und den unpilotierten, autonomen Flug. Dass wir batteriegetrieben und durch 18 kleine Rotoren aussergewöhnlich leise mit unserem VoloCity im urbanen Umfeld emissionsfrei fliegen können, das allein ist eine Revolution und echte Pionierarbeit. Dass wir diese Qualitäten mittelfristig um das Thema des autonomen Fliegens ergänzen werden, das ist eine weitere Revolution.

Zweitens nahverkehrstechnisch: Flugtaxis können und wollen den öffentlichen Nahverkehr nicht ersetzen. Sie können ihn jedoch sinnvoll und effizient ergänzen. Die Stärke eines Flugtaxis kommt bei besonders staugeplagten Mega-Städten zum Tragen. Dort können besonders Pendlerinnen und Pendler sowie Geschäftsreisende ihre Reisezeit deutlich reduzieren. Ein weiterer, vielleicht noch wichtigerer Aspekt ist, dass sie ihre Reisezeit planbar machen können, weil es keine unvorher-



VoloCity und VoloPort in Singapur. Quelle: © Volocopter GmbH.

gesehenen Staus in der Luft gibt. Gleichzeitig erleben sie die Stadt nicht aus der Stau- sondern aus der Vogelperspektive. Ergänzt um das Wissen und gute Gewissen, sich emissionsfrei fortzubewegen.

Hierbei gilt Volocopter als ein Flugtaxi-Pionier und Vorreiter der Urban-Air-Mobility (UAM): Warum ist das so und was unterscheidet Sie von der Konkurrenz?

Flugtaxi-Pionier und Vorreiter der Urban-Air-Mobility (UAM) wird man nicht, indem man nur Vision erzählt. Man muss auch liefern. Liefern in allen Bereichen der Entwicklung und das konstant über Jahre hinweg. Volocopter hat 2011 mit dem VC1 – dem Fluggerät mit dem Yogaball als Landegestell – in Karlsruhe den weltweit ersten pilotierten Flug eines elektrisch betriebenen Multikopters erfolgreich durchgeführt. Diesen Technologievorsprung konnte uns bis heute keiner mehr nehmen. Im Gegenteil: Wir konnten den Vorsprung kontinuierlich ausbauen. 2016 folgte mit dem VC 200 der weltweit erste bemannte Flug mit einem elektrisch angetriebenen, senkrechtstartenden Fluggerät, und zwar mit Verkehrszulassung. 2017 waren wir das erste Unternehmen, das einen autonomen Flug mit einem Flugtaxi über Dubai durchgeführt hat. 2019 hat Volocopter nicht nur den ersten Prototypen seiner Start- und Landeinfrastruktur «VoloPort» in Singapur vorgestellt, wir sind auch als weltweit erstes Unternehmen mit einem pilotierten Fluggerät in einer Innenstadt geflogen – Singapur bot die perfekte Kulisse. 2019 haben wir als erstes Flugtaxi-Unternehmen das «Design Organisation Approval, DOA» von der EASA erhalten. Der Ritterschlag, um die Entwicklung



und Produktion unserer Fluggeräte voranzutreiben. Das sind nur einige Beispiele dafür, wie wir die Flugtaxi-Technologie weltweit vorantreiben und weshalb wir Technologie- und Realisationsführer sind.

Quantitativ ist der Wettbewerb in den letzten Jahren stark gewachsen. Wir schätzen, dass es mehr als 200 Unternehmen gibt, die an dieser Technologie arbeiten. Was ein Beleg dafür ist, welches Marktpotenzial hinter UAM prognostiziert wird. Qualitativ lässt sich der Wettbewerb auf eine Handvoll Unternehmen begrenzen. Deren Konzepte und Produkte haben jedoch ganz unterschiedliche Stärken, sodass ein unmittelbarer Vergleich schwerfällt, beziehungsweise fast nicht möglich ist.



VoloCity über Paris. Quelle: © Volocopter GmbH.

Was gehört eigentlich dazu, ein eVTOL (elektrisch angetriebene, senkrecht startende und landende Fluggeräte)-Anbieter in der Zukunft zu werden?

Wir haben früh erkannt, dass es für unsere Kunden, die Städte, sinnvoll ist, wenn wir das Urban-Air-Mobility-Ökosystem ganzheitlich denken. Wir nennen das «Up Lifting Citys». Konkret heisst das: Wir stellen nicht nur das Fluggerät zur Verfügung, wir übernehmen die Orchestrierung der gesamten Infrastruktur, bestehend aus Fluggerät, Start- und Landeinfrastruktur sowie Buchungsprozess. Somit entsteht ein echter Mehrwert für die Stadt und unsere Endkundschaft. Damit bekommen die Städte und die Endkundinnen und -kunden (Passagiere) ein nahtloses Urban-Air-Mobility-Erlebnis aus einer Hand.

Welche besonderen Herausforderungen muss sich Volocopter stellen, um diese Orchestrierung zu meistern?

Die Herausforderungen sind gross. Unsere Motivation auch. Eine differenzierte Betrachtung hilft. Was das Thema Produktion und technischer Service betrifft, haben wir bereits im April diesen Jahres an unserer Firmenzentrale in Bruchsal eine Produktionshalle und einen Service-Hangar mit zusammen mehr als 7000 qm Fläche eröffnet. Bei unserer Start- und Landeinfrastruktur «VoloPort», die wir bereits im Jahr 2019 in Singapur als Prototyp mit einer Grösse von ca. 500 qm vorgestellt haben, gehen wir einen anderen Weg. Hier arbeiten wir im Rahmen einer strategischen Partnerschaft eng mit der Firma Skyports zusammen, die auf

die Konzeption, Planung und Umsetzung von Vertiports (Start- und Landeinfrastruktur für eVTOLs) spezialisiert ist. Das Herz unseres gesamten digitalen Ökosystems ist unsere VoloIQ – unser digitales Betriebssystem. Auch das ist in der Entwicklung weit fortgeschritten. In Echtzeit steuert es unsere Fluggeräte im Zusammenspiel mit unseren VoloPorts bis hin zu unserer Buchungs-App.

«Wir sind auch als weltweit erstes Unternehmen mit einem pilotierten Fluggerät in einer Innenstadt geflogen – Singapur bot die perfekte Kulisse.»

Sie legen Ihren Schwerpunkt auf das urbane Umfeld, also Städte. Sind Flughafen-Transfers in das Stadtzentrum einer der ersten kommerziellen Anwendungen, die wir in naher Zukunft sehen werden?

Richtig. Wie Sie vielleicht wissen, starten wir bereits nächstes Jahr mit den ersten kommerziellen Routen in Paris. Danach folgen Singapur und Rom. Ein typischer Anwendungsfall ist der Flughafen-Transfer in das Stadtzentrum und zurück. Für Geschäftsreisende steht hier die Zeitersparnis, für den Tourist das Erlebnis im Vordergrund.

Welche weiteren Anwendungsfälle möchte Volocopter in mittlerer und ferner Zukunft anstreben?



Auch rein touristische Routen werden von den Städten stark nachgefragt. Da wir aufgrund der geringen Lärmemission niedriger als Helikopter fliegen können, ergeben sich hieraus neue interessante und unbekannte Perspektiven auf die Stadt. Eine weitere wichtige Zielgruppe werden mittelfristig die Pendlerinnen und Pendler sein. Hier sehen wir die schnelle und komfortable Verbindung von städtischen Randbezirken und Vorstädten mit dem Stadtzentrum.

Welche Zielgruppen sollen zu Beginn angesprochen und welche Nutzerprobleme sollen dadurch gelöst werden?

In der Startphase haben wir drei Hauptzielgruppen. Lassen Sie mich diese mit Personas präzisieren. Es sind die Tech-Enthusiasts, Adventure-Seekers und Business-People. Die Geschäftsreisenden wollen schnell und komfortabel vom Flughafen in die Stadt und umgekehrt reisen. Unter den Touristinnen und Touristen haben wir die Adventure-Seekers, die «ihre» Stadt aus einer neuen Perspektive sehen und erleben wollen. Und all die Technik-Begeisterten, die im besten Sinne des Wortes ein «nachhaltiges» urbanes Flugerlebnis möglichst früh erleben wollen. Zu den erst genannten Zielgruppen werden mit Ausbau und Etablierung der Flugrouten die Pendlerinnen und Pendler hinzukommen.

Wie wollen Sie die Menschen dazu bewegen, ihr Konsumverhalten zu ändern und Volocopter zu nutzen?

Global gesehen können wir das Konsumverhalten noch nicht ändern, dafür sind wir zu klein. Wir kön-

nen ein attraktives Angebot machen. Emissionsfrei, leise und schnell die Stadt mit Volocopter aus einer anderen Perspektive zu erleben, das ist eine Qualität, die sich schnell durchsetzen wird – und zwar nachhaltig.

«Emissionsfrei, leise und schnell die Stadt mit Volocopter aus einer anderen Perspektive zu erleben, das ist eine Qualität, die sich schnell durchsetzen wird – und zwar nachhaltig.»

Welchen Beitrag könnte hierbei das Marketing und insbesondere auch die Marke spielen?

Fangen wir mit der Marke an. Markenführung ist Unternehmensführung aus einer anderen Perspektive. Mit der strategischen Führung unserer Marke Volocopter, den unverwechselbaren Eigenschaften, eindeutigen Botschaften und einem einprägsamen Erscheinungsbild wollen wir in den Köpfen und Herzen unserer Zielgruppen verankert sein. Unser prägnantes Markendesign übersetzt die strategische Positionierung in eine sinnliche Dimension. Es hilft uns dabei, Volocopter zu einer durchsetzungsstarken und zukunftsfähigen Marke aufzubauen, die sich unverwechselbar positioniert und ihre Spitzenleistungen mit den strategisch richtigen Aussagen am Markt vermitteln kann. Das Marketing ist der Transmissionsriemen von der Marke zum Markt.



Hier übersetzen wir die grundlegende Ausrichtung der Marke in Produkte, Dienstleistungen und Kommunikation. Konkret: Ohne Markenstrategie, ohne Marketing, ohne Events und ohne PR wären wir bei Weitem nicht dort in der B-to-B- und B-to-C-Wahrnehmung, wo wir heute sind. Kommunikation schafft den entscheidenden Unterschied zum Wettbewerb und steigert den Unternehmenswert.

Wann werden wir die ersten kommerziellen Flüge sehen?

Wir haben uns zum Ziel gesetzt, dass Volocopter im Jahr 2024 der weltweit erste Anbieter von echter Urban-Air-Mobility (UAM) wird.

Und Paris ist eine der ersten Städte?

Auf breiterer Basis arbeitet Volocopter mit Partnern auf der ganzen Welt zusammen, um in den kommenden Jahren UAM-Dienste einzuführen. Paris ist sehr innovativ und interessiert, was neue Mobilitätskonzepte betrifft. Daher hat sich eine sehr enge Zusammenarbeit ergeben.

Wie teuer werden die ersten Flüge sein?

Zum Ticketpreis kann ich derzeit noch nichts Verbindliches sagen. Ausser, dass wir langfristig einen Ticketpreis anstreben, den sich jeder leisten kann, der sich auch ein Taxi leisten kann. Das wird erst dann möglich sein, wenn alle Prozesse auf eine Serienproduktion ausgerichtet sind. In der Startphase, wenn die Anzahl der Flüge stark limitiert ist, wird der Ticketpreis darüber liegen.



Quelle: © Volocopter GmbH.

Wie könnte ein gewöhnlicher Buchungs- und Flugvorgang in Zukunft aus Endkundensicht aussehen?

Einfach! Der Buchungsvorgang wird über die Volocopter-App stattfinden und vergleichbar einfach in der Handhabung sein, wie das Buchen eines Taxis. Kurzum: Die Endkundin oder der Endkunde (Passagier) bucht sich einen Flug für eine bestimmte Strecke. Dann begibt er sich zu unserer Start- und Landeinfrastruktur VoloPort, checkt ein und schwebt davon.

Und zum Schluss: Wo sehen Sie Volocopter im Jahr 2030?

Bis zum Jahr 2030 werden wir die Art und Weise, wie wir Menschen im urbanen Raum befördern, nachhaltig verbessert haben – in vielen Städten weltweit. Als erstes Unternehmen am Markt haben wir signifikante First-Mover-Vorteile. Dadurch können wir Standards definieren, in den Städten, in der Konzeption, in der Umsetzung, im Kundenerlebnis. Volocopter hat dadurch die Chance, weltweit zum Gattungsbegriff für Flugtaxis zu werden. Ich gehe davon aus, dass 2030 für Sie, Herr Greifenstein, ein Volocopter-Flug genauso alltäglich sein wird wie eine Taxifahrt und dass Sie bei Flugtaxis immer zuerst an Volocopter denken. ;-)

New Mobility in Everyday Life

Perspectives From 20 Households
Examined Over Four Months

The study examines the experiences of 20 households adapting their mobility behaviour with the goal of lower-emission mobility over four months, using, e.g., shared mobility products. The results of 13 targeted interventions are described and combined into three key perspectives that need to be considered when developing lower-emission future mobility products.

Jannis Linke, Dr. Philipp Scharfenberger, Jürgen Stackmann

As it accounts for a significant share of overall CO₂ emissions, the transport sector is currently in focus and will have to realise substantial reductions in the coming years (European Council, 2023).

Tackling climate change makes it necessary to adapt individual mobility behaviour, but the share of individual motorised transport in the modal split has remained the same in Germany (Umweltbundesamt, 2023) and Switzerland (Bundesamt für Raumentwicklung ARE, 2023) in recent decades. One solution that addresses overall efficiency improvement and resource reduction consists of new mobility services (Sarasini & Linder, 2018), which encompass shared mobility, i.e., the shared use of means of transport (Machado et al., 2018). In addition, the use of Mobility-as-a-Service (MaaS) apps (Hensher et al., 2021; Utraiainen, 2018) links various modes of transport as an alternative to trips with a privately owned car.

The following study results from the tension between the need for lower-emission mobility in the future and the fact that there is as yet no significant adoption of available alternatives to a privately owned car as measured by the modal split despite new, primarily digital possibilities for making mobility more efficient.

Therefore, to find out what people experience when changing their mobility behaviour, e.g., by abandoning a private car and using public transport or shared mobility services, the following question was investigated in an explorative study with a user-centred perspective:

What do households experience when changing their mobility behaviour towards lower-emission mobility in everyday life?

The study is based on recent findings from studies such as Umparken (Kalkbrenner & Ritz, 2021) in Munich or Ottensen macht Platz (Berestetska et al., 2021) in Hamburg, in which changes in mobility behaviour were researched in the respective contexts. However, to the best of the authors' knowledge, the present study is unique with regard to the diversity of the mobility interventions implemented in the everyday life of 20 households in four different cities in Germany and Switzerland.

Research Design, Methodology and Sample

The study aimed to observe factors influencing mobility preferences, decisions, experiences, and changes in people's everyday mobility behaviour. Answering a call for participation on social media, 377 people stated their potential interest in the study.



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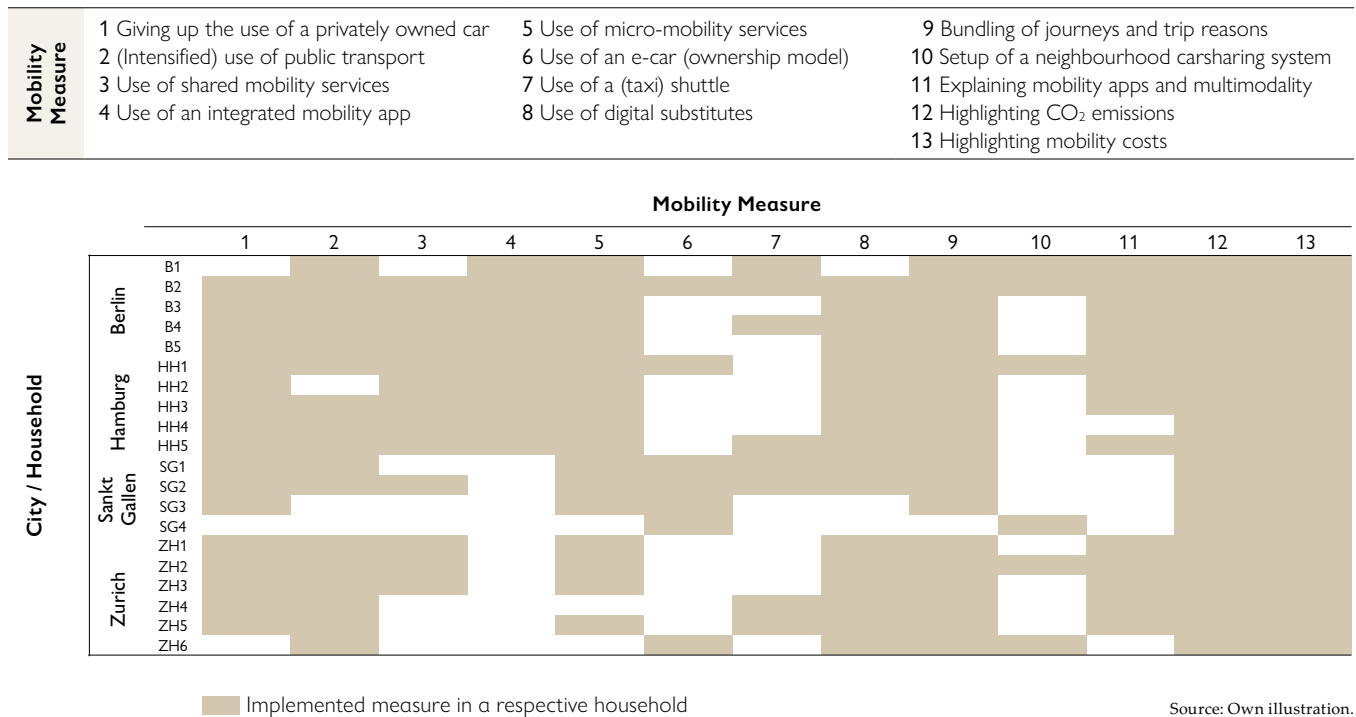
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After checking the applications, households in different cities, countries, and spatial contexts (a total of 10 urban, 5 suburban, and 5 rural households) were selected for data collection. Specifically, 20 households in or around four cities, i.e., Berlin (5 households), Hamburg (5 households), St. Gallen (4 households) and Zurich (6 households), were accompanied over four months (August to November 2022).

For these four months, 13 mobility interventions were defined by the study authors and challenged by industry experts. On the one hand, the interventions focused on specifying concrete changes in physical modes of transportation. On the other hand, they provided information on specific aspects of mobility behaviour like CO₂ emissions or the mobility costs of a mode used by the test households. An overview of the measures and the respective specifications can be found in figure 1.

At the beginning of the data collection, a status quo interview was conducted with the households. This interview focused on the modes of transport used for various trip purposes. In addition, households were asked how they currently decided on a mode for each trip purpose, whether they had ever used new mobility services, and what they generally expected from new mobility solutions. Throughout the data collection period the households used a tracking app (SBB MyWay) to record trip purpose, trip length and mode used.

Fig. 1: Mobility Measures Implemented per Household



The first month of data collection served as a reference. After obtaining the reference measurements, the study authors selected several out of 13 mobility interventions for each household. The selection was based on a household’s previous mobility behaviour and the available mobility solutions in the respective city. After introducing the interventions to the households, their mobility behaviour was tracked for the following month. At the end of this period, experiences were discussed with each household in a semi-structured interview, and new interventions were introduced. This intervention selection/behaviour tracking cycle was performed three times over three consecutive months. At the end of the data collection period, a final interview was conducted with each household.

For the present study, data analysis focused on the households’ ex-post descriptions of their experiences with the mobility interventions. Accordingly, the study authors clustered the stated experiences of all households by mobility intervention type. Subsequently, all findings regarding a particular intervention were analysed using an interpretative synthesis.

Among those directly involved in the study (i.e., interviewees and tracking app users), 42% were women, and 58% were men,

with ages ranging from 18 to 68 years. Two people had physical disabilities. Nineteen children were passively involved in the study. Participating households included 12 families with \geq three people in the household, four single-person households, and four couples. The economic situation of the households was average to above average compared to the population in their city of residence.

Results of the 13 Mobility Measures

In the following, the results of the 13 mobility measures are described in a summarised manner. The implemented interventions per household, which provided the base for the results, are presented in figure 1.

Giving up the use of a privately owned car. *Specification of the measure: affected one or all cars of the household (depending on the given household situation).* If a household had more than one car and a cheaper substitute was provided, households did not perceive giving up the use of the second car as a restriction of their daily mobility behaviour. Only in urban areas was it possible

to abandon the only car in a household without significantly changing daily routines (time efficiency in suburban and rural areas was low). In Switzerland, the accepted substitutes were public transport combined with the occasional use of sharing services. In Germany, the accepted substitutes were multimodal apps, including frequent usage of shared mobility services. But even when a substitute was available and found acceptable, it became clear in the ex-post discussions that no contextual factor would encourage the sale of a private passenger car. In this context, individuals described the potential sale of the vehicle as a personal expense and risky in terms of timing and optimal return.

(Intensified) Use of public transport. *Specification of the measure: using rail, bus, and tram for any trip reason.* For individuals with little public transport experience, the use of public transport was initially challenging and not self-evident. Among other things, challenges pertained to the search for connections, the orientation in the train station and at the platform (i.e., at the departure, transfer and destination stations) as well as unfamiliar proximity to strangers and ‘free time’ on the train, compared to driving a car. Furthermore, it was observed that experiences with public transport tend to be generalised, especially in the German city households. This means that people transferred negative experiences in other places or from other contexts of use to the entire public transport system. This transfer was also made between different modes or lines of public transport in a city (e.g., bus to train or line 1 to line 2 and vice versa).

Use of shared mobility services. *Specification of the measure: station-based and free-floating car-, bike-, e-scooter-, scooter-, or cargo bike-sharing and ride-pooling.* In general, the households

in the study associated ownership with reliability and taking pleasure in property that adds value. Conversely, the negative side of sharing was associated with a lack of availability (while mobility hubs were described as counteracting this); the positive side of sharing was tied to using it for leisure activities and as a supplement to private motorised individual transport. For using shared mobility services, users had to acquire knowledge and skills regarding different functions, payment models, service levels, and rules of the sharing providers. Because usage ultimately fostered the emergence of one favoured service, an overall systematic optimum arising

“For using shared mobility services, users had to acquire knowledge and skills [...]”

from the use of multiple providers and therefore access to more offerings was not attained. Households also repeatedly mentioned a privately owned car as a space for storage. Therefore, it is not so much the transport of objects as the possibility of a storage space that cannot be substituted by shared mobility services (yet). Users cited the (initial) organisational hurdles, i.e., having to change established organisational/daily routines, as an argument for their willingness to incur additional costs for their individually owned car.

Use of an integrated mobility app. *Specification of the measure: mobility apps integrating multiple modes and providers.* In Berlin and Hamburg, integrated mobility apps were available and helped people who had previously used only one mobility

Management Summary

The experiences of 20 different households in Berlin, Hamburg, St. Gallen and Zurich that integrated lower-emission mobility solutions in their daily life show positive examples but also existing challenges for a change in mobility behaviour from a user perspective. To create a shift towards lower-emission mobility, existing mobility decision patterns have to be changed, and competitive substitutes, compared to the benefits of a privately owned car, must be offered. Furthermore, on an overarching level, a stronger focus on the differences in spatial contexts (urban, suburban, rural) and living situations, resulting in a demand for different mobility solutions, needs to be established.

Main Propositions

- 1 From a user’s perspective, multimodal mobility is a complex ‘product’, rarely self-explanatory, and must be learned proactively.
- 2 Despite the availability of a substitute that allows the same daily routine as before, a majority of the participants in the study is willing to pay an extra price for a privately owned car.
- 3 The reduction of CO₂ emissions is stated as a central motivator to adapt new mobility behaviour. Still, it loses out to factors such as travel time and comfort when it comes to actual change.

service to establish an understanding of multimodal mobility as well as intermodal travel chains and to lower the barriers to using new forms of mobility. Households stated that compared to apps from individual providers, integrated mobility apps (still) have a disadvantage regarding possible promotions and the app's usability for selected mobility services. Overall, users summarised that integrated mobility apps provide the first step toward reducing the complexity of 'multimodal mobility' as a product.

“[...] integrated mobility apps helped people to establish an understanding of multimodal mobility [...]”

Use of micro-mobility services. *Specification of the measure: integrating (e-)bike, e-scooter, scooter, cargo bike (all: sharing and/or ownership), and walking in intermodality.* A positive perception of micro-mobility services depended mainly on infrastructural factors (e.g., bicycle ownership requires theft-proof parking facilities, and e-scooter sharing requires parking areas as visible as possible). Moreover, users considered integrating micro-mobility solutions without existing rain protection in intermodal travel chains as a substitute for a car for the summer months only. In winter, the integration strongly depended on subjective comfort factors. Regarding cargo bikes as an alternative to transporting heavy goods with a car, the households perceived cargo bikes as apt either

for the occasional use at mobility stations or as a permanent substitute in case of specific trip purposes (e.g., bringing the children to kindergarten). The occasional use often required 'training' to counter fears about driving safety.

Use of an e-car (ownership model). *Specification of the measure: used when no adequate public transport or sharing product was available.* A distinct majority of participants who drove an e-car in the study described the driving characteristics and the associated positive emotional component as superior to driving a car with a combustion engine. Besides these comfort and fun factors, ownership of an e-car was associated with the necessity of a charging infrastructure at home and/or at work. Most users described the complexity of the charging infrastructure (i.e., different cards and providers) as very challenging and a hurdle to buying an e-car as yet. When discussing a potential future purchase of an e-car with the households, purchasing an e-car and establishing the necessary charging infrastructure was described as an information-intensive purchase decision, requiring more attention than purchasing a car with an internal combustion engine, and with a high investment volume.

Use of a (taxi) shuttle. *Specification of the measure: discussing and testing shuttles as a public transport complement for intermodality.* Although using a shuttle would be an option for individuals who use their privately owned car only occasionally, no household had considered the regular use of a (taxi) shuttle to complement a public transport trip as a



Source: © Adobe Stock.

sustainable option in a mobility mix. Individuals who tested this measure indicated that the usage of (taxi) shuttles for the first and last mile came with a high level of convenience. However, the costs of current solutions were described as too high. Furthermore, the question of the availability of a service provider and, thus, the need for planning was challenging, especially in rural areas.

Use of digital substitutes. *Specification of the measure: discussing or intentionally testing a reduction of the number of trips realised and consequences for daily routines.* In a professional context, digital substitutes (such as video calls) led to a reduction in the number of journeys made and thus in emissions. Participants mentioned that such substitutes were very time-efficient and hence served an important mobility need. The perceived emotional distance to the social environment was highlighted as a common disadvantage of virtual versus physical forms of exchange.

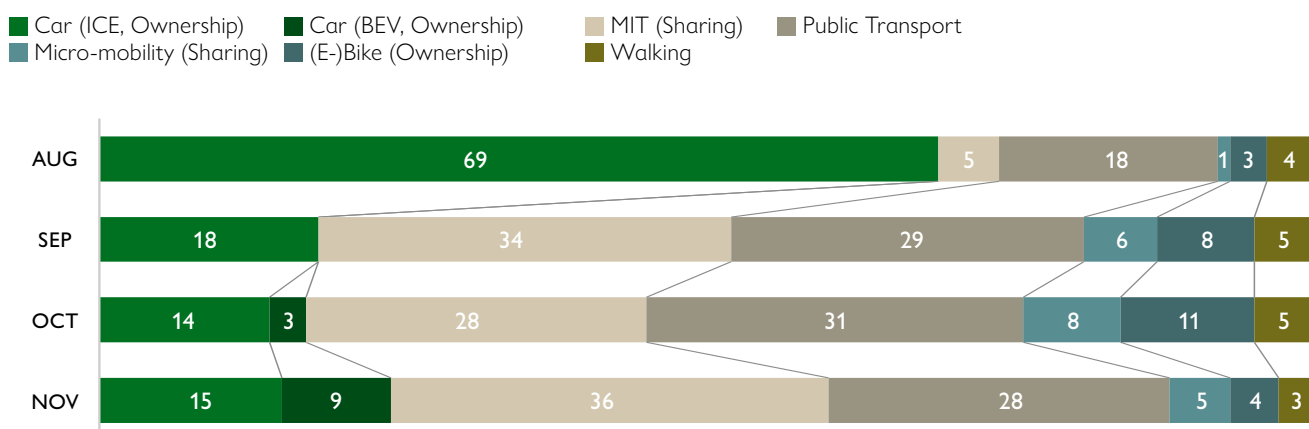
Bundling of journeys and trip purposes. *Specification of the measure: discussing whether a household's trip purposes can be combined when using a privately owned car.* Following the assumption of being easy to implement, combining or pooling routes was mainly utilised by the study households to organise leisure trips with children or hobbies. For other trip purposes, the households often described the efforts to combine commutes and running errands with the private car as time-consuming and adding a degree of uncertainty to the daily routine. Only a few households were aware of opportunities to combine

journeys with people outside their household, except for leisure journeys.

Setup of a neighbourhood carsharing system. *Specification of the measure: discussing relevant conditions and implementing a test setup.* In the context of this study, six neighbourhood carsharing setups were planned, four got started, but only two worked successfully. In retrospect, social interaction factors were the main differentiator between the positive and negative experiences. The challenges of sharing were described similarly to those of a residential community (e.g., cleanliness, establishing agreements, and determining times of use). To the knowledge of the study authors, no integrated product was available in the study areas that offered the implementation of neighbourhood carsharing. From the experiences in the study, an integrated product would need to include insurance, sharing of fuel costs, dealing with damage claims, cleaning the vehicle, and handing over the vehicle key (or a digital variant).

Explaining mobility apps and multimodality. *Specification of the measure: explaining available products and the use of mobile apps for inter-/multimodality.* For the optimal use of carsharing, e-scooters, and other modes of transport (e.g., in different areas of a city), people would have to install multiple apps. However, the installation and learning efforts for apps that offer an identical means of transport were perceived as too high. Moreover, mobility apps that enable one mode of transport only were predominantly linked to specific reasons for journeys and a selected period. They thus substituted these specific trips, but

Fig. 2: Changes in the Modal Split During the Implementation of the Mobility Interventions



Source: Own illustration. N=37 (people using the tracking app); % of ways per mode during study execution; reference measurement in August 2022; mobility measures undertaken from September to November 2022; flights excluded.

not a mode of transport in its entirety. Therefore, mobility apps that only include the mode of one service provider are rather not suitable for learning about intermodal travel chains or multimodal mobility as substitutes for motorised individual transport.

Highlighting CO₂ emissions. *Specification of the measure: highlighting the CO₂ emissions of specific transport modes (used) and discussing implications for mobility behaviour.* While one primary purpose of the study was to induce people to switch to lower-emission modes, the households perceived CO₂ emissions as highly abstract (e.g., asking what is the environmental impact of one gram/one kilo/one ton of CO₂?). Thus, highlighting CO₂ emissions had a limited effect with regard to changing individual mobility behaviour. Households stated that they weighted the reduction of CO₂ emissions via a (potential) change in behaviour in the mobility sector against potential reductions in other sectors. A personal preference was formed as to which shift in behaviour was subjectively 'easiest'. It can be summarised that highlighting CO₂ emissions as a stand-alone factor did not lead to changes in mobility behaviour.

Highlighting mobility costs. *Specification of the measure: calculating a household's mobility costs and discussing implications for mobility behaviour.* During the status quo interviews, nearly all households named mobility costs as a decisive factor for switching to another mode of transport. However, households had only limited knowledge of mobility costs. During interventions using multimodal mobility without subscription models, the in-

creased number of smaller monetary payments was perceived as expensive overall. It turned out that even when a substitute was provided with which everyday life could be realised in an identical form, people were willing to pay more for a privately owned car. Additionally, it was observed that as soon as a company car or the subsidisation of a mode of transport by the employer was available, substituting a journey with another mode of transport was difficult since users perceived these costs as purely additional.

Validating the Effectiveness of the Mobility Measures

In addition to the qualitative results described above, the data of the tracking app showed mobility intervention-related changes in the modal split (see figure 2).

The strongest shift manifested in a decrease in private car use by (on average) 49%. The respective trips were mainly replaced by motorised individual transport (MIT; carsharing, ride-pooling, and scooter; on average +27%) and public transport (on average +12%). Smaller increases were noted for the modes of micro-mobility (sharing; on average +5%) and (e-)bike (ownership, including households using a cargo bike in September and October; on average +5%). The increase in these modes was directly related to intensifying the use of intermodal travel chains, especially for the first and last mile in connection with public transport. The share of walking changed only slightly, which can be interpreted as being the first/last mile solution in connection with public transportation.

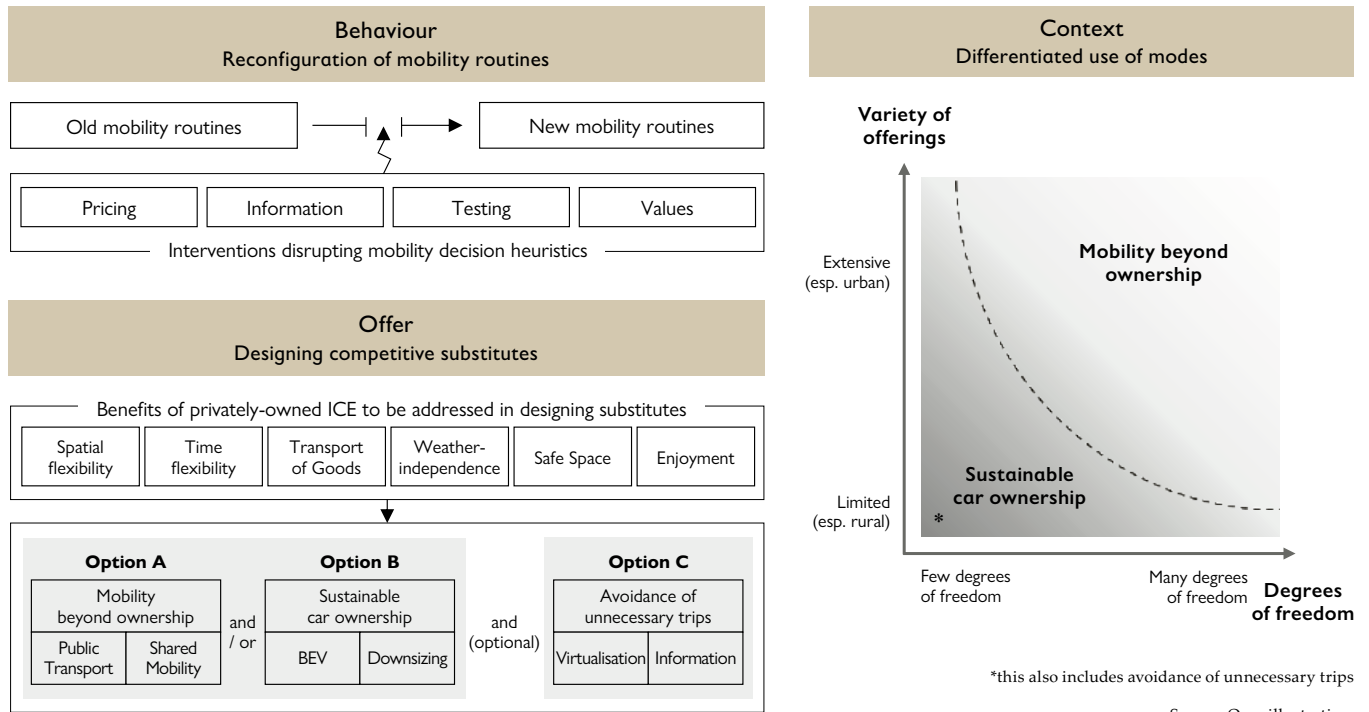
Weather conditions proved to be a noticeable external factor influencing mode choices in November (more rain, cooler temperatures) compared to September and October. There was less use of micro-mobility (sharing) and (e-)bike (ownership). Additionally, car use (ownership) increased compared to September and October (on average +6,5%), which was also due to four households using an electric car (BEV, ownership) as a mobility intervention in November. It needs to be noted that the modal split does not reflect the realised changes in CO₂ equivalents for the usage phase. Despite the increase in car usage it can be assumed that the CO₂ equivalents from the usage of vehicles did not rise significantly in November because the increase of car usage as shown in the modal split was mainly driven by battery electric vehicles that emit fewer CO₂ equivalents during the use phase.

In summary, changes in the modal split reflect two things. First, the applied mobility interventions led to behavioural changes that show up in the modal split. Second, a more homogeneous mode distribution emerged. The latter is particularly relevant

Lessons Learned

- 1 A mobility product intended to gain a permanent share of the modal split means a significant change in a person's everyday life routines and, therefore, must meet individual expectations.
- 2 New mobility services will only be adopted if a product's digital and physical components are convincing.
- 3 Collaborative mobility planning – an interplay between administrations, businesses, science, and citizens – is required to implement 'push and pull'-measures that will orchestrate change.
- 4 Suitable mobility solutions for trips outside the urban area and a better understanding of already available solutions must be provided.

Fig. 3: Key Perspectives Integrating Lower-Emission Future Mobility Products



with regard to efforts that entail learning about multimodal mobility and intermodal travel chains.

For the quantitative validation in the context of this paper, the focus was placed on the measure of the modal split since an analysis of trip purposes, trip lengths and the number of trips as well as respective correlations with measures could only have been valid for the analysis of individual cases considering the small study size of 20 households and different study contexts.

Deriving Key Perspectives for Developing Lower-Emission Future Mobility Products

In a qualitative process, the findings from the 13 mobility measures were consolidated in a conceptual framework with three dimensions (see figure 3).

The first dimension, behaviour, targets the behavioural aspects of changing mobility routines. Importantly, existing mobility

routines must be reconfigured to accept new mobility products. Mobility routines entail preferred modes (today mostly privately owned cars) for specific trip purposes. Routine stability and, thus, the effort required for change can vary. External factors influencing such changes range from 'hard factors', such as pricing, to 'soft factors', such as fundamental value system alterations that, e.g., emphasise the issue of climate change.

The second dimension, offer, highlights the need to develop substitutes that encompass the benefits currently perceived by most users of a privately owned combustion engine vehicle. These include quantifiable dimensions such as spatial and temporal flexibility, the transport of goods, and all-weather capability. Factors that entail more emotional components are safe space and enjoyment. The users' subjective perceptions mainly influence the weighting of factors and must be addressed in a value proposition for each user group. The factors can be addressed through different options. Option A focuses on public transport use and shared mobility services. Here, MaaS apps have the potential to create a seamless, cross-modal user experience. Based on the study's findings, people describe a combination of public transport and shared mobility as 'complex', especially when considering it as a substitute for

a private car. Option B addresses contexts where using a car is unavoidable, e.g., in certain spatial contexts (i.e., rural areas) or for people with disabilities. Increasing the market share of battery electric cars and downsizing should attain resource and space usage efficiency.

When purchasing an electric car, users expect a private or nearby charging infrastructure solution. Also, the complexity of the charging infrastructure in terms of payment processes and services needs to be decreased to a level comparable with that of today's gas stations. Lastly, regarding the avoidance of unnecessary trips, Option C addresses the possibility of active avoidance, e.g., by virtualising jobs or using the possibility of remote work. Therefore, information as well as education on the topic need to be fostered by employers and employees.

The third dimension, context, addresses the fact that aspects of product development, mobility beyond ownership, and sustainable car ownership are context-dependent. Regarding the variety of product offerings, supply differs significantly across various contexts (e.g., urban vs. rural). Thus, differences in user groups or vehicle utilisation emerge, which need to be addressed, e.g., by new business models.

The contents of the framework introduced here are to be understood as overarching guidelines to consider when integrating sustainable mobility solutions into everyday life. For example, this article's main propositions and lessons learned can be seen as an input and a consequence of the three key perspectives mentioned above. In any case, it is important when using the framework to design the integration of sustainable mobility solutions to consider context- and user-specific factors to meet expectations and demands of mobility, making mobility available for everyone in everyday life.

Conclusion

Findings from this study show that mobility behaviour changed based on the applied mobility interventions. The participating households realised that a broad range of mobility products for reducing emissions and engaging in shared mobility already exists, especially in urban areas.

The participants' experiences with the mobility interventions show how multifaceted and interdependent mobility-related decision-making is and how complex and difficult it is to induce persistent changes in mobility behaviour. Furthermore, mobility is both driven by and enabling lifestyles. This circumstance must also be considered in the development of future mobility products. In sum, mobility service use is influenced by various personal, situational, and infrastructural factors. Hence, users

will only successfully adopt new mobility solutions if they benefit from them in the context of these factors.

Finally, the limitations of the study also have to be highlighted. Our findings are based on the experiences of 20 households. Considering the overall characteristics of the countries and cities involved in the study, the sample needs to be categorised as rather homogeneous. For this reason, no generalisation of the results is possible. Given these limitations, the study is intended as a starting point for future research and product developments and as a call to continually shape the development of future mobility from a user-centred perspective. ■

Note

This article builds on an earlier German version: Linke, J., Scharfenberger, P., & Stackmann, J. (2023): Nachhaltige Mobilität in den Alltag integrieren – Eine wissenschaftliche Begleitung von 20 Haushalten über vier Monate. Projektbericht der Studie "New Mobility Buddys" des Future Mobility Lab. This study was supported by members of the Future Mobility Lab (mo.unisg.ch/de/future-mobility-lab) in the form of ideational and financial contributions to its execution. The Future Mobility Lab was founded by the Institute for Mobility at the University of St. Gallen and FischerAppel. For the study "New Mobility Buddys" the Future Mobility Lab encompassed the following members: Berliner Verkehrsbetriebe (BVG), City of St. Gallen, City of Zurich (Tiefbauamt), carvelo, Civey, Clyde, DB Regio Bus, Deutschland – Land der Ideen, Friends of Friends, Lots*, micro, mobility, Mobility Allstars, New Mobility Solutions Hamburg, Riverty, SBB CFF FFS, Sozialverband VdK, Volkswagen Group, voi.

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How Urban Society Can Benefit from Inclusive Mobility

Transportation and economic development are deeply intertwined, with commuting among the greatest indicators of an individual's ability to escape poverty. The latest research collaboration between the Boston Consulting Group, the World Economic Forum and the University of St. Gallen explores how thoughtfully designed mobility systems can play a crucial role in everything from a community's health to socioeconomic gains.

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Transportation is a crucial factor in social inclusion, a broad term that describes the ability of individuals or groups to participate in society and to take advantage of social or economic opportunities (Abbott & McConkey, 2006). By providing citizens with access to important social (e.g., personal networks) and economic (e.g., jobs, education) opportunities, it enhances chances for participation and increases individuals' chances for positive socioeconomic development (Herrmann et al., 2022). In contrast, a transportation disadvantage – such as inaccessible public transport for people with mobility impairments or lower income – can set a vicious circle of social exclusion in motion (Church et al., 2000; Daubitz, 2016).

However, research reveals that not all members of society currently have equal access to transportation (Lucas & Musso, 2014). *Low-income communities* are often hampered by poor public transportation services in remote, more affordable living areas (Hine & Mitchell, 2003). At late hours, women might feel anxious in public transport (Lynch & Atkins, 1988). The *elderly* as well as *individuals with disabilities* are regularly confronted with manifold issues of inaccessibility. For example, physical impairments may keep people from using transportation options without barrier-free access (Church et al., 2000). And *minorities* might experience language barriers that prevent their use of public transportation (Church et al., 2000).

Against this background, decision-makers in urban planning seek to keep pace with the increasing opportunities of on-demand, shared mobility services (Dill & McNeil, 2020; Smith & Schwieterman, 2018) and to decide on the needed changes that would broaden their transportation systems' physical and socioeconomic reach. Guidance is needed as to which opportunities for social inclusion in urban transportation exist and how large their effect on society can be. Therefore, Bos-

ton Consulting Group (BCG), the World Economic Forum and the Institute for Mobility of the University of St. Gallen conducted a joint research project to measure the effects of mobility on social inclusion. The present article is based upon this research project. While recent research updates have been added in some sections of the article, several key findings and certain paragraphs are taken from the corresponding original research report (World Economic Forum, 2021).

A mixed methods design was applied (integrating elements of a 'sequential prestudy model' with a 'parallel triangulation model'; Srnka, 2007, p. 254) and carried out along four phases (see figure 1 in the [online Appendix](#)).

- First, examples of social inclusion projects worldwide were identified in an extensive exploratory pre-study. From these insights, a comprehensive solution framework, covering a total of 50 social inclusion measures, was developed and extended in an iterative approach in the following phases.
- Second, a unique quantitative digital twin city model was developed and a status-quo assessment of three cities – Chicago, Berlin, and Beijing – was conducted. Qualitative insights from more than 50 interviews helped to consider dimensions of inclusiveness that are difficult to quantify (Gompf et al., 2020) and were triangulated with the quantitative results.
- Third, the digital twin model was used to simulate the effect of social inclusion measures. The most impactful of them were elaborated qualitatively in more depth and recommendations for implementation were given.
- Fourth, the collected findings were summarised in a global call for action for decision-makers in the areas of urban planning and transportation design.



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Global Perspective: Where Do We Stand?

Research in the Field of Transportation Tackles the Issue of Social Inclusion From Three Perspectives

For several decades, research has been strongly concerned with the inclusiveness of transportation (Malekzadeh & Chung, 2020). Researchers approach this field from mainly three different perspectives (Boschmann & Kwan, 2008). Literature from the stream of *transportation equity* investigates how equitable transport-enabled access to societal and economic opportunities is distributed across different parts of society. The use of transportation, the number of accessible jobs, or the quality of access to essential facilities (e.g., healthcare) are typical objects of investigation, as are inequalities in the financial burden of transportation (see, among others, Burton, 2000; Kaufman et al., 2015). Scholars of the stream of *social exclusion* explore the consequences of unequal transportation opportunities (see, e.g., Church et al., 2000; Lucas, 2012). Closely related is work with a focus on inclusion, i.e., the counterpart of exclusion. Researchers focusing on inclusion take on an active – shaping – rather than just analytical role (Lucas & Musso, 2014). While research on exclusion investigates consequences of transportation disadvantage, work on inclusion focuses more

Main Propositions

- 1 The lack of access to efficient transportation systems leads to social disadvantages.
- 2 Different city archetypes, depending on their maturity, require different mobility levers addressing both supply and demand to achieve socioeconomic gains.
- 3 A multimodal transport system integrating different modes and able to ensure socioeconomic gains is expected to become the status quo in the future.

on changing these disparities (see, e.g., Altenburg et al., 2009; Van der Kloof et al., 2014). The third stream explores the interrelation between transportation and *quality of life*, a construct that goes beyond purely socioeconomic concepts (see, e.g., Currie et al., 2010; Mackett et al., 2008). It consists of manifold dimensions and “[...] may be defined as the extent to which important values and needs of people are fulfilled” (Steg & Gifford, 2005, p. 62). The underlying assumption of this research approach is that people may, in part, care less about general justice than about their very individual personal situation (Boschmann & Kwan, 2008).

What unites these three streams of research is the notion that transportation plays an important role in social inclusion by providing individuals and groups with access to important assets. Accessibility is a broad term that has – despite many years of research – no harmonised definition to date (Malekzadeh & Chung, 2020). Broadly, it can be described as “the freedom of individuals to reach spatial opportunities and benefit from them” (Berechman, 1981, p. 185; reviewing Burns, 1980). Hence, accessibility must be understood as a multifaceted concept, in which transportation plays only one crucial role. In addition to a temporal component (e.g., the chance to participate in social opportunities) and an individual component (e.g., economic ability to participate), another important element of accessibility is the use of land, i.e., the socially beneficial design of urban areas (Geurs & Van Wee, 2004). Urban design is closely related with transportation. That is, an improved supply of elementary facilities (e.g., education, health care) and economic opportunities (i.e., jobs) can reduce the need for transportation. On the other hand, a performant transportation system can compensate for disadvantageous land use in one urban area and provide access to another (Lang et al., 2020).

This research project combines different elements of these three research streams. On the one hand, it adopts established socioeconomic KPIs of accessibility (*Stream 1*) with the aim of reducing social exclusion (*Stream 2*). On the other hand, this research is extended by KPIs describing quality of life (e.g., CO₂ emissions and hours lost in delay, *Stream 3*) in a multidimensional view, as will be seen below (digital twin model).

Management Summary

Transportation and economic development are deeply intertwined, with commuting among the greatest indicators of an individual’s ability to escape poverty. The latest research collaboration between Boston Consulting Group, the World Economic Forum and the University of St. Gallen explores how thoughtfully designed mobility systems can play a crucial role in everything from a community’s health to socioeconomic gains. The report provides approx. 50 levers and a roadmap on how urban societies can offer more inclusive mobility and what benefits they will gain from doing so.

A Closer Look Reveals: We Are Far Removed from Equitable and Inclusive Transportation Systems

In May 2022, the World Health Organisation published the “Vienna Declaration”

with the aim of addressing new mobility solutions and strategies that would tackle socioeconomic and sustainability challenges. Researchers confirmed that the most remote areas without access to public transport or private cars happen to be the most disadvantaged areas,

Mobility has the potential to become a true catalyst for social inclusivity and sustainability – but city-specific realities need to be taken into account.

with New York City as a perfect example (Kaufman et al., 2015). Additionally, another “analysis [of the city of Melbourne] showed that socially advantaged groups were more mobile [...]. These contrasted with socially disadvantaged groups who were more concerned with availability of access to transport modes and the costs of travel” (Currie et al., 2010, S.289). Based on these trends, countries and cities are beginning to tackle the systemic gaps in their transportation systems by democratising access to transport and segmenting mobility users (Herrmann et al., 2022) to create more equitable economic development opportunities and facilitate social progress.

An inspiring example was observed in Utah, USA, where the Department of Transportation, in partnership with the Utah Transit Authority, launched the Autonomous Shuttle Pilot in April 2019. The project targets first- and last-mile commutes, providing them with a pick-up service by autonomous shuttles with 6–12 passengers that would drive them to larger public transit systems and stations. To assist people with limited mobility in boarding, all shuttles

were provided with an automated ramp to ensure an inclusive mobility solution that serves remote areas and low-income individuals that cannot afford a private car.

Another unique initiative was observed in Kerala. In the Indian State, the government offers a safe and secure transportation option for women – She Taxi – with a focus on low-income areas. The fleet of taxicabs aims to reduce gender-based violence inflicted on women in public spaces, allowing them to move safely through the city with cars driven exclusively by other women. This 24/7 initiative not only empowers women in their independent daily life, but also enforces gender equality in mobility services.

Dozens of other innovative mobility examples are continuously initiated across the world with the aim to make mobility safer, healthier and more inclusive, thus tackling socioeconomic and sustainability challenges at the same time.

Status Quo Assessment: The Approach to Social Inclusion in Urban Areas

Despite a rising awareness in both the practice-oriented and the scientific community, there is no uniform methodology for measuring the inclusiveness of transportation systems and simulating the effects of new measures (Gompf et al., 2020; Malekzadeh & Chung, 2020). Many models evaluate the accessibility of transportation systems, yet they differ significantly in their degree of advancement and realism. The simplest models measure access to public transport stations (e.g., time to reach the next bus stop). Those models would typically fail to realistically quantify inclusion measures as they disregard, e.g., the attractiveness of different points of interest (e.g., a playground is of less im-

Lessons Learned

- 1 Put inclusive mobility at the top of the agenda of urban transportation planning and design.
- 2 Segment users in order to understand their specific needs, thinking in radically innovative ways.
- 3 Apply a differentiated approach to optimise both mobility demand and supply, as enhancing supply only improves cities with large transportation system gaps, while in other circumstances demand-optimising solutions need to be considered, e.g., the 15-minute city.
- 4 Integrate multimodal transport solutions and overcome binary views à la “car vs. public transport”, focusing on innovative, shared, on-demand mobility solutions, public transit and environmentally friendly alternatives.
- 5 Improve the understanding of riders’ demand through innovative data collection and mobility behaviour analysis, incl. their preferences, cultural biases, habits, motivations to move & readiness to new modes.
- 6 Run new mobility pilots to test solutions and tackle the problem of lacking evidence by collecting first-hand insights from these communities.

portance than a hospital) and the actual willingness to use specific transportation modes (Gompf et al., 2020; Malekzadeh & Chung, 2020). Advanced models measure more realistic accessibility constructs such as the number of reachable jobs within a certain time of commute. However, many of these approaches would still struggle with a realistic simulation of accessibility measures (Geurs & Van Wee, 2004). For example, not every job can be performed by every urban citizen just because they can reach any workplace faster than before. In addition, there is a variety of different KPIs that reflect the social inclusiveness of urban transport (Gompf et al., 2020).

Against the background of these methodological challenges, an advanced travel demand model was developed by BCG. It consists of six layers taking into account all relevant transportation data (see figure 1).

Trips were distributed using a gravity model, taking into account a friction factor between trip departure and arrival zones. As opposed to other gravity-based models (Malekzadeh & Chung, 2020), this simulation also considers the subjective attractiveness of the respective modes of transport by integrating a measurand for crime and perceived safety. Furthermore, the respective job qualification profiles of dwellers were taken into account to calculate realistic job accessibility values in the simulations. For the city of Chicago alone, 26 million end-to-end trips were simulated. Iterative comparison with actual travel data proved this model to have very high exploratory power. A long list of over 80 potential KPIs was narrowed down to six that effectively measure the effect of possible solutions on inclusivity (see figure 2). Based on this model, the cities' digital twins were created to reflect the status quo and derive realistic simulations of new inclusivity initiatives – for Chicago, this resulted in modelling 26 million end-to-end trips, 4.7 million job

locations, 87'000 points of interest, 70'000 km in road network as well as the travel times between over 8 million pairs of points at different times during the day by different means of transport.

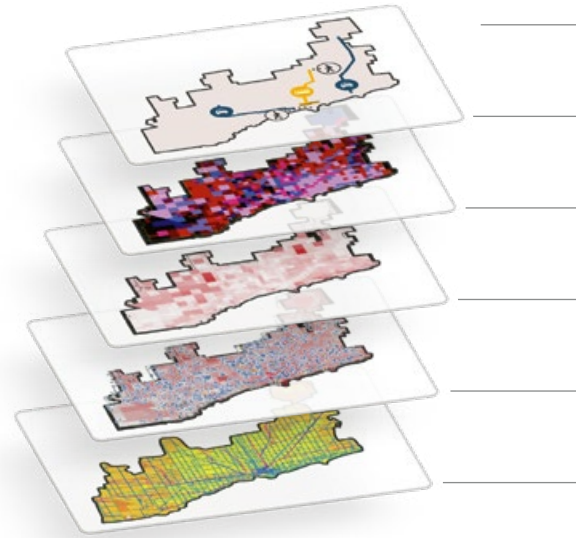
Solution Simulation and Development

Throughout the research, it was found that most cities and authorities are experiencing similar patterns:

- Marginalised groups are often not considered. Mental disabilities, blindness, or reduced mobility are often overlooked and individuals with language barriers are unable to access new services.
- The actual benefit of measures (also relative to others) is often difficult to measure, which is highly relevant against the background of limited financial resources of the public sector.

Driven by this lack of quantitative and qualitative measures and supported by the accessibility evaluation of land use and transport strategies previously assessed by researchers (see, e.g., Geurs & Van Wee, 2004), a universal inclusivity-centric approach that cities can pursue to optimise their existing mobility system and improve inclusivity was developed, targeting three different dimensions. The first aspect improves the supply: it is possible to optimise this dimension by enhancing and upgrading existing infrastructure or introducing new modes of transport. The second aspect stimulates mobility demand: this is done through improving affordability, implementing short-term demand-matching schemes or – in the long run – reducing the need for travel itself. Eventually, with the support of specific levers that range from health-related measures to digitised solutions and optimised operating models it is possible to amplify the effects of these measures. Along these three

Fig. 1: Overview of the Six-Layer



dimensions, approx. 50 solutions and enablers were developed to help and inspire cities and public transport services to improve their mobility solutions and increase social inclusion (see figure 2). These include both traditional mobility solutions, e.g., shared mobility offerings and priority lanes, and solutions that address new ways of work, e.g., the incentivization of remote working to reduce travel demand.

The “Right” Mobility Solution Depends on the City’s Unique Characteristics

While acknowledging that every city has its own mobility ecosystem and social circumstances, for the purposes of our research, each of the three cities analysed represents a different urban archetype and distinct stages in the maturity of mobility ecosystems (see figure 3).

First, “car-centric giants”, with Chicago as a case study, which has a very unequal

Transport Demand Model and Utilised Inclusivity KPIs



For further supplementary figures to the article, visit: [unisg.link.MRSG-Lang-et-al](https://unisg.link/MRSG-Lang-et-al)

KPIs

- Multiple KPIs calculated, including modal shares, costs, carbon emissions, etc.

Trips and modes

- ~26M end-to-end trips
- One of 8 modes assigned to each trip

Origins/destinations

- Origins and destinations for trips of 8 different purposes

Population

- Home location for ~8.5M people
- 12 demographic segments analysed separately

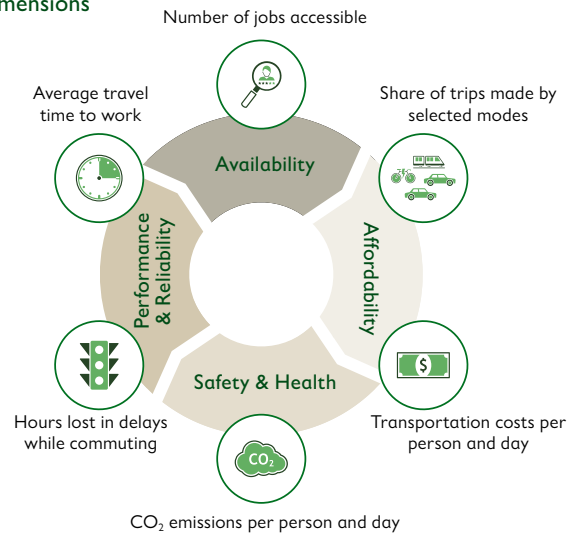
Land use data: Jobs and points of interest

- 87k points of interest in 69 categories
- Locations of ~4.6M jobs

Transport network

- 68,216 km of road network, 3200 km of transit routes, incl. schedules
- Travel times for ~8M pairs of points in the city at different times of day

Key dimensions



Source: Boston Consulting Group (2021).

infrastructure with spatial inequities between high- and low-income areas and heavily relies on private cars as means of transportation to bridge the lack of access to public transport. To tackle its issues of social inclusion, the most efficient levers are those optimising the mobility supply, i.e., to offer to low-income households the opportunity to reach the high-paying job hubs without relying on private vehicles or accepting prohibitive commuting times.

Second, the “compact middleweight”, with Berlin as a fitting example with its high-density, well-developed public transit network. For these cities, not only supply but also demand would need to be optimised. They need to change the offering and positioning of public services to increase mobility across the city, as well as provide opportunities to low-income households to make use of the available services. Differentiated service levels in public transit were among the most successful levers modelled for Berlin, reducing

the cost for basic public transport by 20% and increasing the share of trips with public transport by 11%.

As a third archetype, the “high-density megacity” was identified, using Beijing as an example. The city hosts over 20 million people and, despite tightly scheduled public transit rhythms, suffers from chronic overuse of public transit and other means of transport. For these city types, the most efficient levers should address the optimisation of demand, so as to reduce and change the requirements of the population towards more sustainable usage. In Beijing, a digital platform for metro reservations was implemented to flatten peak hour demand and reduce commute time for users by up to 29% during rush hours.

A Deep Dive into Chicago: The Car-Centric Giant

Chicago is structured around a strong economic centre in the “Chicago Loop”

that hosts most of the high-paying jobs. The poorest areas of the city are located south and west of the city (see figure 4). While the city boasts a large public transportation system, including several providers (e.g., PACE, CTA, Metra), Chicago is highly car-centric, with vehicles accounting for nearly 60% of transportation activities. During the research it was found that an average of 115 hours is lost per year while commuting, ranking Chicago among the most transportation-congested cities in the United States (see figure 2 in the [online Appendix](#)).

Despite the large public transportation system with various providers, low-income communities suffer from inefficient services, e.g., without an elevated degree of mode changes that would connect them to the Chicago Loop in a reasonable time. Currently their commuting time is approx. 1 hour, compared to 37 min for residents living in the high-income Lake View area, north of the city centre. This leads to highly segregated

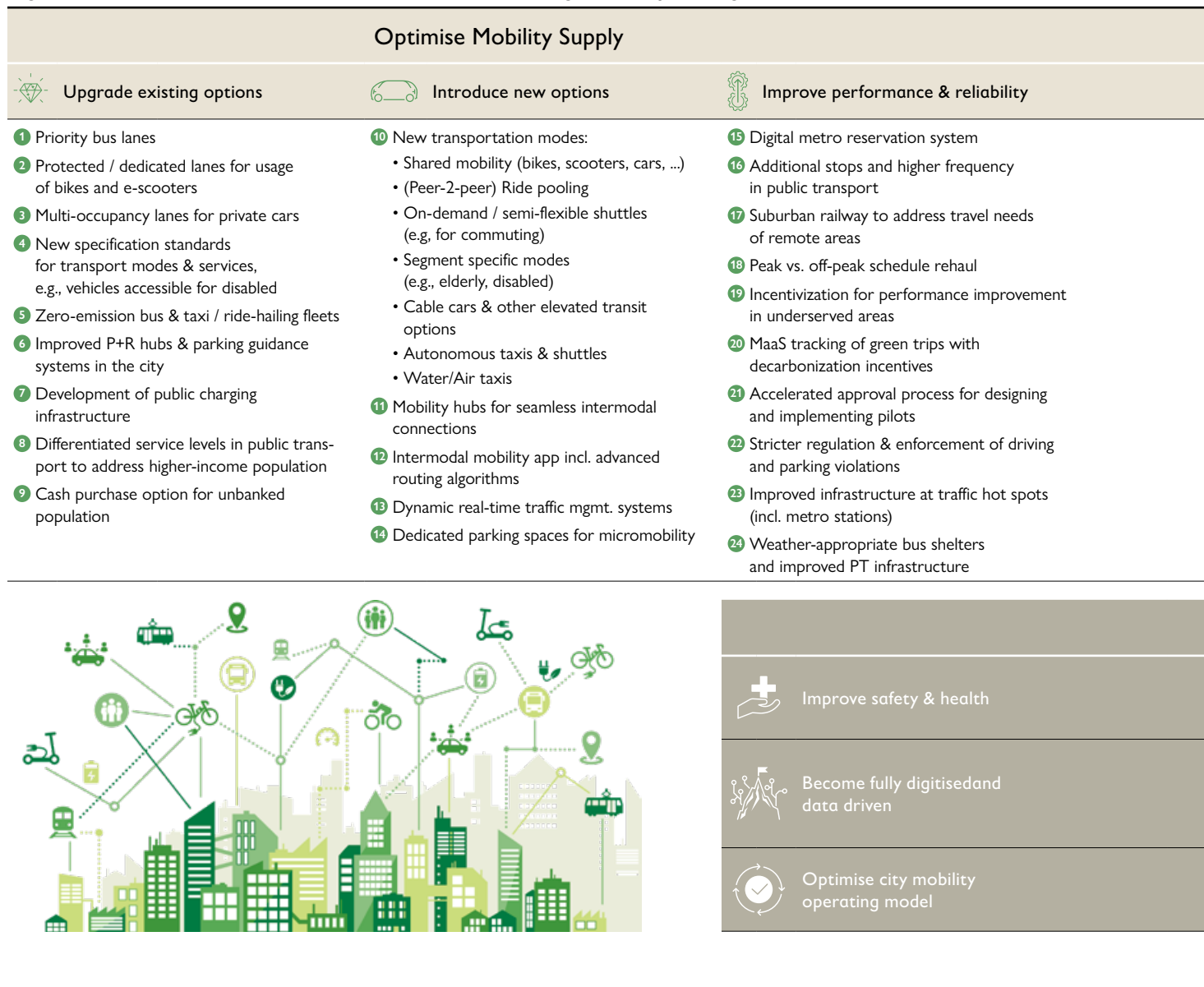
areas with a concentration of low-income households that encounter a natural mobility barrier to areas with potentially high-paid jobs. This research found that low-income households spend up to 35% of their income on transportation. 74% of low-income households are compelled to have cars because of the prevalence of mobility deserts outside the city centre. The high concentration of

jobs and higher wages in the city centre, combined with this patchwork mobility system, exacerbates economic inequity in the city.

The CTA and the Mayor of Chicago have been implementing solutions to address mobility and last-mile issues, e.g., by expanding the Divvy Bikes operations to over 230 square miles

throughout all the city. Against this background, several levers that could additionally reduce socioeconomic inequalities driven by mobility issues were designed. Of all the tested levers, on-demand shuttles in underserved areas, the introduction of congestion pricing in the central business district, and differentiated service levels on public transport to lower the average

Fig. 2: Overview of the Levers and Enablers Tackling Mobility Along Three Dimensions



ticket fare showed a positive impact on the relevant KPIs with the priority but lanes, already becoming reality within the last year. Also, with the expertise of the CTA and several public and private stakeholders, express priority bus lanes were designed and modelled for use during peak hours from and to underserved areas in the east and south of Chicago to connect them to areas with

high job density, i.e., the Chicago Loop. The model showed that these priority lanes could reduce overall travel time to work by 11% and improve job accessibility by 39% for current users (see figure 4).

In December 2022, the CTA agreed with the Chicago District of Transportation to make permanent and further improve

the Chicago Avenue “Pop-up Essential” bus-only lanes featured all along Chicago Avenue between Western and Ashland avenues, with additional priority bus lanes from low-income areas to the city centre soon to come, effectively addressing the pressing socioeconomic inequalities across low-income households caused, in part, by lacking access to mobility.

Optimise Mobility Demand



Increase affordability

- 25 Income-based solutions, e.g., nocturnal services in low-income neighbourhoods
- 26 Fare-capped, pay-as-you-go payment systems
- 27 Increased cost attractiveness of PT by category (women, elderly)
- 28 Congestion pricing to cross-subsidize other modes
- 29 Increased cost of cars (e.g., fuel tax) and cross-subsidizing of public transit or other modes
- 30 Differentiated service levels on PT to subsidize standard ticket prices
- 31 Reduction of unbankable population, e.g., free-of-charge bank accounts
- 32 Free cell phones to lowest income households w / internet connect
- 33 Non-digital access options for new and existing modes



Realise short-term quick-wins

- 34 Employer-sponsored commuting solutions for all employees
- 35 Incentivization of remote working settings to reduce travel demand
- 36 Creation of jobs and other key infrastructure buildings (education, healthcare, etc.) in neglected and underserved areas
- 37 Review of office and school hours / starting times to reduce peak hours congestion



Plan long term measures







- 38 Integrated multi-and intermodal route design in future infrastructure planning
- 39 15-min city as new standard for future city design – incl. multiple city centres/satellites
- 40 Redistribution of key points of interest across entire city area
- 41 Repurposing of road and parking space, e.g., to larger pedestrian walkways, cafés & seating zones, greenification of cities

Improve Mobility Enablers

- 42 Higher number trained staff, esp. to increase security on public transit
- 43 Technical safety systems (collision control / help buttons / ID tracking for public transport, camera control, driver's and passenger's assistance)
- 44 Improved street lighting in lower income neighbourhoods and along trips requiring greater walking distance between modes
- 45 Real-time data collection and share by modalities and by underserved populations – being intentional in data targets by group
- 46 Gender usage rates – running pilots on gathering usage rates and vandalism rates
- 47 Feedback portal to report issues by users directly to the city and/or private provider
- 48 Pollution measurement and digital information system, incl. incentivization of public transit on highly polluted days
- 49 Streamlined organisation and operations, clear responsibilities and measurable objectives incl. tracking and action plan
- 50 Improved and harmonised regulatory standards
- 51 Improved tariff setting, incl. integrated schedules and payment bundles for public transit and first and last mile

Source: Boston Consulting Group (2021) / © Adobe Stock.

Fig. 3: Three Urban Archetypes and Their Characteristics

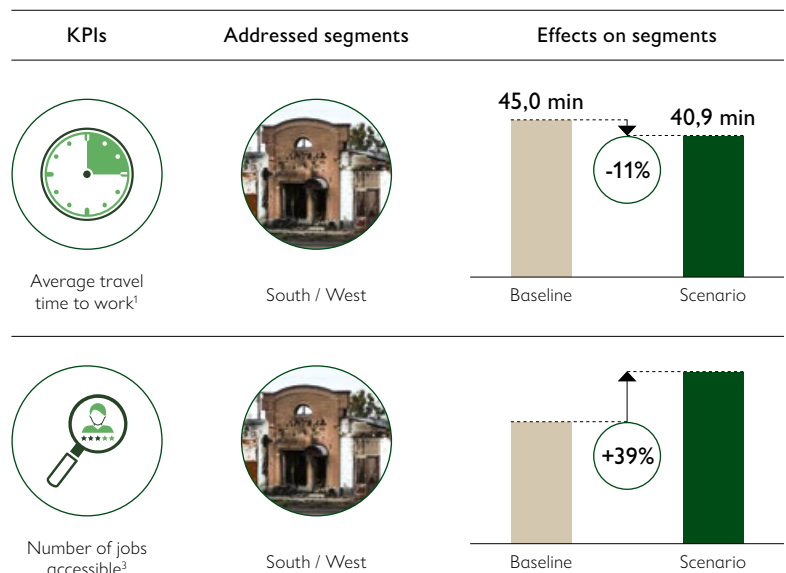
	 The Car-Centric Giant	 The Highly Compact Middleweight	 The High-Density Megacity
Examples	Chicago	Berlin	Beijing
Description	Unequal infrastructure with spatial inequities	High density of mobility services across city	Megacity with efficient public transit system
Mobility stage	Optimise supply  Optimise demand	Optimise supply  Optimise demand	Optimise supply  Optimise demand
Key dimensions	<ul style="list-style-type: none"> Spatial separation between high- and low-income areas Some disconnected areas with poor public transit access Need for optimisation of new vs existing supply 	<ul style="list-style-type: none"> Low-income communities living spread over entire city Easily accessible public transit infrastructure across entire city Need for cross-financing options for new services 	<ul style="list-style-type: none"> Very high number of commuters on public transit Highly optimised public transit system Oversaturated usage of PT leads back to growing car ownership
Focus on solution	<ul style="list-style-type: none"> Optimise mobility supply: Grow equitable access to PT in underserved areas 	<ul style="list-style-type: none"> Optimise mobility supply & demand: Develop quality of existing levers to meet demand 	<ul style="list-style-type: none"> Optimise mobility demand: Shift to demand side-driven solutions

Source: Boston Consulting Group (2021) / iStockphoto.

Fig. 4: Priority Bus Lanes in Chicago and Their Effects on Two Selected KPIs

Add priority bus lanes from underserved areas to job areas¹

Priority bus lanes show an improvement of overall travel time by – 11% and a higher accessibility to jobs



1. The suggested bus lanes only consider the central business district that hosts 50% of medium salary jobs; 2. Measured for those jobs exclusively located in the central business district; 3. In 40 minutes by public transport incl. priority bus lanes. Source: Boston Consulting Group (2021) / © Freepik.

Global Call for Action: What Cities Need to Do

The known challenges faced by urban transport planners are dwarfed by the unknown issues that they and their cities will have to deal with over the next 30 years. Some cities will grow well beyond today's archetype, and transportation systems will struggle both in trying to keep up with these shifts and in navigating the unexpected. To navigate the challenges of an uncertain future, five imperatives have been identified that decision-makers worldwide need to adopt to support the development of a more inclusive mobility ecosystem in cities:

- (1) Put inclusive mobility at the top of the agenda of urban transportation planning and design in order to foster the socioeconomic growth of the city.
- (2) Apply a differentiated approach by exploring how to optimise both mobility demand and supply and tailor the solution to the unique characteristics of the city.
- (3) Integrate more innovative, multi-modal transport solutions and overcome binary views à la "car vs. public transport", ensuring their seamless integration to provide a real alternative to private car commuting.
- (4) Improve the understanding of rider demand through more innovative data collection and (mobility) behaviour analyses, to really grasp the opportunities for individual and collective economic growth.
- (5) Run new mobility pilots to test solutions and to tackle the problem of lacking evidence, validating underserved communities' most urgent pain points.

This research aimed to contribute to socially inclusive mobility ecosystems in order to unlock the potential of these communities and help cities navigate the known and the unknown. ■

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Carsharing – Utopia or Real Gamechanger?

Conceptualising The Potential of
Carsharing for Tackling Carbon Emissions

This conceptual paper addresses the different levers of both carsharing providers and their customers regarding the reduction of greenhouse gas emissions in the mobility sector. The various findings show that the main lever, besides the electrification of the vehicle fleet, is the integration of carsharing models into public transportation.

Andreas Collet, Dr. Philipp Scharfenberger

For quite some years now, carsharing concepts have been hailed as a possible driver of sustainable mobility. However, the breakthrough of these business models is still pending. The reasons vary, from unprofitable business models to higher perceived comfort levels of owning a car, resulting in a constant increase of private vehicle purchases (KBA, 2023; Kreimeier, 2022; MM, 2022). Simultaneously, in urban areas the demand for a new, less car-based and more sustainable transport policy and infrastructure is becoming stronger. Politicians and urban planners seek to address this demand by enforcing interventions that raise the usage costs of privately owned vehicles (Focus, 2022; SZ, 2019). This could, among other things, advance shared mobility concepts and thus enable carsharing concepts to achieve their breakthrough, especially in urban areas.

Public pressure to reduce greenhouse gas emissions (GHGE) of the transport sector and thus create a more sustainable mobility has grown constantly over the years, putting car-sharing solutions in the spotlight. While carsharing providers are themselves attempting to make their fleets more sustainable (Donath, 2022), they are partly also forced to do so by government regulations (NDR, 2022). In the last few years, there has been a broadening of perspective in science and politics regarding the calculation of “real” GHGE. GHGE are now increasingly calculated with a systematic lifetime approach including the relevant infrastructure to compare different modes of transport (Allekotte et al., 2020; Wild, 2021). This conceptual paper takes up this systemic view and closes the research gap mentioned by Shams Esfandabadi et al. (2022) regarding the establishment of a comprehensive long-term sustainability assessment framework. It develops an overarching framework to help both policymakers and corporate decision-makers to compare carsharing offers with privately owned cars in terms of ecological levers and distinguishes between *supply-oriented* and *behaviour-oriented* levers. Hence, our research aims to answer the following overarching question:

What are the main levers of carsharing business models to reduce their GHGE and the GHGE in the mobility sector in general?

A Systematic Perspective on Greenhouse Gas Emissions in the Mobility Sector

The pressure to reduce GHGE has increased dramatically in recent decades. The majority of society is now aware that climate change is a global problem requiring appropriate political and technological solutions (Sonnenberg, 2022). GHGE



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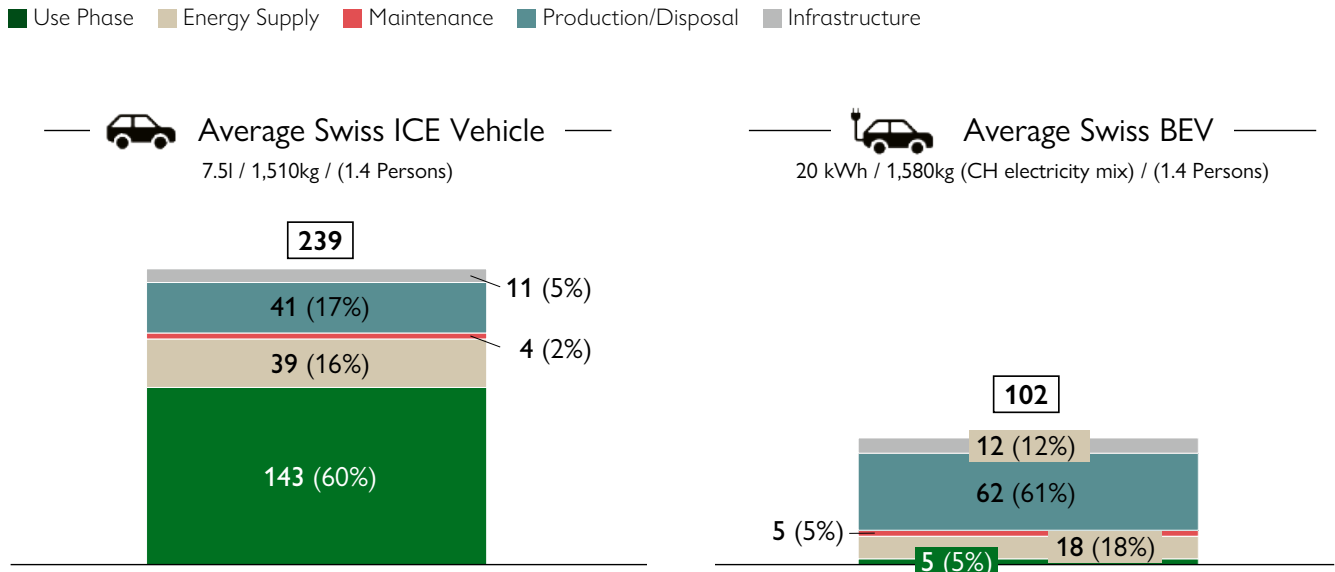
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are seen as the main driver of climate change (COM, n.d.) and therefore, as mentioned above, there is a search for possible mitigation options. However, the authors are aware that there are other factors to consider, such as biodiversity, air pollutants or resource scarcity, to avoid “carbon tunnel vision” (Konietzko, 2022). In order to compare the different types of GHGE with each other and to examine their potential to reduce GHGE, the factor CO₂ equivalent (CO₂-eq.) was introduced (Eurostat, 2016). Taking a closer look at the development of GHGE shows that in many industrialised countries, such as Germany and Switzerland, total GHGE have decreased significantly over the last decades. However, this occurred disproportionately across different sectors (BAFU, 2023; UBA, 2022b). Absolute GHGE in the mobility sector have remained unchanged (BAFU, 2022a; UBA, 2022b). Most technological efficiency gains that would have decreased mobility emissions have been offset by increased travel behaviour (BAFU, 2022b; UBA, 2022c), leading to a more or less unchanged total amount of GHGE in this sector (BAFU, 2022a; UBA, 2022c). The largest share of GHGE in the mobility sector results from motorised private transport, or more precisely, from the emissions accounted for by privately owned vehicles (UBA, 2022c).

Using a systematic perspective allows to consider the direct GHGE of the *use phase*, occurring due to vehicle operation with energy consumption and exhaust emissions. Moreover, the emissions of *energy supply* are taken into account, e.g., emissions produced during the transportation of fuel from its production site to the gas station. In addition, the

Figure 1: Comparison of ICE Vehicle vs. BEV regarding CO₂-eq. per PKM



Source: Own illustration.

indirect emissions caused by the *maintenance* of a vehicle, the emissions occurring during the *production and disposal* process and the emissions of the relevant *infrastructure*, like bridges, tunnels, or road construction, are added. Figure 1 shows the CO₂-eq. emissions per passenger kilometre (pkm) of an average Swiss vehicle with an internal combustion engine (ICE) and an average Swiss battery electric vehicle (BEV). For better comparability, the emissions are calculated as lifetime emissions and are standardised, following the usual scientific calculation parameters. However, the authors are aware that additional factors such as place of production and the specific energy mix and supply chains have a major influence on the ecological footprint. Emission data for German vehicles are in a comparable range (Allekotte et al., 2020; mobitool, 2022).

If one applies the systematic perspective to an ICE vehicle, most of the emissions occur during the *use phase* with 60% (143 g CO₂-eq.). The *energy supply* accounts for 16% (39 g CO₂-eq.), resulting in 76% of emissions (depending on the used ICE vehicle drive type). The remaining 24% are accounted by GHGE during *maintenance* with 2% (4 g CO₂-eq.), *production and disposal* with 17% (41 g CO₂-eq.), and *infrastructure* with 5% (11 g CO₂-eq.). These numbers result in total emissions per passenger kilometre of 239 g CO₂-eq. for the average Swiss ICE vehicle. In comparison, the total emissions

per passenger kilometre for a BEV are 102 g CO₂-eq. (which include 62 g CO₂-eq. generated during the *production and disposal* processes) (mobitool, 2022). The very low amount of emissions during the *use phase* (12 g CO₂-eq.) make BEVs very attractive for an urban context; however, the challenge of the high charging demand also needs to be considered (Adenaw & Lienkamp, 2021).

Defining Shared Mobility

With the success of companies like *AirBnb* or *Uber*, sharing economy business models have been established since the beginning of the 21st century and raised high media attention (Machado et al., 2018; Schor & Attwood-Charles, 2017). A key difference to existing business models is the platform that serves as a broker and allows peer-to-peer bookings (i.e., between users). This enables access to goods and services apart from actual ownership. One key advantage of sharing economies is the potential (re-)distribution and use of underutilised assets, leading to more sustainable consumption. From the beginning, sharing economy business models were seen as a potential driver of sustainable mobility, especially in urban areas (Machado et al., 2018). But the term *shared mobility* is not defined yet (Castellanos et al., 2021), and business models like carsharing, scootersharing, bikesharing, on-demand ride

services and ridesharing might be understood differently. Because this paper focuses on carsharing, the authors recommend the following papers for a more comprehensive view on the different definitions of shared mobility and different types of shared mobility concepts: Castellanos et al. (2021); Machado et al. (2018); McKenzie (2020); Santos (2018); Shaheen and Cohen (2018).

Current State of Research on Carsharing

Literature regarding carsharing is manifold. This paper uses the systematic literature review of Nansubuga and Kowalkowski (2021) as a basis. The authors classify the existing carsharing literature regarding *business models, drivers, and barriers, user behaviour* and *vehicle balancing*. Literature on *business models* has a very broad focus, ranging from strategic concepts to increase participation (e.g., Wilhelms et al., 2017) and the optimisation of relationships between carsharing providers and local governments (e.g., Cohen & Kietzmann, 2014) to pathways for local policymakers for the implementation of sustainable carsharing solutions (e.g., Bocken et al., 2020). The literature on *drivers* focuses on sociodemographic drivers (e.g., Magdolen et al., 2021; Prieto et al., 2017; Ramos & Bergstad, 2021; Ramos et al., 2020), geographic drivers (e.g., Münzel et al., 2019), socioeconomic drivers (e.g., Dill & McNeil, 2020; Hjortset & Böcker, 2020), and environmental benefits (e.g., Julsrud & Farstad, 2020), while literature on *barriers* mentions limited availability (e.g., Kim et al., 2019) and low public awareness (e.g., Burlando et al., 2019). *User behaviour* encompasses studies on trip purposes (e.g., Clark et al., 2015) and trip activities (e.g., Charoniti et al., 2020), frequency of carsharing use (e.g., Paundra et al., 2017), influence on car ownership (e.g., Chapman et al., 2020; Hausteine, 2021; Jochem et al., 2020; Kolleck, 2021; Miura & Yamamoto, 2022) and multimodal mobility (e.g., Münzel et al., 2019). The literature stream on *vehicle balancing* is technically driven, applying user-based (e.g., Brendel et al., 2020) and operator-based (e.g., Santos & de Almeida Correia, 2019) relocation models.

The literature on shared mobility and carsharing has led to the establishment of various frameworks: for instance, models on the impacts of shared mobility from the perspective of city authorities (Roukouni & Homem de Almeida Correia, 2020), models to compare GHGE before and after carsharing membership (Amatuni et al., 2020), discrete choice models to study the willingness to postpone car purchases due to carsharing offerings (Hui et al., 2019), frameworks to optimise the booking decisions of one-way carsharing users (Illgen & Höck, 2019; Nguyen et al., 2022), frameworks regarding shared mobility and the impacts on urban sustainability (Enochsson

et al., 2021), decision-support frameworks regarding critical decisions in a carsharing ecosystem (Golalikhani et al., 2021), or a comprehensive conceptual framework to systematize the interconnections between carsharing services and their environmental effects applying a system thinking approach (Shams Esfandabadi et al., 2020). However, these frameworks have in common that they do not provide an overview of the relevant levers regarding GHGE reduction. Our framework goes beyond the existing models and closes the research gap mentioned by Shams Esfandabadi et al. (2022) with regard to a comprehensive long-term sustainability assessment framework. It provides an overview of the different GHGE levers and distinguishes between *supply-oriented* and *behaviour-oriented* levers.

The Concept of Carsharing

Carsharing has been established for several decades now, first by private associations, later on by classic rental companies, public transport services, car manufacturers and others. In classic car renting, customers need to pick up and return the rented vehicle at a pre-defined station where the keys are handed over. The booking period is usually on a daily basis. The market for rental cars is very competitive (Kiani-Kreß, 2021). With carsharing, a new form of car rental was established. There are two types of operating carsharing models: *station-based* and *free-floating*. *Station-based* carsharing was established in the 1980s. Cars are picked up and brought back to pre-defined areas or parking spots. The rental process differs from classic car rental in that the pre-defined areas are not staffed and customers get access to the vehicle via an app, customer card or key card (BCS, 2023; Kolleck, 2021). In *free-floating* carsharing there is no predefined parking spot but rather a business area where customers pick up and park the car after usage. The interaction and booking process is handled via

Management Summary

Carsharing is supposed to offer various levers to reduce greenhouse gas emissions (GHGE), which can be either supply-oriented or behaviour-oriented. Among the supply-oriented levers, the electrification of the carsharing fleet is the major lever that providers themselves can use to cut their GHGE and should be further encouraged despite low customer demand. However, the mobility behaviour of carsharing users is the major lever and should be more deeply investigated to identify opportunities for extending existing business models.

an app. Payment options depend on the carsharing provider, varying from registration fees and pay per kilometre to pay per time (Balac et al., 2017). *Free-floating* carsharing started in Germany around 2011 (Heise Online, 2011) and by now outnumbers *station-based* carsharing regarding the number of vehicles (BCS, 2023).

Due to the fact that car rental and carsharing concepts vary mainly in the underlying business models, which are irrelevant for the ecological consideration, this paper summarizes *car rental*, *free-floating carsharing*, and *station-based carsharing* under the term *carsharing*.

GHGE Levers of Carsharing vs. Owning

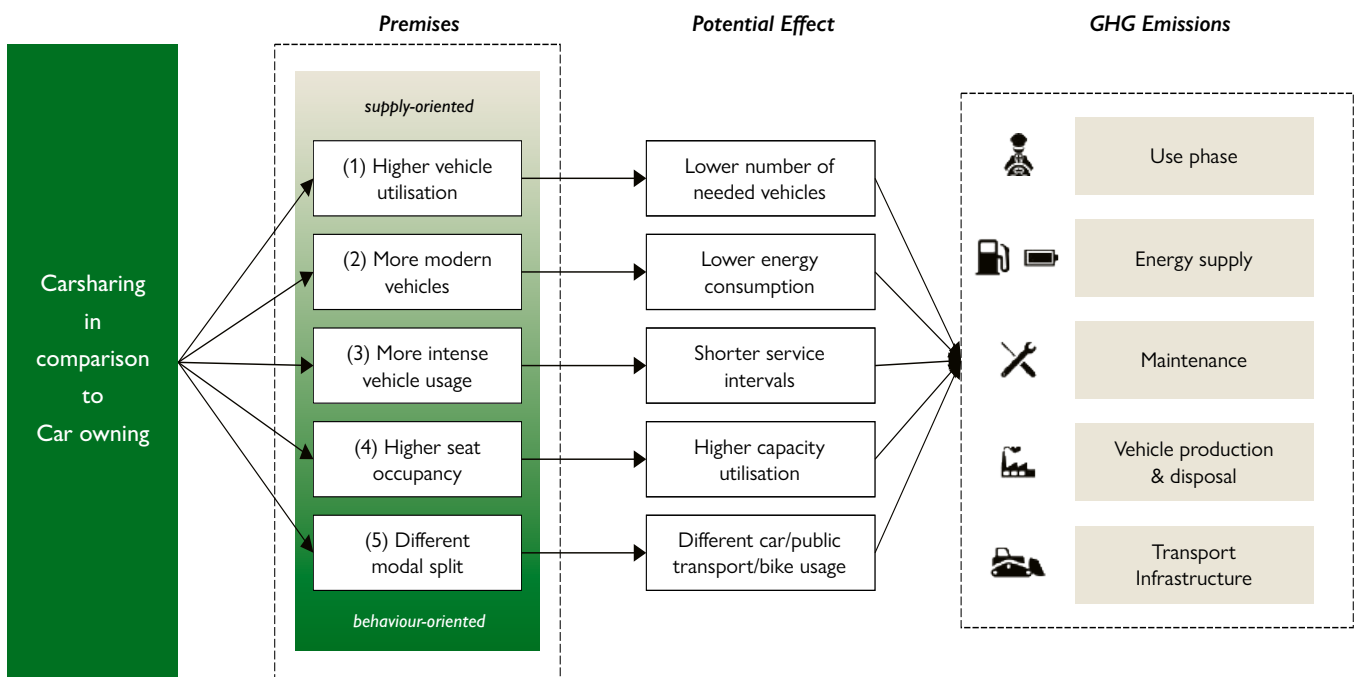
To highlight the differences between carsharing and privately owned vehicles regarding GHGE and to overcome the above-mentioned shortcomings, a conceptual framework was elaborated. It was derived in a two-step process: (1) a narrative literature review was conducted to identify research gaps and to derive the framework; (2) the derived model was challenged

by experts of a global rental and carsharing company (in the context of a project cooperation) as well as by scientific mobility experts and industry experts. The framework illustrates possible ecological levers of carsharing providers and distinguishes between supply-oriented and behaviour-oriented levers, showing the potential effects and the relevant levers to reduce GHGE (see figure 2).

(1) Higher Vehicle Utilisation

One of the main problems of privately owned cars, especially in urban areas, is their underutilisation. For example, an average vehicle in Germany covers 30 km per day and is used for 45 minutes, which is equivalent to a daily utilisation rate of 3% (Nobis & Kuhnimhof, 2018). The disproportionate space consumption by these cars has been addressed for years. The possible replacement rate of private vehicles by shared vehicles is estimated as ranging from 2 to 20. However, these figures must be considered with caution as these studies are based on different assumptions (e.g., Jochem et al., 2020; Magdolen et al., 2021). Regardless of the actual numbers, however, it is obvious that the number of underutilised

Figure 2: GHGE Levers of Carsharing in Comparison to Owning



Source: Own illustration.

private vehicles is far too high and thus valuable resources are literally “parked” unnecessarily (Chapman et al., 2020; Haustein, 2021; UBA, 2022a).

(2) More Modern Vehicles

On average, private vehicles in Germany are ten years old (KBA, 2022). Compared to new vehicles, the exhaust emissions are more harmful and fuel consumption is usually higher (mobitool, 2022). In the sharing context, vehicles are usually replaced after a certain amount of kilometres or at a certain age, which possibly leads to lower GHGE per passenger kilometre (caroobi, 2020; UBA, 2022a). In addition, the share of electric vehicles in the sharing pool is higher than among privately used vehicles (BCS, 2023). Furthermore, old, privately owned vehicles take up resources that would, after recycling, be available for newer and cleaner technology implemented in newer (shared) cars.

(3) Different Vehicle Usage

The different ways things are used that *do* or *do not* belong to a person have been widely researched in science. The use of one’s own belongings is distinctly different, which also applies to cars. Customer misbehaviour in the carsharing context has been researched extensively. However, it is not clear whether users of rental vehicles treat the vehicles better or worse in comparison to carsharing users; this has not been conclusively determined. The resulting costs for carsharing providers are high and the necessary replacements need to be considered when calculating GHGE (Bardhi & Eckhardt, 2012; Belk, 2010; Berliner Morgenpost, 2017; Fisk et al., 2010; Namazu et al., 2016; Schaefers et al., 2015).

(4) Higher Seat Occupancy

One of the most important parameters when comparing transport services is the passenger kilometre. Regarding GHGE, the emissions per passenger kilometre should be compared (Eurostat, 2021; UBA, 2023). Emissions per passenger kilometre can be reduced, inter alia, via higher passenger utilisation. Depending on the study, a privately owned vehicle is on average used by 1.3–1.5 people (Alle-kotte et al., 2020). These figures are lower than for shared vehicles, as these usually carry more people (Best & Hasenheit, 2018). However, seat occupancy strongly depends on the trip purpose, e.g., seat occupancy differs between leisure trips and commuting (Clark et al., 2015; Nobis & Kuhnimhof, 2018).

Main Propositions

- 1 Carsharing providers can reduce GHGE in the mobility sector directly through their own products and indirectly by changing the users’ mobility behaviour.
- 2 A major lever to reduce emissions is the electrification of carsharing fleets.
- 3 A change in the modal split of carsharing users represents the greatest lever to reduce emissions in the mobility sector.

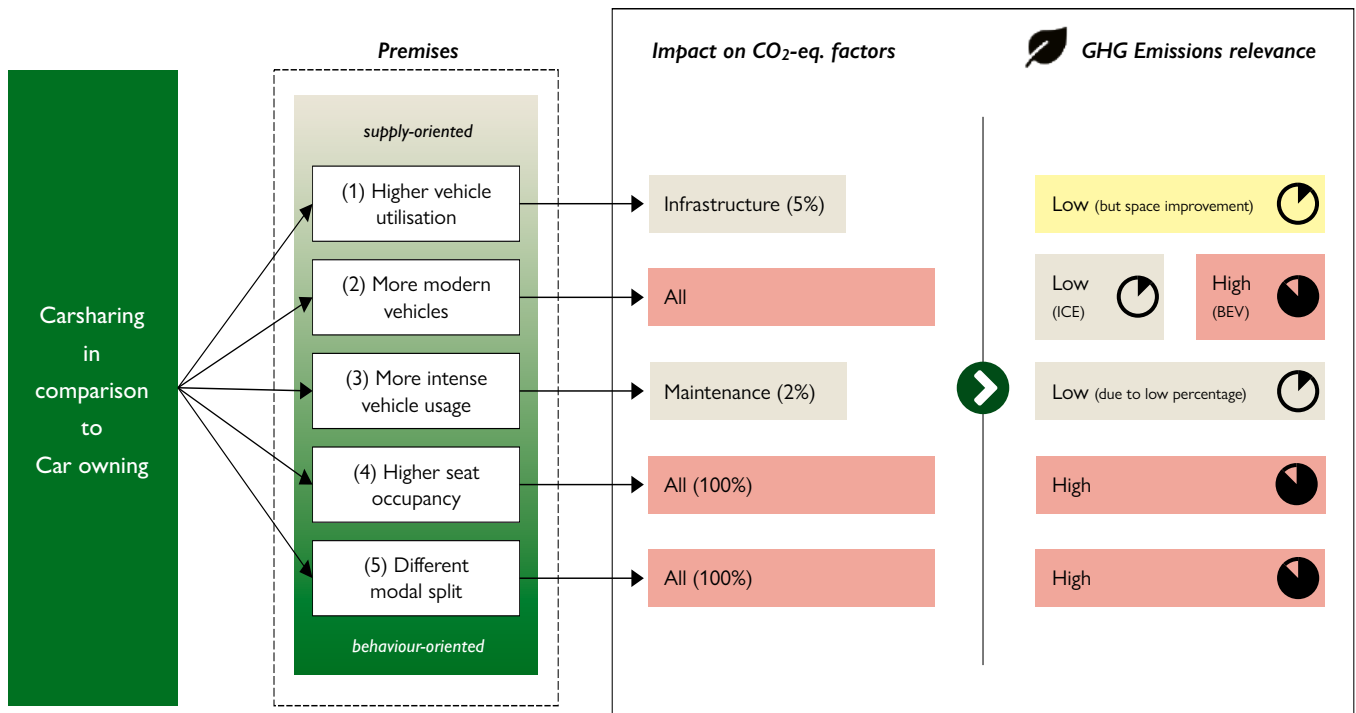
(5) Different Modal Split

The modal split indicates the distribution of the transport volume among different modes or means of transport (e.g., passenger cars, buses, trains) (Eurostat, 2019). Carsharing users might tend to take fewer trips with a car, using more environmentally friendly modes instead. However, studies are inconclusive as to whether the modal split of carsharing users differs from that of people using a privately owned car. Users of *station-based* carsharing tend to move differently and use more public transportation modes. However, there is also a risk that carsharing users will replace more sustainable transportation modes (like public transport) or walking trips, thus leading to a negative impact on GHGE. Furthermore, carsharing cars are often used instead of the privately owned car for certain purposes, which does not lead to a general reduction of vehicles or GHGE (Arbeláez Vélez & Plepys, 2021; Kopp et al., 2015; Magdolen et al., 2021; Nobis & Kuhnimhof, 2018).

Applying the Framework

Figure 3 takes up the previous discussion and extends the established framework of figure 2 by integrating the CO₂-eq. of the GHGE of an ICE vehicle, as shown in figure 1. This helps to distinguish between the main ecological levers of carsharing providers and their customers. The framework shows that the lever (1) *higher vehicle utilisation* of shared vehicles has an impact mainly on the factor infrastructure. Through the more efficient use of cars, journeys of several users can be bundled with fewer cars. However, no GHGE are avoided because the journeys still take place, and GHGE might even increase due to empty runs (Pantuso, 2022). Moreover, the cars need to be replaced at shorter intervals, because due to the higher utilisation rate the cars will reach the end of their lifetime earlier

Figure 3: Application of the Framework with Regard to GHGE



Source: Own illustration.

(assuming that these cars are solely used in a carsharing pool). The factor *infrastructure* is responsible for 5% of the CO₂-eq. of GHGE per pkm. This shows that the lower number of needed vehicles improves space utilisation and is an important benefit; however, it does not help to reduce GHGE significantly. The lever (2) *more modern vehicles* influences all CO₂-eq. factors cited above, has a positive influence on the exhaust emissions and might reduce fuel consumption. But this is highly dependent on the offered car types. By offering ICE vehicles, the impact on GHGE is relatively low, while offering more BEV has an impact on the reduction. The lever (3) *different vehicle usage* is represented in the maintenance factor, which is responsible for 2% of the CO₂-eq. of GHGE per pkm, showing that maintenance is important for sharing companies regarding operating costs, but does not have a high significance with regard to GHGE reduction. The lever (4) *higher seat occupancy* results in a higher capacity utilisation, influences all CO₂-eq. factors mentioned above and has therefore a high relevance for the reduction of GHGE. As shown above, seat occupancy has a high impact on lever (5) *different modal split*, resulting in a high importance of the modal split as well.

Implications

The framework shows that carsharing providers have two major levers to facilitate sustainable mobility and reduce GHGE: the electrification of the fleet and the modal split of their users. The electrification of the fleet is *supply-oriented*, and most of the providers are already electrifying their fleets (BCS, 2023; Donath, 2022). However, providers face a relatively low customer demand for BEV (Ecomento, 2022). The general scarcity of raw materials required for BEV, which are often mined and produced under critical conditions, further argues for a more efficient use of these vehicles in a sharing context. All in all, the electrification of the fleet is a one-off effect, and carsharing providers could use this as an argument to increase their fleet as it would not increase their overall fleet footprint.

Furthermore, carsharing providers can reduce GHGE by focusing more on the mobility behaviour of their customers. In combination with public transportation, shared mobility offers the possibility to avoid individual commuting trips

during the week and still provide the freedom a privately owned vehicle offers for the weekend. This means that car-sharing providers should see themselves more as mobility providers. They should operate as part of the public transportation system and not as car rentals, where merely the ownership differs compared to the model with privately owned vehicles. Furthermore, carsharing providers should more strongly emphasize the high costs of private vehicles for the owners and for society when communicating with their customers and with urban planners (Gössling et al., 2022; Nurhadi et al., 2017). However, the high number of privately owned vehicles in Switzerland shows that these are still in high demand, despite a public transportation system with a high standard and quality.

Future Research

Considering the above-mentioned implications, future research should focus on the following topics:

The drivers and barriers of users regarding BEVs. These have partly been analysed for privately owned vehicles, focusing on incentives, subsidies, or the charging infrastructure (e.g., Berkeley et al., 2017; Febransyah, 2021; Raux et al., 2021). However, the results cannot be fully transferred to the sharing context. Abouee-Mehrizi et al. (2020) showed that the main barriers in the carsharing context are charging speed, charging station availability, and battery range. However, a deeper understanding of the key drivers of BEV bookings in a sharing context is still missing.

The modal split of shared mobility users. Do these users really have a “greener” footprint? How can providers nudge them towards a “greener” modal split? By integrating their mobility apps into one overarching mobility app? Or is it not about booking infrastructure aspects but more about emotional or financial drivers? Is it possible to nudge customers to “greener” transportation modes outside of laboratory experiments (e.g., Schrills et al., 2020)? And how should shared mobility providers be integrated into the existing mobility landscape, especially the public transport system? Should they become part of the *Deutschlandticket* or the *Swiss Generalabonnement*, resulting in a partially updated business model?

Urban planning. Giving up the freedom offered by using a car is still not an option for many people. How should this aspect be considered in urban planning? Does it mean the implementation of *station-based* carsharing in certain areas in order to ensure a certain level of mobility in addition to public transport? Moreover, legislation needs to find solutions for dealing with shared mobility providers that increase their ecological footprint since this might reduce the footprint of the mobility sector in general (due to a changed mobility behaviour) and should therefore not be punished.

Calculation of each environmental lever. Future research should use this framework as a basis to calculate the concrete savings of shared mobility business models as compared to privately owned cars for specific countries, regions, or cities. Furthermore, this framework can be used as a basis for analysing other sustainable mobility factors such as biodiversity, air pollution or resource scarcity.

Lessons Learned

- 1 Carsharing should be considered as a part of public transport and be more fully integrated into public transportation systems.
- 2 Carsharing providers should be more deeply integrated into mobility booking apps to enable and support multimodal and intermodal travel choices.
- 3 Legislation needs to find a solution for companies that increase their own greenhouse gas emissions but at the same time reduce the total emissions of a sector.
- 4 The levers to increase the consumers' low demand for electric cars in the sharing context should be more deeply investigated.

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Who Would Subscribe for a Car?

The Influence of Car Ownership,
Environmental Consciousness, Age,
and Place of Living

This paper investigates the perceived trustworthiness and convenience of car subscriptions in Switzerland. Evidence has been found that age, car ownership and environmental consciousness of the respondents have a statistically significant impact on trust and perceived convenience while the place of living shows no effect.

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Especially younger consumers value traditional car ownership less and are seeking to solve their mobility needs through more flexible and convenient options (Chen et al., 2018; Koroth et al., 2019; Machado et al., 2018). A relatively novel service of the mobility sector is the concept of car subscriptions. It has gained popularity among consumers in the last couple of years as a convenient alternative to traditional car ownership (Bruhn & Hadwich, 2022; Schellong et al., 2021). Car subscription models may expand the sharing economy and might also be considered a part of shared mobility services (Szamatowicz & Paundra, 2019) while others argue that they belong to the subscription economy (Baek & Kim, 2022). Meanwhile, scientific literature on car subscriptions is still limited, with only a few recent studies focusing on the automotive manufacturer side of subscription models (Smania et al., 2023) or on key factors for consumer choices to shift from car ownership to subscriptions (Chaudhuri et al., 2022; Hörcher & Graham, 2020). Furthermore, Szamatowicz and Paundra (2019) focus on traditional and upcoming car features that moderate people's preferences for car subscription models.

However, there is as yet little knowledge about potential car subscription customers and factors (e.g., socio-demographics) fostering the adoption of such innovative services. One of the most important factors of subscription models in general is the perceived convenience due to the ease of booking, flexible cancellation conditions etc., which represents a core element of the value proposition (Andonova et al., 2021; Chen et al., 2018). Analogically, convenience is also one of the most important – and concurrently under-researched – factors of car subscription models (Chaudhuri et al., 2022; Flötotto et al., 2023; Machado et al., 2018). Additionally, the novelty of car subscriptions makes trust in such

a service crucial when establishing a consumer base (Rudolph et al., 2017; Zhang & Wang, 2008). Only when consumers feel they can trust the new car subscription models and the providers, they will be willing to adopt them (Flötotto et al., 2023; Koufaris & Hampton-Sosa, 2004). Beyond that, factors such as age, environmental consciousness, place of living or car ownership (as demonstrated by Lang et al., 2023) may influence the perceived trustworthiness and convenience of car subscriptions (Chen et al., 2018; Flötotto et al., 2023) and consequently might have an influence on the consumers' purchase intentions.

This paper contributes by shedding light on the two under-researched concepts of convenience and trust in relation to car subscriptions. Furthermore, this research contributes by providing first insights for automakers, mobility platforms, startups, dealerships, leasing and renting companies on improving their offerings and addressing potentially interested consumers.

The main aim of this paper is to examine the above-mentioned factors regarding the perceived trustworthiness and convenience of car subscription models by investigating the following research question:

“How do consumer characteristics (e.g., socio-demographics, environmental consciousness, car ownership) affect the perceived trustworthiness and convenience of car subscription models?”



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A representative survey with Swiss citizens (n = 1,052) was conducted to answer this research question. It indicates that age, car ownership and environmental consciousness of people have an important impact on the level of trust in, and the perceived convenience of car subscriptions. Counterintuitively, the factor place of living does not present evidence for an impact.

Car Subscriptions on the Fast Lane?

Comparable to the business models of Netflix and Spotify, with a car subscription model a consumer can subscribe to a car on a monthly basis, with the possibility of cancelling the service at any time (Chaudhuri et al., 2022). The duration of the subscription usually varies between one and twelve months (but sometimes lasts up to 48 months), with the 12-month period appearing to be a duration preferred by most customers (Clyde, 2023; Lang et al., 2023). Car subscription providers offer a wide range of services that typically include, depending on the subscribed model, many features except fuel: costs for insurance, maintenance and taxes, main inspections, tire changes, door-to-door service, switching cars during the subscription duration, and so on (Chaudhuri et al., 2022; FINN, 2023; Szamatowicz & Paundra, 2019). Car subscription models are designed to maximize convenience for the consumer and differentiate from other car-based mobility solutions such as leasing and rental. While rental cars are mainly utilised for shorter periods like a single day or week, leasing requires a long-term commitment of usually 24 to 48 months, with severe penalties for cancellations, and services like insurance or maintenance are often excluded. Thus, subscription models form a new segment right in between rental and leasing (Schellong et al., 2021; Smania et al., 2023; Szamatowicz & Paundra, 2019).

While automakers were among the first ones to offer car subscriptions (e.g., Audi, Volvo), the subscription landscape now encompasses dealerships, rental and leasing companies (e.g., Sixt, Hertz), mobility platform providers (e.g., AutoScout24, MeinAuto.de)

and startups (e.g., FINN, Onto, Clyde) (Schellong et al., 2021; Szamatowicz & Paundra, 2019). Despite optimistic market growth predictions of up to \$40 billion by 2030 in Europe and the US (Schellong et al., 2021) or 2–4 million vehicle contracts by 2030 in the EU-5 market (Ley et al., 2021), it remains unclear how consumer uncertainty can be overcome. The market predictions mention the arising interest and enormous potential for those market players. However, in an online survey, Chen et al. (2018) discovered that 85% of all respondents had not subscribed to any service during the past 12 months. Thus, understanding consumer trust in this new service is crucial.

Management Summary

Car subscriptions are a new shared mobility service still awaiting its big breakthrough. Yet, literature on car subscription models is scarce and empirical findings are required to improve the offerings and address the most interested consumer groups. Therefore, this empirical paper investigates the two under-researched concepts of perceived trustworthiness and convenience of car subscription models and outlines the relevant effects of various consumer characteristics (e.g., socio-demographics).

Methodological Approach

An empirical, representative survey was carried out in Switzerland from the 30th of January to the 9th of February 2023 with a total of 1,052 responses (50.48% male, 49.14% female, average age = 45.1 years; see [online Appendix A](#) for further demographics of the sample).

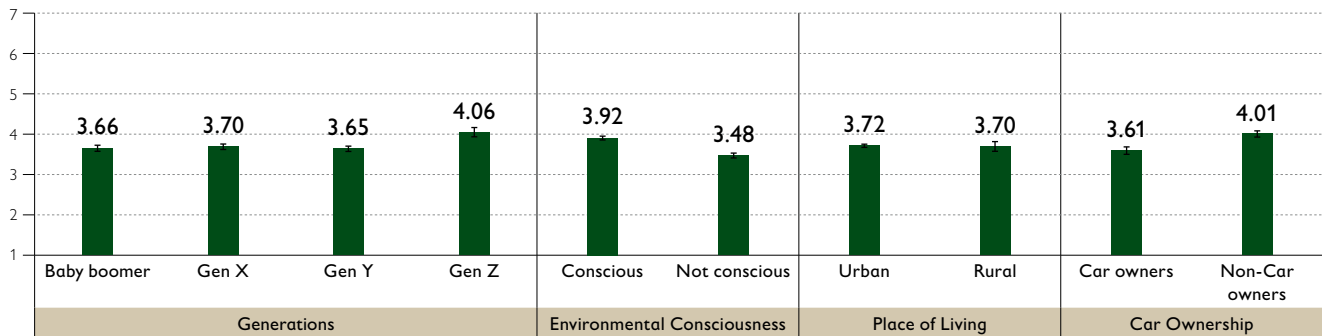
Main Propositions

- 1 Enhancing car subscription adoption depends on the perceived trustworthiness and convenience of these novel shared mobility services.
- 2 Non-car owners and environmentally conscious persons perceive car subscription models as more trustworthy and convenient than their counterparts.
- 3 Younger generations have a significantly higher trust in car subscription services compared to older generations.

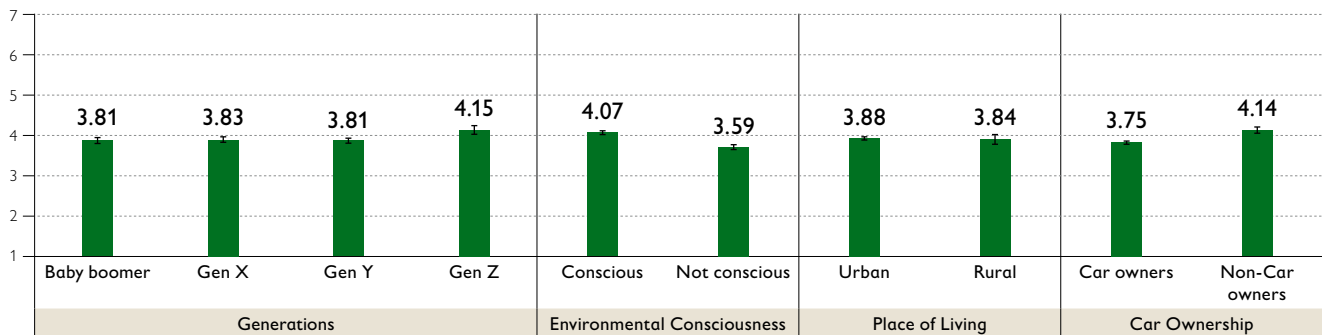
This article uses the data of several subchapters, namely those on car subscription-related items, of the Swiss Mobility Monitor 2023 survey (Schakols et al., 2023). The car subscription-related items were defined and operationalised within the constructs trust and convenience as outlined in [online Appendix B and C](#) and measured via a seven-point Likert scale (from 1 = “strongly disagree” to 7 = “strongly agree”). Due to the novelty of the research area, the constructs of trust and convenience were operationalised by using existing validated measurement scales from other research fields. The trust measure consisted of two modified items, following a shortened version of the original measure by Carnevale et al. (2018) and Wang and Benbasat (2007). Similarly, the convenience measure consisted of three

Figure 1: Differences in the Mean Values of the Dependent Variables Trust and Perceived Convenience

Trust in Car Subscriptions



Convenience of Car Subscriptions



(Note: The error indicator shows the standard error of the means.) Source: Own illustration.

modified items, following a shortened version of the original measure by Yale and Venkatesh (1986), Zhang et al. (2016) and Bi and Kim (2020). All items were phrased in German, French and Italian and later translated to English due to the context of the study.

Following the trend of the sharing economy, in many areas younger people value traditional ownership less and are in many areas shifting towards sharing (Hellwig et al., 2015; Schor & Fitzmaurice, 2015). Applying this general trend on shared mobility services would mean that younger generations also show a higher interest in carsharing and micro-

mobility services due to their high flexibility and convenience (Burghard & Dütschke, 2019; Huynh et al., 2020; Prieto et al., 2022; Shaheen et al., 2020). Therefore, it may be assumed that younger generations find car subscriptions more convenient and trustworthy compared to older generations. Consequently, a difference between the four age groups of baby boomers, generation Y (Gen Y), generation X (Gen X) and generation Z (Gen Z) is presumed, and the following hypotheses are proposed:

(H1a) Gen Z has higher trust in car subscription models compared to baby boomers, Gen Y and Gen X.

(H1b) Gen Z perceives car subscription models as more convenient compared to baby boomers, Gen Y and Gen X.

Besides generational differences, the sharing economy and especially shared mobility have been strongly driven by the environmental consciousness of consumers (Van Veldhoven et al., 2022). A majority of studies demonstrate that environmentally conscious consumers show a higher intention of using shared mobility services such as carsharing or micro-mobility compared to consumers without environmental awareness (Acheampong & Siiba, 2020; Dias et al.,

2017; Van Veldhoven et al., 2022). But, to the best of our knowledge, there is as yet no study investigating this effect for car subscription models. Hence, in our study the subsequent hypotheses have been deduced:

- (H2a) Environmentally conscious people have higher trust in car subscription models compared to non-environmentally conscious people.
- (H2b) Environmentally conscious people perceive car subscription models as more convenient compared to non-environmentally conscious people.

The short subscription duration of several months to a year as well as the “all-inclusive package” (insurance, taxes, maintenance, etc.) might be assimilable to traditional rental or sharing services. Since traditional rental and sharing services are predominantly offered in urban areas, it is assumed that car subscriptions will also be predominantly offered to, and used by, people living in urban areas. Thus, the following two hypotheses are derived:

- (H3a) People living in urban areas have higher trust in car subscription models compared to people living in rural areas.
- (H3b) People living in urban areas perceive car subscription models as more convenient compared to people living in rural areas.

As previously mentioned, car subscriptions fall in between rental and leasing models, with leasing closer to car ownership and rental closer to sharing. Consequently, owning a car versus not owning a car might be a crucial driver and differentiating factor for or against car subscriptions. Additionally, first indications are given that 78% of consumers who use car subscriptions did not drive

a new car before (Lang et al., 2023). Pursuing those tendencies, non-car owners are assumed to show more trust in car subscription models and perceive them as more convenient. Accordingly, the following two hypotheses are proposed:

- (H4a) Non-car owners have more trust in car subscription models compared to car owners.
- (H4b) Non-car owners perceive car subscription models as more convenient compared to car owners.

Results

Before testing the hypotheses, the quality of the measurement constructs trust and convenience was evaluated. The construct validity was measured by Cronbach's Alpha and was greater than 0.7 for both constructs ($\alpha_{\text{trust}} = .854$; $\alpha_{\text{convenience}} = .853$), confirming internal consistency. Furthermore, the differences in the mean values of all examined groups are illustrated in figure 1.

To test hypotheses H1a and H1b, a single factor analysis of variance (ANOVA) was conducted, showing a statistically significant difference in trust ($F(4, 1047) = 2.78$, $p = .026$) and perceived convenience ($F(4, 1047) = 2.45$, $p = .045$) between the four examined generations. Furthermore, a Bonferroni post-hoc test was applied to compare the four generations pairwise and determine significant differences among each generation. The results of the Bonferroni post-hoc test for trust revealed a significant difference between the pairs Gen Y and Z ($p = .025$, $M_{\text{diff}} = -.82$) and baby boomers and Gen Z ($p = .046$, $M_{\text{diff}} = -.80$) at the level of $p < .05$. Despite the significant difference in the analysis of variance between the generations regarding the perceived convenience, the Bonferroni post-hoc test did not find any significant pairwise groups for the factor convenience (cf. [online Appendix D](#)). Consequently, there was

evidence for H1a, but not for H1b. Overall, the findings demonstrate statistically significant differences in the trust in, and the perceived convenience of, car subscription models among the generations. However, it could only be verified that Gen Z has significantly more trust in car subscription services compared to older generations, whereas no effect could be derived for the perceived convenience.

The remaining hypotheses can all be answered by conducting directed t-tests including Levene tests for equality of variances (see Table 1). Environmental consciousness was measured with an environmental trait adapted from Hunecke et al. (1999), and respondents were subsequently split into two groups, namely environmentally conscious and non-environmentally conscious, via a median split. When comparing the mean values for trust, it is apparent that environmentally conscious respondents trust car subscriptions more compared to non-environmentally conscious respondents. The directed t-test for independent samples further discovered a statistically significant difference between environmentally conscious and non-environmentally conscious respondents ($t(1007.69) = -5.52$, $p < .001$). Similar results were discovered for the factor convenience as perceived by environmentally conscious respondents ($t(1006.64) = -6.06$, $p < .001$). Consequently, there is evidence to accept H2a and H2b. It can be concluded that environmentally conscious Swiss find car subscriptions significantly more trustworthy and convenient compared to non-environmentally conscious Swiss.

Conversely, the mean values of Swiss living in urban areas and Swiss living in rural areas are very similar for the factors perceived convenience as well as trust. The directed t-test reveals no significant differences between those two groups for trust ($t(871) = .16$, $p = .438$) nor for perceived convenience ($t(871) = .29$, $p = .385$). Hence, there is no evidence to accept H3a and

Table 1: Directed T-Tests for Hypothesis Testing

Hypotheses (Dependent Variables)	Independent Variables		Mean	SEM	Directed t-Test		
					T	df	Significance (one-sided)
H2a (trust)*	Environmental Consciousness	Conscious	3.92	.052	-5.52	1007.69	< .001
		Not conscious	3.48	.060			
H3a (trust)	Place of Living	Urban	3.72	.047	.16	871.00	.438
		Rural	3.70	.125			
H4a (trust)	Car Ownership	Car Owner	3.61	.092	-4.25	1050.00	< .001
		Non-Car Owner	4.01	.080			
H2b (convenience)*	Environmental Consciousness	Conscious	4.07	.052	-6.06	1006.64	< .001
		Not conscious	3.59	.060			
H3b (convenience)	Place of Living	Urban	3.88	.046	.29	871.00	.385
		Rural	3.84	.125			
H4b (convenience)	Car Ownership	Car Owner	3.75	.046	-4.20	1050.00	< .001
		Non-Car Owner	4.14	.080			

*The Levene test revealed unequal variances for H2a and H2b (at $\alpha = 0.05$). Consequently, the t-test for unequal variances was executed. Source: Own illustration.

H3b. It can be statistically inferred that the factors trustworthiness and perceived convenience are not regarded differently by Swiss living in urban and rural areas.

Lastly, the mean values of non-car owners are higher for both trust and perceived convenience when comparing them to car owners. The directed t-test for independent samples discovered a statistically significant difference between those two groups for trust ($t(1059) = -4.25, p < .001$) and perceived convenience ($t(1050) = -4.20, p < .001$). Thus, there is evidence to accept H4a as well as H4b. In conclusion, Swiss non-car owners find car subscriptions significantly more convenient and trustworthy than Swiss who already own a car.

Discussion and Limitations of the Study

This paper presents findings about car subscriptions from a representative sur-

vey in Switzerland. Hereby, the results lack of generalizability as they are only valid for Switzerland and cannot be readily transferred to other countries. Furthermore, this study solely focuses on perceived trustworthiness and convenience of car subscription services in general, so the results might not be valid for specific cases (e.g., subscription for a sports car) or other variables (e.g., willingness to pay). While the two factors trust and convenience are substantially influencing the acceptance and adoption of car subscriptions, there are various other influencing factors which need to be evaluated in future research.

Nevertheless, the present findings prove that age, environmental consciousness, and car ownership significantly affect the perceptions of Swiss towards car subscriptions regarding the factors trust and convenience. Although these variables are not under the control of the providers themselves, they may help to identify customer segments which might yield the

most promising results. In particular, the study shows that younger generations find car subscriptions more convenient and trustworthy. The latest study of Lang et al. (2023) presented slightly different re-sults, stating that about 50% of the car subscription customers at FINN Auto in Germany are below 40 and families with their head of household in their 30s to 40s are the prime customer group. The results of the present study are not completely contrary but indicate that Gen Z finds car subscriptions the most trustworthy and convenient in Switzerland. Thus, marketers should specifically target Gen Z in future marketing endeavours. Further, the present study shows that environmentally conscious Swiss consider car subscriptions more trustworthy and convenient. These results, however, must be considered with special caution as empirical research on the environmental and social effects of the shift towards sharing and specifically car subscriptions is lacking. For example, it is still controversial whether car subscription models

are indeed more sustainable than traditional car ownership. Also, to the best of the authors' knowledge, there is still no sufficient data on the question whether people use subscriptions to complement their mobility needs, for example during the winter months, using subscription models as a mid-term sharing solution, or to have a new car every year, using subscriptions as a short-term leasing solution. First insights indicate the former case as some companies state the average car subscription duration to be one year (Joas & Deinlein, 2019; Lang et al., 2023). Additionally, there is no evidence yet whether consumers use car subscription models to try out new technological advancements, e.g., electric vehicles (EVs), as mentioned by Lang et al. (2023), which could potentially lead to a sustainability boost. Consequently, the assumption that environmentally conscious Swiss might be an interesting user group to be targeted by marketers has to be viewed with caution as the factual sustainability of car subscriptions is still controversial and needs further investigation.

Additionally, the present study shows no significant differences in the perceived trustworthiness and convenience of car subscription services for Swiss living in urban areas compared to Swiss living in rural areas. Similar results are also re-

ported by Lang et al. (2023) for Germany. Foster-ing those findings by applying future research in additional countries might confirm or disconfirm this trend.

Lastly, this study found that non-car owners find car subscriptions significantly more trustworthy and convenient, in accordance with the user trends reported by Lang et al. (2023).

Although car subscriptions might not solve all mobility- and vehicle-related issues (e.g., overcrowded roads at peak times), they may have positive impacts on urban, suburban, and rural areas.

Ultimately, the combination of some of these findings might expand the opportunities for increasing sales figures, e.g., by specifically targeting Gen Z non-car owners or environmentally conscious Swiss living in rural areas.

The present study answers the research question that car subscription adoption is strongly heterogenic and depends on various factors, namely age, environmental consciousness, and car ownership. Improving the utilisation rate of

sparingly used traditional cars by changing towards the still unfamiliar car subscription services might ultimately have the power to reduce the demand for new cars while also reducing the burden of lacking space capacity or congested road infra-structure (Chaudhuri et al., 2022). Although car subscriptions might not solve all mobility- and vehicle-related issues (e.g., overcrowded roads at peak

times), they may have positive impacts on urban, suburban, and rural areas. The transformation towards an electrified mobility ecosystem has already been decreed by politicians, governments, and the industry in many countries (Pavlínek, 2023; Peiseler & Serrenho, 2022) while car subscription services are still in their infancy.

The contribution of the present article is twofold: Firstly, the study provides guidance to existing (e.g., automakers, dealerships, leasing and renting companies) and new players (mobility platforms, startups) by pointing out customer segments that find car subscription services trustworthy and convenient and might be effectively targeted by marketing measures and promotions. Secondly, the article contributes to academia by enlarging the currently rather small quantitative research data base and exploring the importance of trust and convenience for the adoption of car subscription services. ■

Lessons Learned

- 1 Based on the disparities observed regarding trust and perceived convenience, marketing strategies should take the factors age, environmental consciousness and car ownership into account when targeting consumer segments.
- 2 Marketers should specifically target environmentally conscious non-car owners or young generations to increase the adoption of car subscription services.
- 3 Automakers, mobility platforms, startups, dealerships, leasing and renting companies should focus on the examined factors to improve their offerings and address the most relevant consumer groups.



For further supplementary tables to the article, visit: [unisg.link.MRSG-Greifenstein-et-al](https://unisg.link/MRSG-Greifenstein-et-al)

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Conversational Sales for OEM Apps

Carmakers should leverage conversational sales to turn their apps into two-way sales and marketing channels. They can learn from retailers and social media whose apps are effective conversational sales tools that enhance customer loyalty.

Felix Kuhnert, Dr. Stefan Pühl

Digital sales are becoming increasingly important for selling cars, augmenting direct engagement with customers in car dealerships and laying the ground for potential buyers to visit a dealer with a model already in mind. A new digital sales channel can combine new and existing products with digital or analogue assets and is usually limited to social media and email exchanges (Fuchs, 2022). Automotive apps of original equipment manufacturers (OEMs) – for mobile phones and in the vehicle – link the digital and analogue features of motorbikes, cars and even buses and trains which consumers may or may not own. Telemetry readings and app usage data are leveraged to improve the OEM's understanding of the owners' behaviour before, during and after they are driving the vehicle. Apps organise services based on this data, such as optimal charging duration or car maintenance appointments.

Vehicles and related services such as electric charging and parking become digital via subscriptions, transaction fees, rental and leasing agreements, or other ways of contracting online. The challenge for OEMs is to increase digital interaction with new and existing users to encourage them to renew service contracts and potentially subscribe to other ones.

However, many traditional OEM apps fail to engage customers in digital conversations to sell or recommend products and services around their vehicles directly. These apps often do not include a digital information feed with automated chatbots that could increase meaningful exchanges to assist the potential customer during the purchasing process.

OEM apps and their associated websites should instead increasingly become one-stop shops for the manufacturer's services and products. The possibility also exists for so-called "super-apps" (PYMNTS, 2022) which cover related areas of life spanning different industries such as automotive, health and mobility. In general, OEMs need to include more offerings in their existing apps which differentiate the customer's experience compared with competitors' vehicles (Krings et al., 2023), thereby creating an ecosystem for the OEM which is defined by the app user's activities.

Improving the quality and breadth of OEM apps in this way would be in line with automotive industry trends, where manufacturers' sales models are moving towards more direct consumer communication. A prominent example is the agency model that was introduced first by some OEMs for selling battery-electric vehicles and is now extended rapidly. In this distribution model manufacturers take all risks of producing a set volume of models but have access to all the dealer's sales data and full control over pricing and discounts.



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Digital Interaction for Engagement and Reach

So, what specific new features could be added to OEM apps to sustain and increase vehicle sales and purchases of related services? Here are some examples.

Messenger services on general-purpose platform apps and chat groups are at the core of digital communication and have the potential to become super-apps with specific application programming interfaces (APIs) for business interactions such as sales. At the same time, web search engines are becoming increasingly powerful (Gurdeniz & Hosanagar, 2023), while large language models created by generative AI technology and used in bots such as ChatGPT (Mollick, 2022) can efficiently automate even more complex conversations.

The constantly increasing ability of apps to speak to users is opening up new ways of interacting with customers more conveniently. Chatbots can automate routine tasks such as dealing with pop-up messages which demand one-off attention, text-based searches within the app, and responses to marketing emails which require consent. In addition, chatbots can route users to a human contact to resolve the task where needed, either online or in person (Zoltners, 2022). The quality of the customer and OEM employee experience is in part defined by the convenience of the interaction, which is rapidly improving as the technology advances, enabling more sophisticated automated dialogues with richer, more complex content.

Most OEM apps, especially those connected to vehicles, do not yet have these interactive user elements and the potential to capture valuable data to improve services. App functionalities

such as “mobile key” allowing to open the car with the user’s phone or “one-click” maintenance appointment scheduling are still the exception (J.D. Powers, 2022). As any good retailer knows, higher customer engagement increases the opportunities for upselling of other products and services. This is what marketers call “conversational sales” – engaging with the customers on their terms and at their convenience, rather than making intrusive sales pitches.

The latest chatbots can be online channels for conversational sales because they are now capable of conversations which come close to replicating person-to-person dialogues – close enough that the customer is willing to engage, even though they know they are talking to a bot. This creates zero-party data (Lui, 2020), meaning data that is transmitted directly from the user to the OEM, without an intermediate external digital platform, as is typically the case for email and text exchanges. The OEM cannot, of course, use the data without the users’ permission and needs to protect their data privacy – a key reason why it is critical for chatbot interactions to build trust between the OEM and the users.

The Potential of Digital Sales Conversations

The potential benefit for the OEM is that chatbot data is proprietary and the dialogue can be instantly analysed, based on the user’s questions, allowing more complex customer interactions

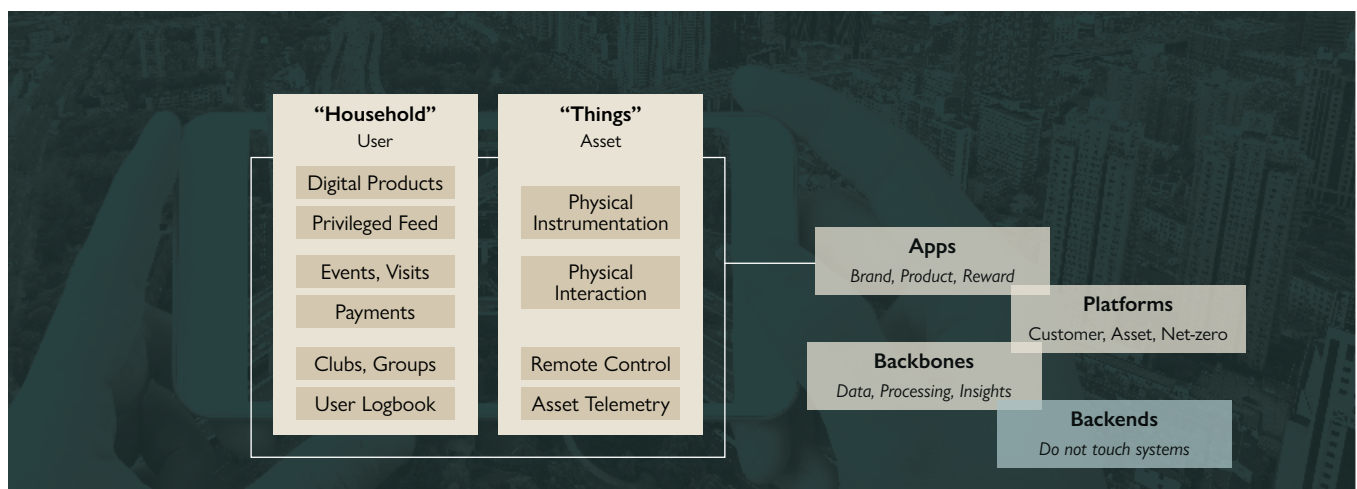
in the future. Sales promotions and recommendations can be customised to take account of the users’ needs, location, current activities, and whether it is a convenient time for them. In addition, the user insights can be shared with OEM partners to create seamless, extended experiences beyond the vehicle – provided the user has given data sharing consent.

However, there are currently only few OEM apps – except those of some Chinese players – that have a social feed or command line to initiate a conversation between the user and the vehicle or OEM. At present, most OEMs still display a virtual simulation of the vehicle itself or a navigation map at the centre of their car dashboard screen. The focus in these cases is mostly on the vehicle status or location, not on the driver’s own needs.

Western OEMs, in particular, have to think less like engineers when they design their apps, and more like retailers or media companies with exclusive customer access while the person is in the vehicle – as driver or passenger. At a minimum, an OEM’s app should have the following digital features (see figure 1) to enable conversational sales, e.g., via a chatbot:

- individual and family sign-ins, with special rates on different product and service offers, depending on who is driving the car;
- direct access to the OEM’s online community or club, and associated deals, discounts and invitations to events;
- offers by third parties, which can range from the OEM’s own suppliers and dealers to companies in other sectors;

Fig. 1: The OEM App Should Combine Digital Capabilities for Asset and User Touchpoints



Source: Own illustration / © iStockphoto.

- easy-to-use record of sales and customer activities using the chatbot interaction history;
- seamless integration and synchronization between the OEM app in the vehicle and on the phone.

These conversational sales feeds can then be manually or automatically monitored and curated to measure the effectiveness of each dialogue, e.g., in terms of the cost per action and customer churn.

Purposeful Conversational Sales

In recent years, all the major OEMs have strived to build communities of loyal customers who will buy more products and services and ideally recommend the brand to friends and family. These clubs and communities exchange expertise and offer a sense of belonging. In this context, OEMs should regard the latest AI-driven human-machine interaction technologies as an opportunity to extend and reinforce their communities, which represent an audience already open to purposeful sales conversations.

OEMs also need to learn from other industries such as media, health or retail and appreciate that it is the joyful, fun, or informative interaction which keeps users engaged, and not just the attractiveness of the product or service being sold. For example, a purposeful conversation might end with the sale of a digital update to fix a problem with the vehicle such as

faulty air conditioning. Such sales can also have a wider social purpose, such as when a digital “companion” to monitor fuel consumption is marketed via the chatbot, helping to reduce the vehicle’s carbon footprint.

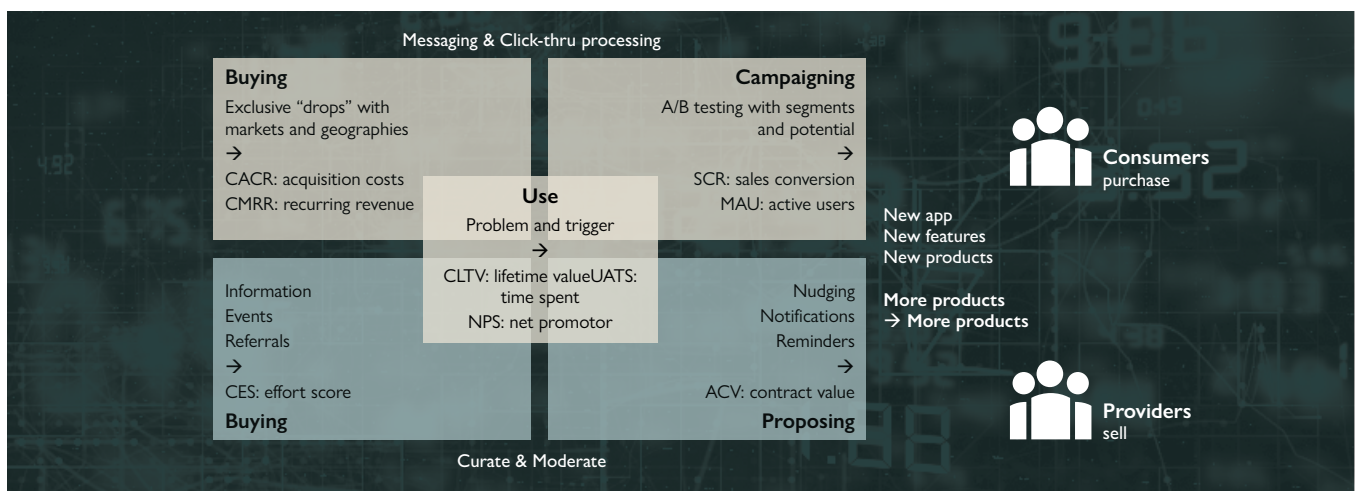
Digital conversational sales as a two-way communication with almost instant feedback loops (figure 2) are therefore not just about using chatbot technology to react instantly to the drivers’ needs and solve technical problems while they are on the road. It is also about creating long-term “lifetime” customer value with purposeful solutions that increase the users’ loyalty (Jenneboer et al., 2022). In the context of sales, lifetime value is the customers’ total expenditure on the OEM’s products and services during their relationship with the OEM (CX Today, 2022).

In this context, an OEM with an actively engaged community or club can help drive conversational sales by inducing customers to share information about a good product or service with other members. The reverse, of course, is also true: news about an inferior or defective offering will spread like wildfire around the community’s online network.

Overall, OEMs should learn from the most successful conversational sales models in other sectors, focusing on the following two aspects:

A defined digital product portfolio. Multiple users and products are combined in digital ecosystems. In this context, digital sales conversations by OEMs need a defined digital product

Fig. 2: The OEM App Should Combine Digital Experiences for Conversational Sales



Source: Own illustration / © iStockphoto.

portfolio because the app is not just about getting the driver from point A to point B. The portfolio should cover usage of the vehicle, including whether it is rented, leased or owned; ongoing maintenance, servicing and electric charging; and the customer's digital activity inside the vehicle – everything from streaming a music playlist to ordering a drive-through burger online – and ideally outside the vehicle via a connected mobile app.

The increasing ability of apps with bots to speak to users is opening up new ways for conversational sales.

The digital products that can be purchased through the app are the content for the digital sales conversations. It is therefore critical to have accurate and complete digital descriptions for all products. However, it is often a practical challenge for OEMs and partners selling complementary products to standardize these digital content formats for chatbot conversations and keep them up to date. Generative AI tools can help to fix this in the future.

Digital sales conversion triggers. To move to more personal interactions in the OEM app, the OEM may need an open-access public feed to package information and conduct exchanges in the same form as a person-to-person conversation. From this starting point, OEMs need to use events such as a tachometer reading or a change in the engine's temperature as digital sales

conversion triggers that initiate sales conversations in the OEM app. Finding these triggers in the digital or physical world and transferring them to the OEM app for a conversation can be a practical challenge.

In one everyday scenario, the vehicle's charging power may be running low. The app might merely alert the driver and inform him or her about the distance and route to the nearest charging station. Yet a well-designed OEM chatbot with sufficient data can conduct far more complex sales conversations, provided the OEM is willing to devote the necessary resources to identify the right trigger to interact with the user about a relevant product or offer. For example, if the vehicle is leased, an approaching date for a contract renewal could trigger a recommendation for a different model, depending on the current car's usage.

Coherent Conversational Sales

Conversational sales needs to be coherent to keep dialogues going in a flexible, responsive manner. The style and structure of exchanges must be in line with the overall purpose to create value in the form of sales and increased customer loyalty, while avoiding the risk of annoying the user with intrusive demands for money or commitments. Users stop interacting when they feel they are on the receiving end of sales and marketing pitches with no relation to their original request.

OEM chatbots – like any successful chatbots in other industries – therefore need to be able to answer in natural, colloquial

Management Summary

Leading carmakers have been slow to translate latest technology advancements in AI-driven human machine interaction into better user experiences and deeper customer understanding. Next generation chatbots can transform OEM's mobile and in-vehicle apps from basic sales and driver assistance devices into two-way communication channels for both potential and existing customers. The industry should learn from media and other retail sectors where apps with chatbots that mimic complex human dialogues are increasingly powerful conversational sales and loyalty tools. Manufacturers should move towards a more dialog-centric app design encouraging users to engage via chatbot or voice command and then start to discover more about the drivers' individual needs and preferences.

Main Propositions

- 1 OEM apps with advanced text and audio chatbots may be used to create long-term conversational sales opportunities and build customer loyalty.
- 2 The OEM app may be positioned as a one-stop shop for all sales, service, and marketing activities, including offerings from selected ecosystem partners, e.g., for onboard entertainment, charging or maintenance.
- 3 The OEM app can be the leading touchpoint to provide the same level of responsiveness as the company's other touchpoints for prospective and existing customers.

language and process the received data to answer certain standard requests – for example, a customer ordering a service or product. The latest generation of artificial intelligence (AI)-based chatbots deploy what is called a “large language model” to maintain the right conversational tone and reduce the range of answers. Other chatbots may use pre-recorded question-and-answer sequences and search for keywords from the sales triggers to provide the requested automated customer assistance.

The easiest way to assess a chatbot’s conversational ability is to measure the average time spent by the user with the app, especially in conversational mode, and the resulting revenue generated. The goal should be for conversational chatbots to become the voice of your brand, guiding the user, who is a potential customer, through the complexity of their problems and offering solutions in a rewarding textual dialogue. The sales conversion rate per product and per conversation will show the success of the conversational design for sales, compared with other conversations that the chatbots may support – for instance, requests for technical information by the driver. The user’s willingness to engage in a conversational sales dialog is the essential starting point in chatbot design. The challenge is to ensure that the conversations are as natural as exchanges between two people, while preserving essential OEM app features such as electric charging monitors and location tools in the screen display.

Efficient Conversational Sales

Efficient digital sales conversations by OEMs should cover all the retail basics – encouraging the prospective purchaser to talk to a dealer or service partner, getting him or her inspired by the vehicle or service, negotiating the price, and making clear the contract options. The goal should be to guide the customer through these stages with fewer but more meaningful interactions than in the physical world.

Efficient text and audio sales and marketing chatbots all have the following hallmarks, regardless of the sector:

A simple, one-stop shop digital feed. App users appreciate simplicity. The OEM’s feed should be a one-stop shop to start and finish a conversation with all the media channels required by the user, including a person-to-person conversation with the OEM’s customer service centre. Where needed, the app should also be able to attach a relevant contract or payment invoice. OEMs should ensure the app incorporates the latest graphical and audio user experience technology which can provide images and videos linked to textual dialogues in the centre of the notification and messaging area.

Lessons Learned

The way forward for OEMs is to establish the right software strategy for conversational sales via app feeds with chatbots and smart voice assistants, based on the following key success factors:

- 1 Define the brand’s conversational sales language and digital product portfolio within the app in line with the OEM’s overall brand.
- 2 Analyse the app usage to find trigger events for brand-defining digital experiences that create sales opportunities and moments that truly matter for the customer.
- 3 Motivate app users to share their data in a trusted digital setting to enable customised sales recommendations and better vehicle experience.
- 4 Identify the digital products or actions which are relevant to propose in conversational sales to maximize engagement and reach via the app.
- 5 Control the flexibility of the language model to steer the app user’s interactions.
- 6 Ensure full connectivity and responsiveness with the OEM app based on the respective internal and external platform ecosystems.
- 7 Create an app design with the digital feed for sales and marketing interactions at the center.

A focus on the combination of sales and marketing. Users ignore or opt out of online adverts and unsolicited email promotions which they do not think are offering them obvious value. The OEM’s app should be just one – and arguably the most important one – of multiple digital touch points and channels with an increasing range of digital capabilities to connect to the company’s products and services and those of selected sales partners, such as parts suppliers. Ideally, the OEM’s app should be a channel to offer multiple products or mobility-related services to many consumers at the same time, creating network effects. Leveraging digital experiences as part and parcel of conversational sales will allow both sales and marketing activities to boost sales of the brand’s products and services in the OEM app.

Frictionless interaction. A positive buying experience without unwanted interruptions from marketing campaigns increases the chances of sales success. OEM apps should follow best practices in other sectors and imitate social media interaction patterns. In addition, as noted above, two-way text and voice communication should be at the

Purposeful, coherent,
and efficient digital conversations
with a promoted OEM app
increase reach and
opportunities for sales.

center of the app, to engage directly with the user. A frictionless OEM app should only include recommendations that are based on the user's profile and known preferences. These proposals should not simply be reactions to user requests; they need to anticipate what the user might want from his or her activity with the app and more generally from driving the vehicle.

Standardised touchpoints. The app's touchpoints with the OEM navigate to all the other possible online communication channels that are available to the user, starting with the company's website. These touchpoints should also have the same level of connectivity between the vehicle and the OEM's online sales, marketing and customer service divisions, in order to resolve customer requests rapidly and initiate conversational sales. The overall experience should make the app user feel as if he or she is engaging with an efficient, engaging expert.

Stronger customer trust. The OEM app must establish trust between the potential buyer and the seller to initiate a conversation that will lead to an ongoing relationship throughout the customer's lifecycle with the company. Trust is especially important if the relationship is based on both human and automated conversations; the two channels have to be as similar as possible in content and style.

It is technically challenging to create software controls for trust and ethics to monitor the creation and usage of digital content for conversational sales – in particular when using the latest AI models. These controls need to be transparent for both the potential buyer and the seller. They should include validation and training data for the AI models used for the dialogue and for the predictive engines to ensure that the interaction is correct and complete while eliminating bias.

The Way Forward for OEM Apps

In the pre-digital age, drivers interacted with vehicle manufacturers via a smooth-talking dealer when they bought the car; a dog-eared owner's manual in the vehicle's glove pocket when the vehicle broke down; and the rest of the time, a garage mechanic in oil-stained overalls who fixed problems. Yet it is worth remembering as well that they were interacting with OEMs which had repeatedly demonstrated a superb ability to innovate and keep pace with a rapidly evolving mass market.

OEMs need the same inventive, imaginative spirit to promote apps with the latest chatbots as the right place for today's digitally sophisticated consumers to engage in conversational sales. Quite simply, what works for banks, media players, healthcare providers and many other sectors has to work for mass market carmakers if they want to capture all the sales growth that digital business models can deliver. ■

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How to Improve the Continuous Usage of Mobility Apps

The Effects of Personalisation and Privacy on the Use of Mobility Applications in German Urban Areas

Even though mobile apps are becoming more important in the marketing mix, not much research has been done on what makes people decide to use an app or not. This paper presents a new value-based technology adoption model and investigates whether the perceived value of a mobility app influences the user's intention to continue using the service.

Arjan Vlaskamp

The way people move from A to B is changing, causing an increase in demand for more individual and sustainable mobility solutions. Digitization is changing society rapidly, and the role new technology plays in the consumer's everyday life is increasing. Technological advancements and the change from private to shared and public mobility create many opportunities for cities and mobility companies to address the challenges of congestion, climate change, and increasing density in urban areas.

Smartphones and mobile apps are getting a lot of attention from users who rely on them every day for getting around the city and using mobility services. On the one hand, apps are therefore a relevant asset in an organisation's marketing mix and, on the other hand, a crucial service as well as a revenue channel for mobility companies.

Even though mobility apps are becoming more important, low reviews in the Apple App Store and Google Play Store indicate that very few of the ones run by public transportation companies actually satisfy customers. However, from a company's perspective, customer expectations should be met and app users must value the provided services, as this fosters continuous app usage and, thus, retention and success.

The success of new technologies depends more on how often they are used than on how quickly they are adopted by the customer. Since the app market is very competitive, customers often stop using a service and uninstall the app, ending their relationship with the service provider. Losing a customer is disadvantageous, as gaining a new one is more challenging than retaining an existing one. Thus, mobility companies should particularly focus on the continuous usage of their digital services by their customers.

This research paper analyses the significant drivers for the continuous usage of

mobile applications for urban mobility. Overall, the challenges and impacts of digitization on urban mobility services have rarely been investigated in academic marketing literature. By crafting and verifying a quantitative model, this research tries to fill this gap. The empirical results enable the development of recommendations for practice and professionals, as well as directions for further research.

Theoretical Background

In academic research, mobile applications are regarded as digital services and information systems (IS). Ye et al. (2019) found that customers decide to continue using an app depending on their prior expectations as well as their actual experiences when using these apps. Studies conducted across a range of industries argue that retaining an existing customer is much less expensive than finding a new one. According to Bhattacharjee (2001), acquiring new customers can cost up to five times as much as keeping existing ones. Research shows that apps with higher continuous usage generate increased customer satisfaction and loyalty and provide a higher return

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on investment (Albashrawi & Motiwalla, 2019). It can therefore be argued that continuous usage is critical to a technology's long-term viability and the economic success of a service or product.

In recent marketing research, customer value has become a key strategic variable that helps explain brand loyalty, commitment to a relationship, and making multiple purchases. Therefore, increasing the value as perceived by the customer should be the aim of every new technology and part of its development.

Perceived value is partially influenced by the perceived net benefit of performing a behaviour, such as using the app. This follows the Prospect Theory's underlying logic, which is conceptualized as the consumer's assessment of the balance of perceived quality and perceived sacrifice (Kahneman & Tversky, 1979; Zeithaml, 1988).

Today, marketers look at personalising marketing as a way to improve how customers perceive the quality of their products, how well they like them, and how long they stay customers. Personalisation creates benefits for the customer, such as better products, services, communication, and user experience, thereby positively impacting customer satisfaction

and presumably perceived value (Tam & Ho, 2006; Vesanen, 2007).

Ceder and Jiang (2020) state that users of mobility applications not only seek a route from A to B but also expect to receive a connection that considers the user's preferences provided beforehand. Mobility apps personalise their services based on location-based services, which use the user's location to, for example, show routes based on the user's preferences (Wang & Lin, 2017). This can include direct routes, but also more sustainable routes, or factoring in other modes of transportation. Moreover, data entered by the customer like payment details can be used by the service provider to issue tickets or calculate trip-based prices and discounts.

Personalisation and the rise in demand for personal data go hand in hand. To give users a personalised app experience, data collection is necessary. To receive such a unique and personalised service, users must "sacrifice" data, such as personal information, which might intrude on their information privacy (Zhang et al., 2013). According to Zeithaml (1988), consumers sacrifice not only money but also other resources to obtain products and services. As data collection happens in the technical background of a mobil-

Management Summary

Mobile apps have become trusted daily companions for the user in navigating a city, as well as relevant assets in an organisation's marketing mix and a vital revenue channel for mobility companies. This research looks at the privacy-personalisation paradox and develops a value-based technology adoption model (VTAM) to analyse the reasons why users decide to continue or quit using a mobility app. App managers are advised to incorporate personalisation components in the app to increase the service's value to the user, while equally taking into account consumers' privacy concerns.

ity app, personalisation silently creates non-monetary costs or investments for the customer. These sacrifices include, among others, increased privacy risks (Vesanen, 2007) and, consequently, lower perceived value.

Consumers have named privacy concerns and risks as fundamental reasons for not using mobile commerce systems

(Zhang et al., 2013). Even though there is evidence that more personalisation makes customers more engaged, this could also make customers feel uncomfortable, which could make them less engaged and use the service less (Aguirre et al., 2015). This phenomenon describes the contradictory wish for more personalisation without sharing private information. This so-called "personalisation-privacy paradox" can be prominently observed in the context of smartphone apps (Sutanto et al., 2013).

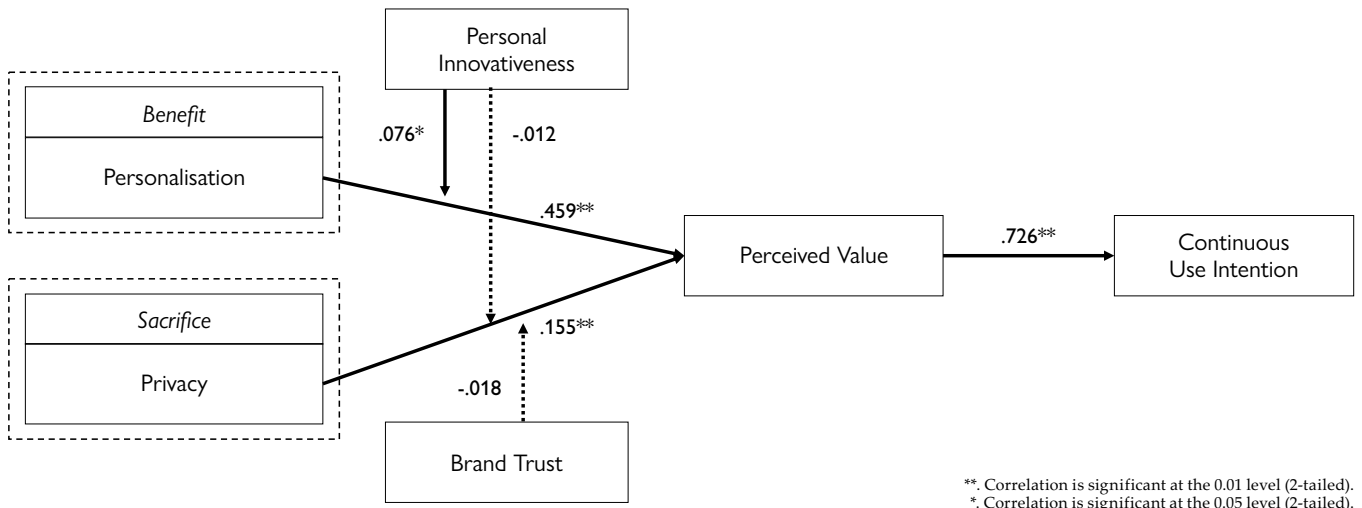
However, there is a clear distinction between desirable and undesirable personalisation in academic literature. Aguirre et al. (2015) conclude that the credibility of personalised advertising when it appears on a trusted website can mitigate the negative effect of data collection. Research has revealed that trust and perceived risk are essential variables in explaining users' acceptance of information systems and are impacting brand loyalty and continued use in the context of mobility (Briliana & Sari, 2020; Featherman & Pavlou, 2003; Lee & Song, 2013).

In the case of information systems and apps, the user's trust means trust in the application's provider (Molla & Licker, 2001). Regarding mobility apps, the market is competitive, and many app providers are offering digital services to users. Traditional public transport companies are nowadays facing competition from emerging new mobility companies, such as TIER, Lime and Uber. Even though these companies are operating very physical services, such as electric scooters or taxis, customers can only access their services through an app on their smartphones. Public transportation firms, however, provide a wide range of additional, established services, a greater physical presence, as well as a long history, in addition to digital services. As a result, customers are more familiar with public transportation providers, as they might interact with them on a daily basis due to the

Main Propositions

- 1 The perceived value of using a mobility application has a significant impact on the continuous use intention.
- 2 To get the perceived value of a mobility app, users have to weigh the benefits and sacrifices, such as personalisation and privacy risk.
- 3 A higher degree of brand trust in the mobility provider can mitigate the perceived sacrifice brought on by potential privacy issues.
- 4 Innovative customers are more likely to appreciate the advantages of personalised services and are more willing to make compromises when it comes to privacy concerns.

Figure 1: VTAM Research Design and Findings



Source: Own illustration.

everyday usage of the bus or train for transportation. Therefore, customers may perceive public transportation apps' privacy and data collection practices differently than those of private companies. Thus, brand trust will likely moderate the perceived privacy risk.

The success of an information system depends on both technology and individual differences (Lu et al., 2003). People's interest in new technology and how they react to more personalisation may depend on a number of personal factors and traits. In marketing literature, it is argued that innovation, by its nature, is often linked to more significant risks. Agarwal and Prasad (1998) argue that individuals with higher personal innovativeness are more open to taking risks and making sacrifices. Therefore, highly innovative individuals tend to be more able to cope with a higher level of uncertainty, especially with regard to technology (Lu et al., 2003), and are more likely to cope with higher risks (Xu et al., 2011). They are more optimistic about using innovation and the latest technology. Therefore,

the individual's inherent innovativeness will likely moderate the acceptance of new technology, personalisation, and privacy risks.

Research Design

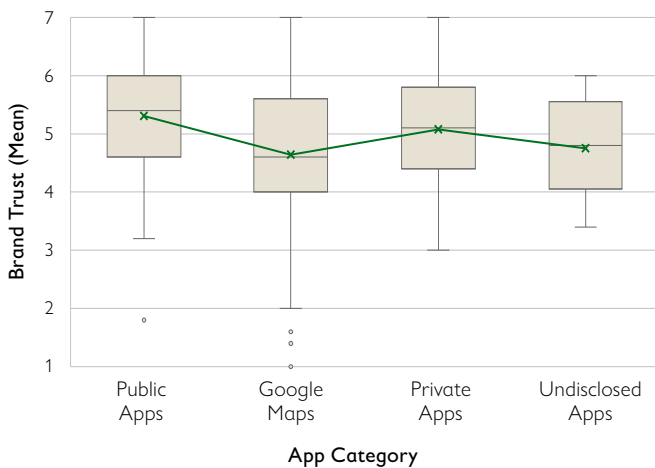
Present academic research mainly focuses on the initial adoption of mobile applications, primarily through utilising and extending the Technology Acceptance Model (TAM) or the Unified Theory of Technology Acceptance (UTAUT) (Lai, 2017; McLean et al., 2020; Venkatesh et al., 2003). Kim et al. (2007) argue that adopters of new technology are people who use and adopt digital services, such as apps, for personal reasons. Therefore, adopters of new technology must be looked at from a more consumer-oriented and less technical point of view, with consumer choice and decision-making processes as the main drivers of technology adoption and maximising value. Kahneman and Tversky's (1979) Prospect Theory states that people always weigh how much

they will gain and how much they will lose when deciding what to do.

All of this existing research has now been translated into a new value-based technology adoption model (VTAM) (see figure 1), where the constructs of gain are transformed into benefits, and losses into sacrifices. The analysed "perceived value" of using an app is mostly based on these two constructs. The research design has factored in the discussed constructs and questions. It therefore involves the two dependent variables continuous use intention and perceived value; the two independent variables personalisation and privacy; and the two moderating variables personal innovativeness and brand trust (for a complete overview see table 1 in the [online Appendix](#)). This research has either adopted or adapted existing validated constructs where possible.

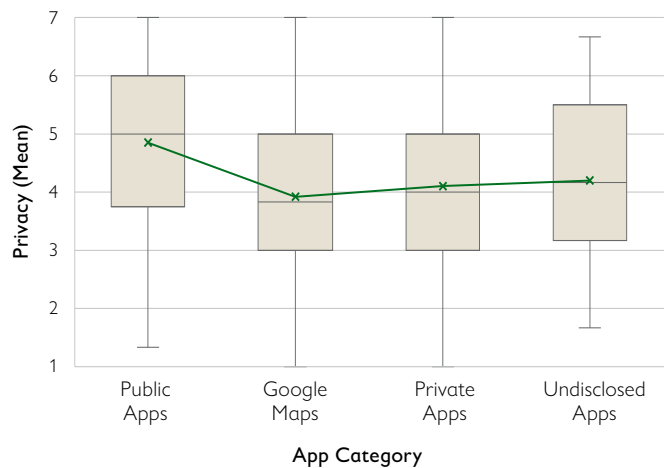
A survey with closed-ended questions was distributed to test the research design and hypotheses (for descriptive statistics on the participants see table 2 in

Figure 2: Brand Trust (Means) by App Category



Source: Own illustration.

Figure 3: Privacy (Means) by App Category



Source: Own illustration.

the [online Appendix](#)). First, participants were asked to indicate their most-used mobility app and their usage of this app. Participants were required to choose their most-used mobility app from a list of 32 apps (see table 3 in the [online Appendix](#)) for the purpose of evaluating the app category. These apps were then grouped into three categories: publicly owned, privately owned, and Google Maps. Second, demographic questions about gender and age were asked. Third, participants were asked to answer 25 research items concerning the selected constructs. A seven-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (7), was used to measure the items.

Since it may be assumed that people in urban areas are more likely to use mobility apps than people in rural areas, this research focused on cities. Germany was chosen as the area of research, so participants had to live in one of Germany’s four largest cities: Berlin, Cologne, Hamburg, or Munich.

The online questionnaire was provided in German and English. The data was

collected from mid-November to mid-December 2021, and participants received a small monetary compensation for completing the survey. In total, 424 responses were collected, of which 332 were considered for this study.

Findings

The purpose of this research is to investigate the significant drivers for the continuous usage of a mobility app. Its central hypothesis is that the perceived value of using an application motivates continued use.

First, personalisation and privacy were found to be significantly related to perceived value. Therefore, most importantly, the research confirms that perceived value from using an application is a significant factor in determining the continuous usage of an app. On the one hand, these findings are in line with the established theories by Bhattacharjee (2001) and Zeithaml (1988). On the other hand, they extend their validity into a digital context by adding new con-

structs, providing a baseline for further research based on the research design. Based on the personalisation–privacy paradox, this research supports the hypothesis that personalisation is regarded as a benefit and reduced privacy as a sacrifice. The research data provides evidence that both variables significantly impact an application’s perceived value. Furthermore, the mediating role of the perceived value in the relationship between personalisation and privacy with regard to continuous usage intention is confirmed.

Second, the moderating roles of personal innovativeness and brand trust were analysed. The moderating role of personal innovativeness is supported regarding personalisation but not regarding privacy. In addition, the moderating role and thus mitigating effect of brand trust on the relationship between privacy and perceived value of a mobility app could not be supported.

A third finding of this research is derived from the analysis of frequencies and correlations of the control variable

app category with privacy and brand trust. Brand trust correlates significantly with the constructs of perceived value, personalisation, and the app category. The subsequent ANOVA analysis confirmed one of the assumptions made in this research. Data shows that the mean for brand trust is lowest in the case of Google Maps ($M = 4.64$). Slightly higher are privately operated apps ($M = 5.08$) and highest regarding brand trust are apps owned or provided by public organisations ($M = 5.31$) (see figure 2). In addition, the level of privacy is ranked significantly higher in publicly operated apps ($M = 4.85$) than in privately operated apps ($M = 4.10$) or in Google Maps ($M = 3.92$) (see figure 3).

Theoretical Contributions and Managerial Recommendations

Marketing experts agree that retention rates are becoming more important in digital and mobile commerce. Since there are fewer and fewer physical interactions with users, the value of offerings must be transferred through product experiences and services.

This research is among the first to shed light on the role of personalisation and privacy in mobility apps and how these factors impact an app's perceived value and continuous usage intention. Through qualitative analysis and research on existing models in the domain of information systems, three variables were identified as applicable to investigating continuous usage intention in this context: (1) personalisation, (2) privacy, and (3) perceived value. The new research framework provides an "ex-post perspective" on the usage of an application, compensating for the shortcomings of existing research frameworks in analysing the continuous usage behaviour of

customers with regard to mobile apps beyond their current use.

This study goes beyond previous research in the domain of app marketing and contributes to understanding the user's app usage and behaviour motivations. Its findings provide three practical managerial recommendations for mobile marketers and app developers in the public and private sectors when designing new mobility apps:

First, the goal of app development should be to give the customer more value, and personalisation is one of the best ways to do this. Personalisation can make the users' experience better and keep them using the app longer by adapting it to their preferences and needs. Because of this, it's important to find a good balance between personalisation and privacy concerns and to avoid putting user data at risk in the name of personalisation.

Second, privacy should be a requirement for app developers, and public institutions should be more aware of what users want and make apps that meet those needs. To make sure that

user data is safe, app developers should make privacy a top priority and a key criterion in how they build apps. When designing mobility apps, public institutions should also keep in mind what users want and make apps that meet their needs and provide both privacy and personalisation.

Third, publicly owned mobility apps may have a competitive advantage in the mobile app market if they make use of their well-known brand. Using existing trust to build brand loyalty can lead to higher adoption rates and more usage in the long run. So, extending an existing brand when making a new app is the smart thing to do from an economic point of view for developers of publicly owned mobility apps.

Fourth, the value-based technology adoption model (VTAM) has proven to be a solid framework for evaluating criteria that impact mobile app adoption and continuous usage. The model shows that app developers need to evaluate the benefits and losses induced by new product features, taking into account the evaluation criteria of personalisation and privacy, among others.

Lessons Learned

- 1 The main goal of app development should be to provide customer value, and personalisation is a key factor why users continue using mobility apps.
- 2 Privacy should be a requirement for app developers, and public institutions should be more aware of what customers want and make apps that meet those needs.
- 3 Publicly owned apps can achieve an advantage in the market for mobility apps by using existing brand trust and making sure their digital offerings are privacy-compliant.
- 4 App developers can use the value-based technology adoption model (VTAM) as a guide for evaluating criteria when creating a new digital product.

Further Research

In the past, academic research has emphasised that marketers need to be aware of cultural differences and possible value conflicts when it comes to how people adopt and use technology. A framework designed by Hofstede (1980) has become an established model to measure the impact of culture. Research has shown that users from cultures with high individualism value personalisation and personalised features, while those from cultures with high uncertainty avoidance

are more risk-averse. Social and environmental factors, such as the reason for using a particular app, have not been in the scope of this research but might be included in future studies.

Furthermore, the importance of the uses and gratification theory in the context of

media consumption analysis has been demonstrated in academic literature (Sutanto et al., 2013). Therefore, further research on the gratifications and benefits users derive from using an application, including their impact on enjoyment and perceived value, is strongly recommended. ■

Getting personalisation and privacy just right, adds value to the mobility app and keeps customers using it.

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Digital Due Diligence

Assessment of Digital Growth Potentials

Digital markets are based on other mechanisms than classic markets. Due diligence analyses the present position and future potential of a business. This research aims to develop a conceptual framework of relevant dimensions that encompasses digital due diligence. Haniel's acquisition of the startup Emma is used to illustrate the practical application of this framework.

Dr. Anja Konhäuser, Dr. Stefan Sambol, Toni Stork, Prof. Dr. Alexander Hahn

Due diligence (DD) is a process performed before the acquisition or sale of a business. It is a systematic assessment of whether the target company is a good investment on behalf of investors or banks. It supports the investment decision as such investments carry a high degree of risk and uncertainty. Strengths and weaknesses of the target's business model are analysed. Together with market and trend analyses, the growth expectations of the target can be estimated.

DD thus is the basis of any business evaluation. It ensures that key business data, facts and forecasts are correct, complete and collected accurately while being analysed with appropriate care (Howson, 2017). Initially, DD focused on financial figures. Nowadays, market or commercial DD are also common (Harvey & Lusch, 1995).

The Need for Digital Due Diligence

Digital firms have transformed markets fundamentally. Some global driving factors are high-speed internet, growing digital maturity of firms, growing internet usage as well as the global availability of electronic devices.

COVID-19 has accelerated this transition to electronic markets. Current e-commerce penetration rates of most product categories would not have been expected five years ago (Sambol, 2021a). Thus, the importance of online channels for customer acquisition and revenues is growing, especially for B2B firms. Brand reputation is increasingly created online. It enables new business models, such as startups that scale exclusively via online communities and social media platforms. Businesses engage influencers to reach their target groups online (Vrontis et al., 2021). Digital startups, but also incumbent SMEs and corporates with digital approaches are targets for com-

panies that aim to increase their digital competence and technology expertise via mergers and acquisitions (M&A). However, many companies struggle with their digitalisation efforts (Gebauer et al., 2020).

Digital firms differ significantly from traditional ones. For instance, for digital firms IT infrastructure is an integral part of the product itself (Iansiti & Lakhani, 2014). Companies that use best-in-class technologies can increase productivity by a factor of three (Sattler, 2018). Therefore, digital DD must have specific criteria for assessing business value, scalability and potential value improvements for the target's future growth.

Moreover, for digital business there usually is a large amount of data available, allowing for fast and precise adaptations to market developments. This data enables live valuations of key performance indicators (KPIs) and in-depth analyses and predictions via intelligent algorithms (Saura, 2021).

In summary, digital DD is a method to determine and analyse a firm's unique position against competitors, the sustainability of its digital business, the potential risks and the digital growth potential.

Empirical Approach

The goal of this research is to develop a framework which encompasses relevant dimensions for digital DD. The dimensions should be collectively exhaustive and mutually exclusive. While more dimensions would guarantee exhaustiveness, parsimony calls for fewer dimensions with high explanatory power regarding the goal, i.e., estimating a target's future growth. Table 1 shows the research process and methods.

Existing digital readiness frameworks were collected via academic databases



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Table 1: Research Approach

Research Step	Goal	Method	Outcomes
Literature Analysis	Identifying central dimensions for digital due diligence	Comparative analysis of 7 Digital Readiness Frameworks	Preliminary framework
Expert Interviews	Validating digital due diligence dimensions	Qualitative data analysis of 6 expert interviews	Expected number and relevance ranking for digital due diligence dimensions
Refinement	Validating framework	Adjustment, condensation and enrichment of dimensions based on 100 due diligence projects	Refined framework
Survey	Confirmation of relevance of digital due diligence and its dimensions	Quantitative descriptive analysis	Finalisation of digital due diligence dimensions

Source: Own illustration.

and websites of transaction advisory service providers. Highly specific frameworks, e.g., focusing only on SMEs, were excluded. Table 2 lists the seven cross-industry frameworks, each incorporating 3–9 dimensions, that were analysed for the present study. An initial digital DD framework was derived based on the most frequently mentioned dimensions.

A qualitative study was conducted for which a semi-structured interview guideline was developed, pre-tested and used for interviews with six experts. Each expert had considerable business and/or academic experience in DD as well as in digital transformation. Ex-

emplary job de-scriptions are “Head of Corporate Development”, “Partner” at a transaction advisory company or a digital consulting company or “Director” at a private equity firm. The interviews were recorded, transcribed, and analysed via qualitative data analysis according to Mayring and Fenzl (2022). In summary, the results highlighted the increasing importance of digital DD. Due to time constraints in transactions, the experts advised to have a parsimonious digital DD, i.e., limiting the number of dimensions to a maximum of 3–5 KPIs for each dimension. Ultimately, the results of the interviews validated the relevance of the dimensions of the framework.

Additionally, data on the structure of 100 digital DD projects was screened to validate the frequency of the dimensions of the existing models and to further define the specific KPIs. A quantitative online survey with 19 experts was conducted to further validate the relevance of the dimensions and to reduce the complexity, ultimately resulting in a proposed framework for digital DD which encompasses eight dimensions, as shown in figure 1.

In the following, these dimensions will first be discussed and subsequently applied to a case study that focuses on Haniel’s acquisition of Emma.

Table 2: Analysed Digitalisation Frameworks

Author(s)	Name	Number of Dimensions	Source
Back & Berghaus	Digital Maturity model	9	Back and Berghaus (2017)
BCG	BCG Digital Acceleration Index	4	Grebe et al. (2018)
CapGemini	CapGemini Digital Mastery	5	CapGemini (2021)
Deloitte	Deloitte Digital Maturity Model	5	Deloitte (2018)
KPMG	KPMG Business Analytics Digital Readiness	7	KPMG (2021)
PwC	PwC Digital Business Model	6	Geissbauer et al. (2016)
wdp	wdp Digital Due Diligence	3	wdp (2022)

Source: Own illustration.

Conceptual Framework for Digital Due Diligence

First, focusing on the *sustainability of the business model*, investors want to assess the resilience of the target company during future growth. Market research insights and trend analyses aim to detect radical changes in the focal markets within the holding period of the asset. The higher the likelihood of changes, the greater the investment risk.

Even without radical changes, a target should show resilience and adaptiveness to market developments. This requires a well designed and executed business

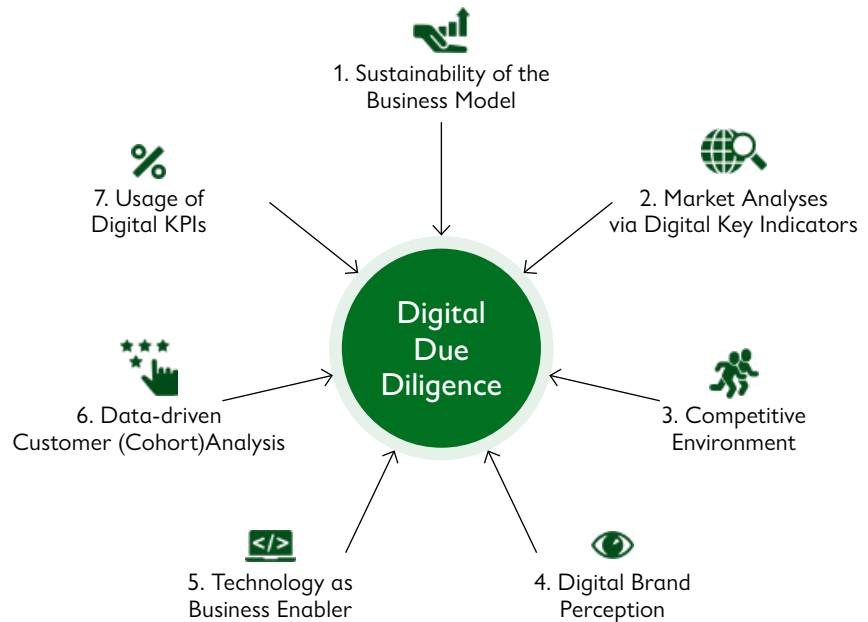
strategy with mid- and long-term goals in combination with market observation mechanisms. In digital due diligence, the following criteria are therefore addressed: (I) extent of process digitalisation and automation, (II) digital ecosystem (i.e., the possibility of expanding the product with partners), (III) market development potential, (IV) digital capabilities for being best-in-class, (V) missing digital capabilities compared to competition, and (VI) necessary CAPEX/OPEX investments for closing digitalisation gaps.

Second, *market analyses via digital key indicators* assess market size and growth as crucial factors. Traditional top-down analyses determine the market potential and the market size via existing market research data and forecasts. Target population size and structure as well as relevant competitors are determined. In digital DD, this approach is augmented by examining digital growth opportunities based on the potential expansion of the target's business.

When the total market is growing and more customers are migrating towards digital channels, digital channels will grow faster than the market average. This calls for both the analysis of historic online market penetration and the projection of the digitalisation trend for the upcoming years.

Third, the aspect *competitive environment* focuses on direct and indirect competition. Direct competitors have comparable offerings. Indirect competitors have different offerings but target comparable search engine traffic. Therefore, indirect competition also affects customers' buying behaviour and customer acquisition costs. Considering different local market entry barriers (i.e., country-specific certificates, particular customer demands, etc.) and the different competitive levels they might lead to is also important for digital DD, as startups often seek to expand internationally quickly. Furthermore,

Fig. 1: Conceptual Framework for Digital Due Diligence



Source: Own illustration.

there can be very tough digital competitive structures. For instance, Amazon runs a marketplace but also acts as an independent seller on this marketplace. Thus, Amazon can prioritise its own products in customers' search results and strengthen its competitive position.

Consequently, core competitors must be closely analysed. Online visibility (i.e., the SEO Visibility Index that shows the visibility of a website in organic search results), number of ranking keywords, social media presence, sentiment analyses (i.e., recognising sentiment towards a product in texts and commentaries) are important key indicators. The target's market position and potential can be assessed via online channel performance, digital market shares and organic and paid marketing channel development.

Fourth, *digital brand perception* focuses on the impact of digital channels on

the target's brand equity. Brand equity is determined by factors such as brand recognition, customer perception, customer loyalty and brand reputation (Swaminathan, 2016). For digital channels, the more known and popular a brand is, the sooner and easier the target can generate organic traffic. This reduces customer acquisition costs due to paid traffic.

Besides brand strength, the target's ability to generate and retain customers via a variety of online channels is assessed. This includes social media channels fitting the brand positioning, utilisation of influencers, organic performance on search engines, paid acquisition channels, and digital sales channels, such as web shops, marketplaces or mobile apps.

The target's resilience is also affected by its brand equity. Search algorithms

are changing continuously and the role of social media platforms changes over time with different demographic groups. Regulatory actions affect central tracking technologies such as cookies, which allow for user profiling. Many browsers nowadays have built-in anti-tracking tools. Google is a major player enforcing the European General Data Protection Regulation (GDPR). The phasing out of third-party cookies can result in conversion rate decreases of up to 30% (Sambol, 2021 b). Companies with digital business must therefore employ alternative ways of generating user data, such as first-party data, which are obtained via the brand's own channels.

Fifth, *technology as business enabler* focuses on the advantages of IT, which is fundamental for digital business. For instance, nearly 100 percent website uptime, flexible scalability, the security of the IT infrastructure or dynamic real-time pricing are central factors (Iansiti & Lakhani, 2014). For investors, IT capabilities are a central driver of market equity (Demling & Jahn, 2021). However, many companies overestimate their IT capabilities. Thus, digital DD must assess the target's digital maturity carefully.

The IT infrastructure has to be scalable for growth at transparent costs while supporting agile work structures. Therefore, external partners and service providers often deliver best-in-class approaches. For instance, cloud computing as a managed solution is scalable at low initial investment costs.

Leveraging the newest IT also requires clear governance and security rules. User data collection and analysis must adhere to local legislation and requires secure solutions. Digitalised firms extensively use tools for video chats, collaborative project work or shared documents. Defining standard procedures minimises risks while supporting agile work approaches.

Management Summary

Digital markets are based on more complex rules than classic distribution channels. Therefore, companies with a high dependency on digital value creation must conduct their due diligence process by employing additional key figures and evaluation criteria. Haniel, a private equity firm which – following an extensive digital due diligence process – invested in a mattress startup called Emma, serves to illustrate this procedure in practice.

Sixth, *data-driven customer (cohort) analysis* focuses on identifying customer value. Some questions for analysing customers are: (I) When does a customer become profitable? (II) How many customers buy repeatedly? (III) How many customers leave? (IV) What is the average number of returns?

The overall goals are minimising customer acquisition costs (CAC) while maximising customer lifetime value (CLV) (Zeithaml et al., 2001). Digital DD should analyse the development of these KPIs and compare them across customer cohorts. Customer cohorts divide the customer base into groups

optimisation via frequent A/B testing is important for maximising customer equity (Hahn et al., 2020). To collect this data, state-of-the-art business intelligence software, ERP and CRM systems are important.

A central element for increasing CLV are personalised CRM campaigns. In combination with forecasting KPIs, such as digital market growth, future pay-offs of such customer loyalty initiatives in terms of sales growth can be estimated.

Seventh, the *usage of digital KPIs* is a central factor for assessing the target. For digital business there are numerous data points for the evaluation and preparation of forecasts. Up to 100 KPIs may be used to evaluate the efficiency and scalability of digital channels; e.g., the number of website visitors during a given period is an indicator of sales potential. All channels have to be analysed to determine whether customer traffic is generated via paid search, organic search, direct contacts, affiliates, social media or other campaigns (e.g., mail marketing). This helps to assess the customer base and its profitability when combined with conversion rates and the average size of orders.

Eight, *AI readiness* is critical for the value and potential of target businesses. This encompasses processes, products, and people. For instance, process mining

With the right focus on consistent digitalisation within the business model and a well-trained team, an increase of 20 to 30 percent in EBITDA is possible.

based on the time of their first purchase. Differing behaviour between cohorts can be explained by mixed channels and, more importantly, changes in the user interface impacting the user experience. Precise and continuous

tools can optimise workflows to remedy bottlenecks and inefficiencies. Also, AI tools help identify customer satisfaction drivers in order to improve product quality in the product lifecycle. In the digital content industry, AI can

automatically tag and categorise stock images, improve search and discovery functionalities, and enable companies to offer more personalisation. However, AI also poses business disruption risks for incumbent companies in industries such as digital marketing, software development or financial services. Companies that fail to embrace AI and to attract talent can be overtaken by AI-savvy competitors with improved efficiency, customer experience or product innovation.

Case Study: Haniel Acquires a Majority of the Sleep- tech Startup Emma

In early April 2020, Franz Haniel & Cie. GmbH (Haniel) acquired 50.1 % of equity in Emma – The Sleep Company (Emma). 24.95 % of the equity remained with the two founders (Wer-zu-Wem, 2019).

The acquisition of Emma by Haniel, a traditional family enterprise, was an investment in a fast-growing startup specialising in online mattress sales. This case study focuses on the digital DD executed by the specialised digital strategy consulting firm OMMAX. The framework developed above was applied to analyse the business data, forecast growth and prepare the transaction. The case study shows the transition from commercial DD to digital DD and highlights specific insights.

Haniel: A Family Enterprise with a Long Tradition

Haniel was established in 1756 and is one of the oldest German family-owned equity companies, headquartered in Duisburg. In 2020, Haniel had around 20'400 employees and achieved sales of EUR 3.1 billion. Currently, Haniel's portfolio encompasses six divisions, which oper-

ate independently (Haniel, 2022). Haniel focuses on sustainability goals, communicating their ambition to “exclusively invest in companies that, besides profit expectations for their portfolios, also make a positive contribution to a livable future” (Haniel, 2019). All investments are aligned with the UN sustainability goals (United Nations, 2022).

Emma: A Strongly Growing Sleep-Tech Company

Emma was initially founded as Bettzeit by Dr. Dennis Schmoltzi and Manuel Müller in 2013. Emma develops and sells mattresses and sleep accessories, such as pillows, toppers and bedding, via a direct-to-customer sales model (D2C). It operates mainly online, with more than 350 employees, and is active in 21 countries. Emma quickly became a major market player and reached the break-even point as early as 2017. Its sales grew from EUR 80.5 million in 2018 to more than EUR 405 million in 2020 (Haniel,

2020). It received a Tech5 Award in 2017 and 2018 (Emma, 2022).

Digital Due Diligence

In 2020, Haniel screened Emma as a target. The market was volatile and entry barriers for mattresses were low. Established offline brands started to compete with digital startups. Therefore, growth projections had to be based on diligent research.

Interestingly, some of Emma's direct competitors were developing negatively. In 2019, the US-based Casper achieved a unicorn valuation of more than USD 1.1 billion. In 2020, the valuation decreased so that Casper had to lower the price per share from initially USD 17–19 to USD 12–13 for its stock market listing (Finanznachrichten, 2020). Berlin-based Muun declared bankruptcy in 2018 and was acquired by the competitor Matrazzo (Voss, 2019). Bett1, an online shop, achieved high brand recognition via TV advertising but struggled to gain market shares.

Thus, Haniel required DD based on the highly competitive market. Data sources involved digital tools (e.g., Google Analytics, Google Keyword Planner, various social media channels), data banks (e.g., OMMAX Business Intelligence Structure, Statista, SEMrush, Sistris, various link research tools), market studies (e.g., Bed & Mattresses Report, Statista Bedroom Furniture Report), and online sources (e.g., business websites, press articles). Also, internal information of Emma was collected for a period of three years.

Market analyses via digital key indicators. The global market potential for mattresses was estimated to reach EUR 80 billion in 2023. Market growth assumptions showed an annual compound growth rate (CAGR) of ~1 % for the period of 2020 to 2023. The online market share was growing faster: 20 % of mat-

Main Propositions

- 1 Digital markets differ from traditional markets in core mechanisms.
- 2 Digital due diligence must factor in these differing mechanisms.
- 3 A parsimonious but powerful digital due diligence framework focuses on seven dimensions.
- 4 Each dimension focuses on specific areas and KPIs.
- 5 The diligent analysis of these seven dimensions can substantiate investment decisions in the digital age.

tresses were sold online, with a growth rate of ~10–15 %. Search volume and search terms showed that established brands, like Emma, had a competitive advantage.

Regarding local factors, the British market – in which Emma was strongly established – showed higher growth rates. In Germany, customers rely strongly on certificates, such as those issued by “Stiftung Warentest”, where Emma ranked number one in 2019.

Besides the core mattress market volume, the global sleep tech market, which includes sensors and apps, was estimated to reach EUR 520 billion in 2024. As Emma focused on this market, DD factored this in.

Competitive environment. In the mattress market, there are traditional retailers and startups operating a D2C sales model. During the DD, retailers owned ~84%

of the market but faced strong competition from startups who offered a more convenient buying experience. The DD assessment showed a strong competitive position for Emma in European markets and potential in the United States. The SEO Visibility Index showed a positive development of Emma in every core market.

Technology as business enabler. Emma showed solid, scalable, and state-of-the-art technical infrastructure and data analytics. The shop system, along with the connected data, warehouse monitoring and tracking system, were set up very efficiently. Along with sophisticated data governance directives, this represented an important factor in the DD.

Data-driven customer (cohort) analysis. Naturally, for mattress sellers it is difficult to establish close customer relationships because customers buy on average only every nine years. However,

Emma had promising customer journey forecasts, with several planned projects for multi-channel marketing. With the help of intelligent multi-touch attribution software, Emma could address potential customers cost-efficiently via a broad channel mix. Thus, Emma could scale in a sustainable manner with lower customer acquisition costs than direct competitors.

Usage of digital KPIs. In each of the core markets, central parameters such as website traffic, conversion rate and the number of resulting transactions, had increased continuously over the previous three years. The well-constructed website, clear design, convenient checkout process, and mobile implementation also yielded a good user experience.

The Investment Decision

As figure 2 shows, central factors of the framework were assessed favorably.

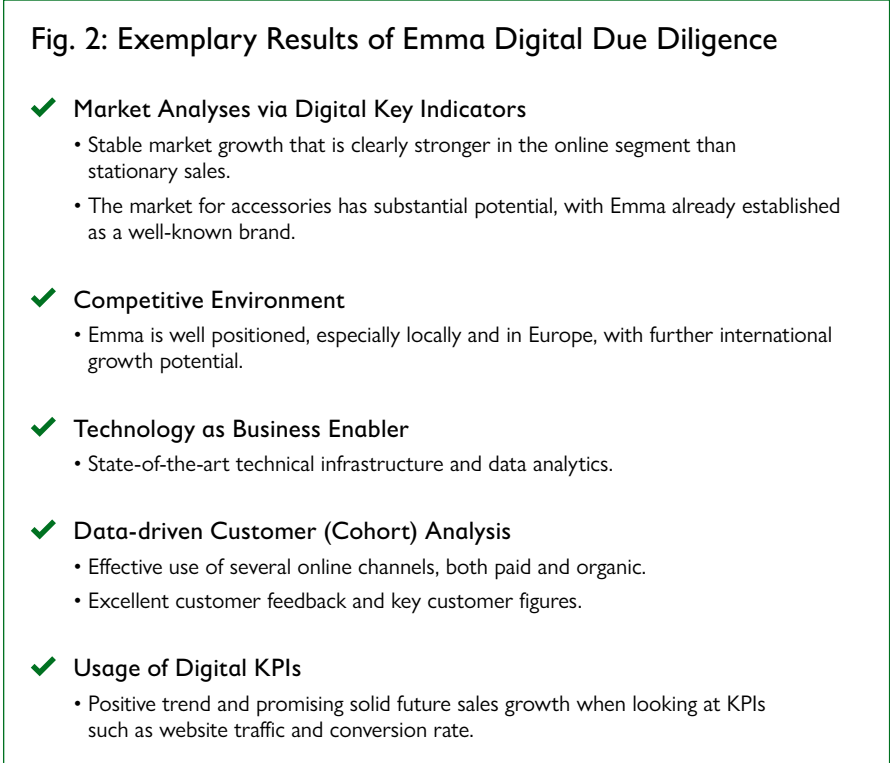
Additionally, Emma had better management with fewer investments than its competitors. Also, Emma showed a focus on R&D and optimising supply chain design, allowing it to outperform competitors in terms of cost efficiency.

This led to a positive investment evaluation by Haniel, who planned to focus on strengthening and advancing Emma’s international expansion and developing new business areas within the sleep tech category.

Implications

The box “Lessons Learned” shows the implications of this article for investors, managers of targets and consultants in the digital DD process.

The findings of digital DD provide valuable market insights. In contrast to



traditional business audits, digital DD considers key digital data, digital market development and online potential. However, digital DD must be carried out with great care and profound expertise of digital strategies and practices, as digital KPIs are not easily interpreted and sometimes misleading. Digital KPIs frequently suffer from strong fluctuations, mutual dependencies and are subject to higher dynamics than traditional business data.

In the illustrated case study, digital DD endorsed the acquisition of Emma by Haniel.

Lessons Learned

- 1 Investors, consultants and managers should understand the growing importance of digital due diligence.
- 2 Investors, consultants and managers should know the seven dimensions of digital due diligence.
- 3 Investors, consultants, and managers should know the key analysis areas within the seven dimensions of digital due diligence.
- 4 Managers of startups and established companies should assess their own business model with regard to digital due diligence.
- 5 Consultants should consider developing traditional commercial due diligence towards digital due diligence.

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Personalisierung im Customer Experience Management

Unternehmen investieren erhebliche Ressourcen in die Personalisierung ihrer Touchpoints. Sie schaffen es allerdings häufig nicht, das volle Potenzial ihrer Bemühungen auszuschöpfen. Der vorliegende Artikel zeigt auf, wie Unternehmen Personalisierung als Instrument für ihr Customer Experience Management effektiver nutzen können.

Jakob Weidig

Die Personalisierung von Touchpoints (Kundenkontaktpunkte wie Produkte, Services und Gespräche mit Mitarbeitenden) gewinnt zunehmend an Bedeutung (z.B. Chandra et al., 2022). Personalisierung bezeichnet das Anpassen von Touchpoints an die individuellen Vorlieben einzelner Kundinnen und Kunden (Surprenant & Solomon, 1987). Neue Technologien wie das Internet of Things (IoT) und Künstliche Intelligenz (KI) eröffnen zusätzliche Möglichkeiten zur Personalisierung von Touchpoints (Hoyer et al., 2020). Gleichzeitig wachsen die Erwartungen der Kundschaft an personalisierte Touchpoints (Abraham et al., 2019). So bevorzugen 91% der befragten Kundinnen und Kunden solche Unternehmen, die ihre persönlichen Präferenzen im Kaufprozess berücksichtigen (Accenture, 2018). Auch die Literatur bestätigt, dass Personalisierung die Kundenloyalität erhöhen kann (z.B. Chen et al., 2022; Kwon & Kim, 2012).

Viele Unternehmen tragen den Erwartungen ihrer Kundschaft an die Personalisierung von Touchpoints Rechnung. In einer Befragung gaben 89% der Unternehmen an, in Personalisierung zu investieren (Witcher, 2018). So kann gut umgesetzte Personalisierung den Unternehmenserfolg verbessern: Amazon führt 35% des Umsatzes auf personalisierte Empfehlungen zurück (MacKenzie et al., 2013) und Netflix gibt an, mehr als 1 Milliarde US-\$ pro Jahr durch eine erhöhte Loyalität dank Personalisierung von Touchpoints einzusparen (McAlone, 2016). Aber nicht alle Unternehmen schöpfen das Potenzial ihrer Personalisierungsmaßnahmen aus (Nidhi Arora et al., 2021). Während 88% der befragten Marketingverantwortlichen mit Personalisierung eine verbesserte Customer Experience (das ganzheitliche Kundenerlebnis) anstreben, erreicht nur etwas mehr als die Hälfte dieses Ziel (Evergage, 2019).

Eine mögliche Ursache hierfür ist, dass viele Unternehmen ihre Maßnahmen zur Personalisierung von Touchpoints nicht in eine Gesamtstrategie zur Verbesserung der Customer Experience (CX) integrieren (Tyrväinen et al., 2020). Ihre Bemühungen konzentrieren sich meist auf einzelne Touchpoints in der Vorkaufphase (z.B. personalisierte Werbung; Aguirre et al., 2015) statt auf die gesamte Customer Journey (Kundenreise), die auch die Kauf- und Nachkaufphase inkludiert (Kuehn et al., 2019; Lemon & Verhoef, 2016). Dadurch wird das Potenzial der Personalisierung nicht voll genutzt, da für den Unternehmenserfolg die CX der gesamten Customer Journey wichtiger ist als die einzelner Touchpoints (Duncan et al., 2016; Jaakkola & Terho, 2021).

Personalisierung ist zudem meist auf die Erreichung kurzfristiger Ziele wie die Erhöhung des Umsatzes ausgelegt (z.B. Jannach & Jugovac, 2019), da Personalisierung aufgrund der hohen Kosten (z.B. Arora et al., 2008) einen messbaren ROI liefern muss (Gorgoglione et al., 2019). Das Ergebnis sind perso-



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nalisierte Touchpoints, wie personalisierte Empfehlungen, die nur auf eine Margenerhöhung abzielen (Hosanagar et al., 2008). Die Folge kann jedoch eine negative CX sein, da Kundinnen und Kunden den Empfehlungen misstrauen und es letztlich nicht zum Kauf kommt (Chau et al., 2013).

Zusätzlich bewerten viele Unternehmen den Erfolg von personalisierten Touchpoints nur mit einfachen Kennzahlen wie der Clickthrough-Rate (Evergage, 2019). So fehlt ein tieferes Verständnis der resultierenden CX und der Auswirkungen der getroffenen Maßnahmen auf Kundenzufriedenheit und Treue (Mehmood et al., 2022). Gerade negative Effekte von Personalisierung, wie Sorgen um die Privatsphäre, werden so nicht erfasst (Aguirre et al., 2016). Hier können Auswertungen der Kundenreaktionen (z.B. in Chats) mithilfe von KI helfen, die Auswirkungen personalisierter Touchpoints auf die CX genauer zu verstehen (Huang & Rust, 2021b).

Um das Potenzial der Personalisierung besser auszuschöpfen, können Unternehmen Personalisierung als Instrument für ihr Customer Experience Management (CXM) einsetzen. CXM beschreibt das strategische Management der gesamten CX durch ein Unternehmen (Schmitt, 2010) und umfasst die kulturellen Denkweisen, die strategische Ausrichtung und die organisatorischen Fähigkeiten, um die CX kontinuierlich zu verbessern (Homburg et al., 2017). Konkret verfolgt CXM das Ziel, durch die passende Gestaltung der Touchpoints eine hohe Kundenloyalität zu erreichen (Holmlund et al., 2020).

Die CXM-Literatur hat die Relevanz von Personalisierung für CXM hervorgehoben (z.B. Becker & Jaakkola, 2020), allerdings wird der Einsatz der Personalisierung im CXM nicht detailliert behandelt. Auf Basis der bestehenden CXM- und Personalisierungsliteratur lassen sich Vorteile des Einsatzes von Personalisierung als CXM-Instrument im Vergleich zu allein-

Tabelle 1: Vorteile von Personalisierung als CXM-Instrument

	Personalisierung als alleinstehende Massnahme	Personalisierung als CXM-Instrument	Vorteile von Personalisierung als CXM-Instrument
Ziel(e)	Meist kurzfristige Ziele, wie z.B. Erhöhung des Umsatzes (Jannach & Jugovac, 2019)	Meist langfristige Ziele, wie Kundenloyalität (Homburg et al., 2017)	Höhere Kundenloyalität
Treiber	Häufig technische Aspekte (Adolphs & Winkelmann, 2010)	Kundennutzen (De Keyser et al., 2020)	Verbesserte CX durch Fokus auf Kundennutzen
Betrachtung	Einzelne Touchpoints (Mehmood et al., 2022)	Alle unternehmenseigenen Touchpoints entlang der Customer Journey (Homburg et al., 2017)	Vollständige Betrachtung der Customer Journey
Erfolgsmessung	Conversion-Rate, Clickthrough-Rate etc. (Mehmood et al., 2022)	Auswertung der Kundenreaktionen (z.B. in Chats), um Effekt auf CX zu verstehen (Becker & Jaakkola, 2020)	Besseres Verständnis der resultierenden CX

Quelle: Eigene Darstellung.

stehenden Personalisierungsmassnahmen ableiten (vgl. Tabelle 1). Konkret wird Personalisierung durch die Einbindung in das CXM auf die Erreichung einer positiven CX ausgerichtet, um Kundenloyalität zu erreichen. Die positiven Effekte der Kundenloyalität auf Profitabilität und Unternehmenserfolg (z.B. Hallowell, 1996) dürften mögliche negative Effekte (z.B. weniger Clickthrough) aufwiegen.

Der vorliegende Artikel gibt zunächst einen Überblick über personalisierte Touchpoints und die resultierenden Kundenreaktionen. Im Anschluss daran wird anhand der Literatur und von Praxisbeispielen aufgezeigt, wie Personalisierung als CXM-Instrument von Unternehmen effektiv eingesetzt werden kann.

Personalisierte Touchpoints in der Customer Journey und Kundenreaktionen

Unternehmen konzentrieren ihre Personalisierungsmassnahmen häufig auf wenige digitale Touchpoints in der Vorkaufsphase der Customer Journey (Mehmood et al., 2022). Allerdings können Touchpoints eines Unternehmens entlang der gesamten Customer Journey personalisiert werden (vgl. Abbildung 1 für eine Übersicht).

In der Vorkaufsphase können Unternehmen Werbung, Angebote und Empfehlungen personalisieren (Aguirre et al., 2015). Nur zusätzliche Käufe zu erreichen, greift als Ziel zu kurz. Erfolgreiche Personalisierung in der Vorkaufsphase zielt darauf ab, die Kaufentscheidung für Kundinnen und Kunden zu verein-

fachen (Murthi & Sarkar, 2003). Die Nutzung digitaler Technologien an physischen Touchpoints bietet das Potenzial, einen grösseren Kundennutzen durch Personalisierung zu schaffen (Hoyer et al., 2020). So stattet der Juwelier Tiffany & Co. seine Mitarbeitenden mit mobilen Endgeräten aus, um den Kundenservice im Ladengeschäft durch den Zugriff auf Kundenprofile zu personalisieren (McLaughlin, 2019). KFC China nutzt digitale Kioske, die mithilfe von Gesichtserkennung Alter, Geschlecht und Stimmung der Kundinnen und Kunden erfassen und der Kundschaft anhand dieser Informationen personalisierte Menüempfehlungen aussprechen (Hawkins, 2017).

In der Kaufphase können Unternehmen Preise (z.B. Arora et al., 2021), Produkte (z.B. Rosenbaum et al., 2017), Kaufprozess (z.B. Thirumalai & Sinha, 2009) und den Kundenservice (z.B. Neuhofer et al., 2015) personalisieren. Personalisierung in der Kaufphase zielt darauf ab, den Kauf für Kundinnen und Kunden komfortabler zu machen (Siebert et al., 2020).

Zusammenfassung

Um Personalisierung effektiver zu nutzen, können Unternehmen Personalisierung in ihr Customer Experience Management integrieren. Es wird ein Überblick über die Möglichkeiten zur Personalisierung verschiedener Touchpoints und die resultierenden Kundenreaktionen gegeben. Zudem werden Empfehlungen ausgesprochen, wie Personalisierung in das Customer Experience Management eingebunden werden kann.

Die Hotelkette Marriott personalisiert den Check-in, indem alle nötigen Angaben sowie Präferenzen aus vorherigen Buchungen übernommen werden. Der Gast kann dann direkt mit dem Smartphone die Zimmertür öffnen (Burgess, 2022). Und der Online-Service Habit.com liefert seinen Kundinnen und Kunden Mahlzeiten, die auf Basis medizinischer Tests für die jeweiligen Ernährungsanforderungen personalisiert sind (Rosenbaum et al., 2017).

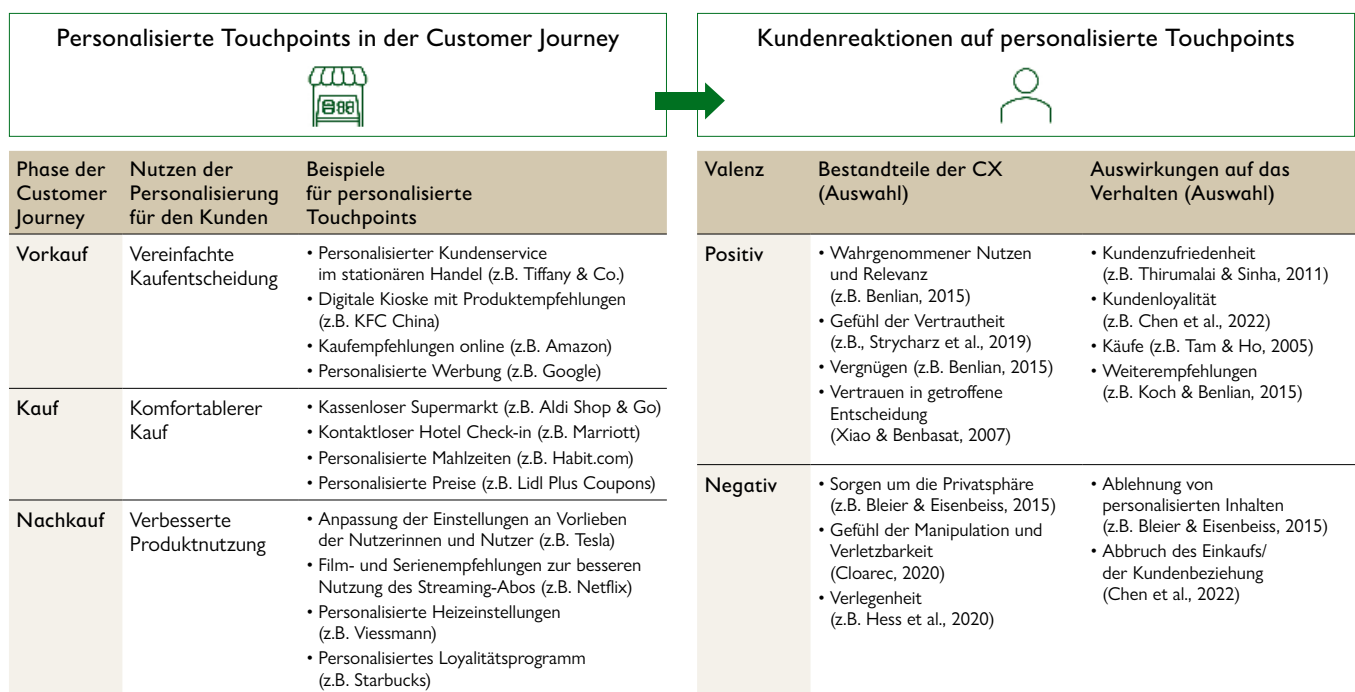
In der Nachkaufphase können Unternehmen ihre Kommunikation mit Kundinnen und Kunden (z.B. Huang & Rust, 2021a) und den Kundenservice personalisieren (z.B. Surprenant & Solomon, 1987).

Erfolgreiche Personalisierung in der Nachkaufphase ermöglicht es Kundinnen und Kunden, das Produkt optimal zu nutzen (Goyal & Deshwal, 2022). Tesla-Fahrzeuge können am Schlüssel die Fahrerin oder den Fahrer erkennen und passen eine Vielzahl von Fahrzeugeinstellungen (z.B. Sitzkonfiguration und Federung) an die im Fahrerprofil gespeicherten Vorlieben an (Morgan, 2021). Und der Heizungsbauer Viessmann bietet mit seiner ViCare App die Möglichkeit, durch personalisierte Einstellungen Energie zu sparen (Viessmann, 2022).

Personalisierte Touchpoints lösen verschiedene Kundenreaktionen aus. Bei den Kundenreaktionen auf personalisierte Touchpoints unterscheidet die aktuelle CX-Literatur meist zwischen der eigentlichen CX (unmittelbar und unbewusst) und Auswirkungen auf das Verhalten (bewusster und bedachter als CX) (z.B. Becker & Jaakkola, 2020). CX ist zudem subjektiv und abhängig vom individuellen Kontext (individuell, sozial, markt- oder umweltbezogen) der Kundschaft (De Keyser et al., 2020). Personalisierung kann daher ein wichtiges Werkzeug für Unternehmen im CXM sein, um der Subjektivität der CX Rechnung zu tragen und Touchpoints an die Präferenzen der Kunden anzupassen (Kuehnl et al., 2019).

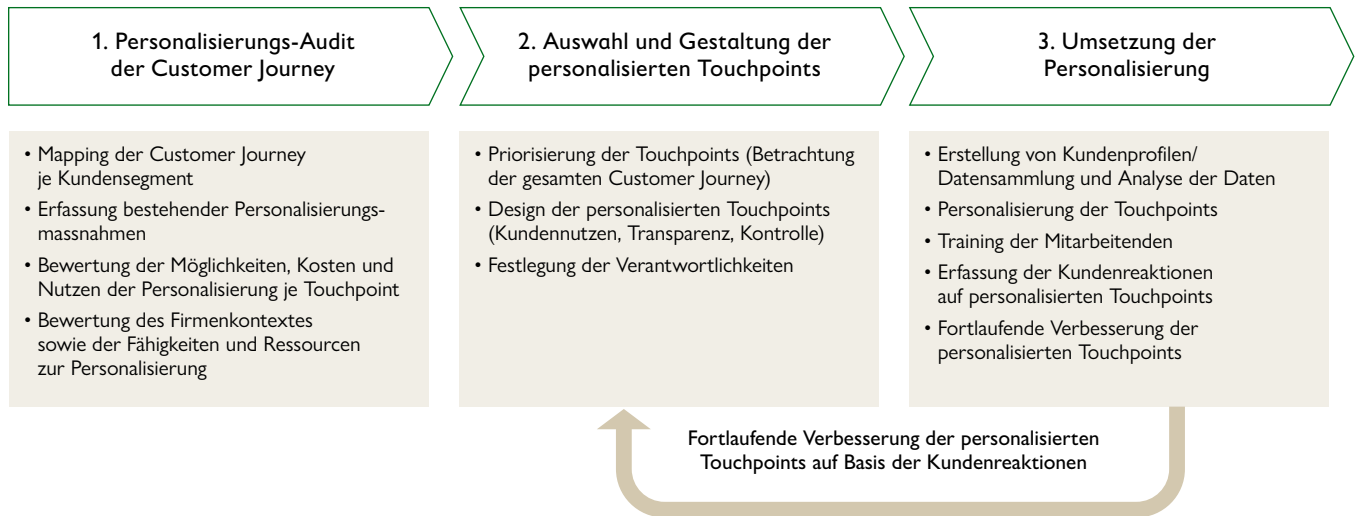
Allerdings gelingt es Unternehmen nicht immer, mit personalisierten Touchpoints die Präferenzen der Kundinnen und Kunden zu erfüllen. Daher kann die Valenz der Kundenreaktionen auf personalisierte Touchpoints sowohl positiv als auch negativ sein (z.B. Bleier et al., 2018) (vgl. Abbildung 1). Zu den positiven Bestandteilen der CX infolge von personalisierten Touchpoints gehören z.B. wahrgenommener Komfort und Vergnügen (z.B. Xiao & Benbasat, 2018). Positive Ergebnisse der personalisierten Touchpoints sind in der Folge z.B. höhere Kundentreue und Umsätze (Vesanan, 2007). Zu den negativen Bestandteilen der

Abb. 1: Personalisierte Touchpoints in der Customer Journey und Kundenreaktionen



Quelle: Eigene Darstellung.

Abb. 2: Schritte zum Einsatz der Personalisierung als CXM-Instrument



Quelle: Eigene Darstellung

CX infolge von personalisierten Touchpoints gehören z.B. Misstrauen gegen das Unternehmen sowie das Gefühl, manipuliert zu werden und verletzlich zu sein (z.B. Cloarec, 2020). Im Ergebnis versuchen Kundinnen und Kunden, personalisierte Touchpoints zu vermeiden und brechen ihren Einkauf oder sogar die Kundenbeziehung ab (Chen et al., 2022).

Einsatz der Personalisierung als CXM-Instrument

Um Personalisierung im Rahmen ihres CXM effektiver zu nutzen, können Unternehmen folgende Schritte berücksichtigen (vgl. Abbildung 2): (1) einen Personalisierungs-Audit der Customer Journey, (2) die Auswahl und Gestaltung der personalisierten Touchpoints und (3) die Umsetzung der Personalisierung entlang der Customer Journey.

1. Personalisierungs-Audit der Customer Journey

Mit einem Audit der Customer Journey kann das Potenzial für Personalisierung ermittelt werden (vgl. Tabelle 2). Zunächst bietet sich die Durchführung eines Customer Journey Mappings an, bei dem alle Touchpoints der Customer Journey mit ihren Eigenschaften und Funktionen aus Kundensicht (Rosenbaum et al., 2017) erfasst werden. Ein wichtiges Kriterium ist die Kontrolle über den Touchpoint, da Unternehmen nur Touchpoints persona-

lisieren können, die sie selbst oder mittels Partner (z.B. Vertriebspartner) gestalten (vgl. Lemon & Verhoef, 2016). Es bietet sich an, das Mapping der Customer Journey aus der Perspektive einzelner Kundensegmente durchzuführen, um Unterschiede zwischen den Segmenten zu erkennen (McColl-Kennedy et al., 2019). Im Anschluss werden für die einzelnen Touchpoints die bestehenden Personalisierungsmassnahmen sowie die Kundenerwartungen an die Personalisierung und der mögliche Kundennutzen aufgenommen. Zudem ist es wichtig, die Kosten der Personalisierung der einzelnen Touchpoints zu verstehen. Dabei sind nicht

Kernthesen

- 1 Personalisierung als CXM-Instrument ist effektiver als alleinstehende Personalisierungsmassnahmen.
- 2 Effektive Personalisierung setzt ein umfassendes Verständnis der Customer Journey voraus.
- 3 Das volle Potenzial für die Personalisierung vieler Touchpoints in der Kauf- und Nachkaufphase bleibt bisher weitgehend ungenutzt.
- 4 Unternehmen müssen die positiven und negativen Kundenreaktionen personalisierter Touchpoints abwägen.

nur direkte Kosten (z.B. für die technische Implementierung), sondern auch indirekte Kosten wie eine erhöhte Komplexität der internen Prozesse (Rust & Chung, 2006) und mögliche negative Kundenreaktionen (Aguirre et al., 2015) relevant.

Über die Customer Journey hinaus empfiehlt es sich, auch das Geschäftsmodell sowie die Fähigkeiten und Ressourcen zur Personalisierung des jeweiligen Unternehmens in dem Audit zu betrachten. Im Hinblick auf das Geschäftsmodell ist ein wichtiger Faktor für die Personalisierung, ob die angebotenen Produkte eher hedonistischer oder praktischer Natur sind. So sind bei hedonistischen Produkten die Anforderungen an Personalisierung höher, da die Entscheidungsprozesse der Kundinnen und Kunden stärker auf den individuellen Präferenzen der Kundschaft basieren als bei praktischen Produkten (Dhar & Wertenbroch, 2000; Choi et al., 2011).

Ähnliches gilt für Dienstleistungen, die im Vergleich zu Produkten mehr Aufwand bei der Gestaltung der Touchpoints benötigen (Kuehnl et al., 2019). Bei den Fähigkeiten und Ressourcen wird erfasst, welches Mass an Personalisierung das Unternehmen in der Lage ist umzusetzen. Technische Fähigkeiten beschreiben die Möglichkeiten des Unternehmens, Daten zu sammeln, durch die Analyse dieser Daten die Präferenzen einzelner Kundinnen und Kunden abzuleiten, sowie die Touchpoints zu personalisieren und zu verknüpfen (Rust & Huang, 2014; Vesanen, 2007). Organisatorische Fähigkeiten umfassen in erster Linie die für Personalisierung notwendige Koordination über verschiedene Abteilungen hinweg (IT, Marketing, Produktion) (Arora et al., 2021). Dies erfordert auch, dass Personalisierung als unternehmensweite Initiative verstanden wird (Kumar et al., 2019). Um noch nicht vorhandene Fähigkeiten auszubauen und Personalisierung dauerhaft

Tabelle 2: Personalisierungs-Audit

Personalisierungs-Audit der Customer Journey	
Mapping der Customer Journey je Kundensegment	Was sind die relevanten Kundensegmente, die sich im Verlauf der Customer Journey (Art der Touchpoints) oder in ihren Präferenzen und Zielen unterscheiden?
	Welche Touchpoints beinhaltet die Customer Journey in den einzelnen Phasen und wie sind diese beschaffen? (Art der Touchpoints, Phase der Customer Journey, Kontrolle des Unternehmens über die Touchpoints)
	Was ist die Funktion der Touchpoints und welches Ziel verfolgen Kundinnen und Kunden dort?
	Wie wichtig sind die Touchpoints für die CX entlang der gesamten Customer Journey?
Erfassung bestehender Personalisierung und der Kundenreaktionen	Welche bestehenden Touchpoints werden bereits personalisiert und wie ist die Personalisierung dort umgesetzt?
	Wie unterstützen die personalisierten Touchpoints die Kundinnen und Kunden bei ihren Zielen?
	Wie werden die CX (Kundenreaktionen) und die Auswirkungen auf das Verhalten dort erfasst?
	Wie reagieren die Kunden auf die bestehende Personalisierung (CX und Auswirkungen auf das Verhalten)?
Bewertung von Möglichkeiten, Kosten und Nutzen der Personalisierung je Touchpoint	Wie kann Personalisierung Kundinnen und Kunden an den Touchpoints bei ihren Zielen unterstützen und was erwarten sie in Bezug auf Personalisierung?
	Welches Mass an Kontrolle hat das Unternehmen über die Touchpoints?
	Wie kann die Personalisierung dort technisch umgesetzt werden? (benötigte Daten, Analyse der Kundenpräferenzen, Anpassen der Inhalte)
	Welche Kosten entstehen durch die Personalisierung der Touchpoints? (technische Implementierung, erhöhte Komplexität, Risiko negativer Kundenreaktionen)
Bewertung des Unternehmenskontextes sowie der Fähigkeiten und Ressourcen zur Personalisierung	Was für Anforderungen an die Personalisierung ergeben sich aus dem Geschäftsmodell?
	Welche technischen und organisatorischen Fähigkeiten bestehen zur Personalisierung dieser Touchpoints?
	Welche finanziellen Ressourcen stehen für die Personalisierung zur Verfügung?
Ergebnis	Überblick über alle Touchpoints der Customer Journey im Hinblick auf Möglichkeiten zur Personalisierung
	Verständnis der Kosten und Nutzen der Personalisierung der einzelnen Touchpoints
	Verständnis der Stärken und Schwächen der bestehenden Personalisierung
	Verständnis der generellen Fähigkeiten des Unternehmens für die Personalisierung

Quelle: Eigene Darstellung.

umzusetzen, werden zudem auch finanziellen Ressourcen benötigt (Vesanen, 2007).

Das Ergebnis des Audits ist ein umfassender Überblick über die Customer Journey im Hinblick auf Möglichkeiten zur Personalisierung. Zusätzlich lassen sich Stärken und Schwächen der bestehenden Personalisierung und der Fähigkeiten des Unternehmens zur Personalisierung identifizieren.

2. Auswahl und Gestaltung der personalisierten Touchpoints

Auf Basis des Audits können Touchpoints für die Personalisierung priorisiert werden. Eine Priorisierung ist notwendig, da die Fähigkeiten und Ressourcen in den meisten Fällen nicht ausreichen dürften, um die Customer Journey vollständig zu personalisieren. Es ist sinnvoll, neben den Möglichkeiten und Kosten der Personalisierung auch die erreichbare Qualität (geringe Fehlerquote) zu berücksichtigen. Personalisierung,

Handlungsempfehlungen

- 1 Mit einem Personalisierungs-Audit können das Potenzial für die Personalisierung der Customer Journey ermittelt und die Grundlage für die Priorisierung von Touchpoints für die Personalisierung geschaffen werden.
- 2 Neben der reinen Kosten-Nutzen-Abwägung ist auch die mögliche Qualität der Personalisierung ein wichtiger Faktor in der Priorisierung von Touchpoints zur Personalisierung.
- 3 Unternehmen können die CX mit personalisierten Touchpoints positiv beeinflussen, indem sie sich auf den Kundennutzen fokussieren und den Kunden Transparenz und Kontrolle über die Personalisierung bieten.
- 4 Schulungsmassnahmen für Mitarbeitende und klare Verantwortlichkeiten für die Personalisierung von Touchpoints erhöhen die Effektivität der Personalisierungsmassnahmen im Rahmen des CXM.
- 5 Eine detaillierte Erfassung der Kundenreaktionen und des langfristigen Kundenverhaltens sind wichtig, um den Effekt personalisierter Touchpoints zu verstehen und die Personalisierung zu verbessern.

die nicht den Präferenzen der Kunden entspricht, resultiert häufig in einer negativen CX (Arora et al., 2008; Shen, 2014).

Für die zu personalisierenden Touchpoints sind wichtige Gestaltungsentscheidungen zu treffen. Unternehmen können die CX positiv durch personalisierte Touchpoints beeinflussen, indem sie den Kundennutzen in den Mittelpunkt stellen (Chen et al., 2022). Bei personalisierten Empfehlungen entspricht der Kundennutzen einer vereinfachten Entscheidungsfindung (Li & Karahanna, 2015) und bei personalisierter Werbung einer höheren Relevanz für die Kundschaft (Aguirre et al., 2015). Zudem kann eine hohe Transparenz die Personalisierung unterstützen (Awad & Krishnan, 2006). Kundinnen und Kunden erfahren so, auf welchen Daten ein personalisierter Inhalt basiert und warum er gezeigt wird (Tintarev & Masthoff, 2011). Zusätzlich hilft es, wenn Unternehmen deren Kundschaft Kontrolle darüber geben, ob und wie personalisiert wird (Aguirre et al., 2015).

Um negative Effekte auf die CX zu vermeiden, empfiehlt es sich, darauf zu verzichten, mit Personalisierung Kundenentscheidungen zu manipulieren (Ham, 2017). Zudem ist es sinnvoll, Personalisierung auf das notwendige Detaillevel zu beschränken (Bleier & Eisenbeiss, 2015). Denn personalisierte Werbung, die personenbezogene Daten abbildet, wird als aufdringlich wahrgenommen und ist dadurch weniger wirkungsvoll (Van Doorn & Hoekstra, 2013).

Personalisierung setzt auch Vertrauen der Kundinnen und Kunden in das Unternehmen voraus (z.B. Salonen & Karjaluoto, 2016). Deshalb wird idealerweise die Genauigkeit der Personalisierung über den Verlauf der Customer Journey mit wachsendem Kundenvertrauen gesteigert.

Neben der Gestaltung sind die Verantwortlichkeiten für die Personalisierung der Touchpoints zu klären (Holmlund et al., 2020). Diese liegen zum einen bei den Verantwortlichen für den Touchpoint (z.B. der Leitung des Kundenservice). Zum anderen muss definiert werden, wer die Personalisierung im Rahmen der gesamten CXM-Strategie verantwortet (vgl. Homburg et al., 2017).

3. Umsetzung der Personalisierung

Um die Personalisierung der priorisierten Touchpoints zu implementieren, werden zunächst die notwendigen Kundendaten gesammelt und Kundenprofile erstellt. Die Kundenprofile müssen ausreichend Informationen enthalten, um daraus die relevanten Präferenzen ableiten zu können (Adomavicius & Tuzhilin, 2005). Für die Personalisierung der Touchpoints bietet es sich an, einen Prototyp zu entwickeln und mit A/B-Tests bei Kundensegmenten mit hoher Akzeptanz zu testen (z.B. Early Adopters) (Wedel & Kannan, 2016). Der Prototyp kann



Quelle: © Adobe Stock.

dann mit dem Kunden-Feedback weiterentwickelt und in die Customer Journey weiterer Kundensegmente eingebunden werden. Diese Einbettung gestaltet sich bei rein digitalen Touchpoints wie Webseiten und Apps in der Regel einfacher, da sie nur technisch erfolgt. Bei Touchpoints, die von Mitarbeitenden mitgestaltet werden (z.B. Kundenkontakt im Laden, Hotline), sind Schulungsmassnahmen ein wichtiges Mittel (Bettencourt & Gwinner, 1996), um die Akzeptanz und Qualität der Personalisierung sicherzustellen.

Um die Wirkung der personalisierten Touchpoints im Detail zu verstehen, ist es wichtig, die Reaktion der Kundinnen und Kunden zu erfassen. Befragungen sind eine Möglichkeit, um neben positiven auch negative Reaktionen zu erkennen (Huang & Rust, 2021b). Bei vielen digitalen Touchpoints kön-

nen Unternehmen Clickstream-Daten erheben, um das Verhalten in Apps und auf Webseiten auszuwerten (Montgomery & Smith, 2009). Eine weitere Möglichkeit ist die Auswertung von Kundeninteraktionen mit Stimmauswertung (Puntoni et al., 2021) und Gesichtserkennung (Garaus et al., 2021). Auch Service-Mitarbeitende können aus der Interaktion mit Kundinnen und Kunden wertvolle Informationen zur Wirkung der personalisierten Touchpoints gewinnen (Gwinner et al., 2005). Zusätzlich ist es sinnvoll, die Auswirkungen der personalisierten Touchpoints über Metriken für das langfristige Kundenverhalten, wie Churn und Customer Lifetime Value, zu messen, die auch Rückschlüsse auf die finanziellen Effekte der Personalisierung zulassen (Mehmood et al., 2022). Auf Basis der Kundenreaktionen kann die Personalisierung der Touchpoints fortlaufend verbessert werden (Neuhofer et al., 2015). ■

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Artikel

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Zusammengestellt von Marvin Greifenstein

Buchrezension

Abstract

Mobilität bewegt. Nicht nur Menschen und Güter, sondern auch die Gemüter derer, die von und mit ihr leben. Wie lässt sich unser dringendes Bedürfnis nach Unabhängigkeit, nach komfortabler beruflicher Mobilität, nach Reisen befriedigen, ohne dass Städte, Menschen und Systeme unter der immer grösser werdenden Verkehrslast kollabieren?

Nutzen für die Praxis

Mobilität für alle ist ein erfrischend unaufgeregtes und inhaltlich ausgewogenes Buch, das sich genau dieser Herausforderung annimmt. Das Credo der Autoren: Mobilität von morgen muss nutzerfokussiert, multimodal und per Knopfdruck planbar sein. Um das zu veranschaulichen, nehmen sie die Leserinnen und Leser mit auf eine Weltreise in Megacities und Metropolregionen. Anhand gut recherchierter Episoden zeigen sie, wie und warum Menschen Mobilität nutzen und was sie zu einem anderen Mobilitätsverhalten bewegen könnte. Im Zentrum steht der Mensch in seinem spezifischen Nutzungskontext, nicht die Technologie. Das macht die Stärke des Buches aus. Wer zu einer besseren Mobilität in Sao Paulo beitragen möchte, muss Maria verstehen. Sie pendelt täglich fünf Stunden, weil sie sich das Wohnen in der Stadt nicht leisten kann. Um ihr zu helfen, müssten Arbeitsplätze in die Vorstädte verlagert oder öffentliche Mobilitätsangebote besser aufeinander abgestimmt werden. Lernen kann man dabei von Busan in Südkorea, wo Sumi bereits heute von autonomen Shuttles profitiert. Die lassen sich per Smartphone ordern und sind perfekt auf andere Mobilitätsangebote abgestimmt. Dadurch lässt sich Sumis Pendelzeit halbieren. Aber auch individuelle, exklusive Mobilitätslösungen werden zukünftig eine Daseinsberechtigung haben. So möchte Gianna, eine Mailänder

Innenarchitektin, ihre Pendelzeit als Arbeitszeit nutzen. Für ein Fahrzeug, das ihr als komfortabler, geschützter Arbeitsplatz dient, zahlt sie gerne mehr. Am Besitzen und Selbstlenken hat sie hingegen kein Interesse. Ein anderer Nutzungskontext mit Entwicklungspotenzialen in Richtung autonome Pods. Im Zentrum steht die Multimodalität. Es geht nicht um die eine oder die andere Lösung, sondern um die intelligente Kombination relevanter Angebote in einer APP.

Herrmann und Kollegen nutzen diese und andere Beispiele, um für vielfältige Herausforderungen zu sensibilisieren, Best Practices zu teilen und um komplexe Sachverhalte in einfachen Worten zu erläutern. Sie nehmen sich die Zeit, die es braucht, um Gedanken herzuleiten und Zusammenhänge zu erklären. Damit stehen sie im wohltuenden Kontrast zu den vielen Beiträgen, die auf einzelne Phänomene und Buzzwords setzen, ohne sich um eine Einbettung der Inhalte in den Gesamtkontext zu bemühen. Ein lesenswertes Buch, das sich im Kern in drei Kernthesen zusammenfassen lässt.

Prof. Dr. Sven Henkel von der
EBS Universität für Wirtschaft und Recht



Andreas Herrmann,
Johann Jungwirth, Frank Huber
**Mobilität für alle ...
auf Knopfdruck**
Campus Verlag,
1. Auflage 2022, 96 Seiten
CHF 37,50, EUR 32,00
ISBN: 978-3-593-51557-1

Kernthesen

- 1 Mobilitätslösungen müssen den Menschen dienen, die sie nutzen, nicht den Industrien, die sie herstellen. Wer sich zu lange an altergebrachten Lösungen klammert, kann nur verlieren.
- 2 Mobilität von morgen ist multimodal und digital vernetzt. Angebote müssen einfach und zuverlässig sein und die erste und letzte Meile einschliessen. Hierfür bedarf es einer App, die alle Angebote auf Basis eines intelligenten Geschäftsmodells bündelt.
- 3 Die Zukunft liegt in der 15-Minuten-Stadt. Mobilitäts- und Stadtentwicklung müssen so zusammenarbeiten, dass die wichtigsten Angebote (Arbeit, Medizin, Kultur) für jeden innerhalb von 15 Minuten erreichbar sind. Denn Mobilität ist kein Selbstzweck, sondern Mittel zum Zweck.

Thema der nächsten Ausgabe: Contemporary Branding

Der Aufbau einer erfolgreichen Brand dauert Jahre. Diese zu erhalten und weiterzuentwickeln, bedeutet eine ständige Adaption gemäss sich ändernden Umwelteinflüssen und sozialen sowie politischen Entwicklungen. Im Zentrum dessen steht unter anderem die Corporate Social Responsibility. Die darunter gefasste soziale wie auch ökologische Nachhaltigkeit sind als Teil eines Purpose zu definieren und unter Führung des Brand-Managements in ihrer Umsetzung zu steuern. Aufgrund einer immensen medialen Aufmerksamkeit ist neben einer erfolgreichen Implementierung auch eine richtige Kommunikation bei Fehlritten essenziell. Darüber hinaus ist das digitale Brand-Management im ständigen Wandel und ist ein zentraler Bestandteil einer zeitgemässen Brand. Nach wie vor bestehen jedoch grosse Differenzen in Bezug auf die richtige

Umsetzung einer zeitgemässen Markenführung. Vor diesem Hintergrund werden Beiträge gesucht, die sich mit der Corporate Social Responsibility, dem agilen Brand-Management und der Kommunikation im Umgang mit Imagekrisen befassen.

- Brand-Communication: Kontinuierlicher Wandel vs. Markenkontinuität
- Politischer Aktivismus einer Marke in Zeiten internationaler Krisen
- Nachhaltiges Markenimage von Marken in der D/A/CH-Region
- Corporate Social Responsibility: vom Purpose zur Vision zur Brand-Strategy zur Brand-Implementierung
- Digital Branding: Wo die digitale Marke ihre Grenze findet

Impressum

Marketing Review St. Gallen
Thesis Verlag
Universität St. Gallen
Institut für Marketing
und Customer Insight
Dufourstrasse 40a
CH-9000 St. Gallen

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Communication
Network Media
Ridlerstrasse 35a
D-80339 München
Telefon: +49 (0) 89 72 95 99-15
Deivis Aronaitis,
Alexandra Budik

Schlussredaktion
Wolfgang Mettmann (deutsch)
Renate Schilling (englisch)

Layout & Produktion
deivis aronaitis design | dad |
Leonrodstrasse 68
D-80636 München
Telefon: +49 (0) 89 120 278 10
Telefax: +49 (0) 89 120 228 14
grafik@da-design.lt

Titelbild
© Adobe Stock (Solweig)

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Insights
Die Inhalte unter dieser Rubrik
sind aus der Marketingpraxis
gesponserte Beiträge.

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Druck & Verarbeitung
Aumüller Druck
GmbH & Co. KG
Kennwort:
Marketing Review St. Gallen
Weidener Strasse 2
D-93057 Regensburg

Herausgeber
Prof. Dr. Sven Reinecke (schriftführend)
Prof. Dr. Thomas Bieger
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Marketing Review St. Gallen
erscheint im 40. Jahrgang

ZKZ 70610

ISSN 1865-6544

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KÜHNE-STIFTUNG

Dr. Christoph M. Müller
und Sibylla M. Müller


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