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EDITED BY
Jaeyoung Jay Lee,
Central South University, China

REVIEWED BY
Elena Alyavina,
University of Huddersfield, United Kingdom

*CORRESPONDENCE
Marc Hasselwander
✉ marc.hasselwander@dlr.de

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Local super apps in the 15-minute city: a new model for sustainable smart cities?

Marc Hasselwander[1]*, Daniel Weiss[1] and Stefan Werland[2]

[1]German Aerospace Center (DLR), Institute of Transport Research, Berlin, Germany, [2]Urban Living Lab Center, Wuppertal Institute for Climate, Environment, and Energy, Berlin, Germany

In this perspective paper, we propose to integrate the concepts of Mobility-as-a-Feature (MaaF, an extension of MaaS) and the 15-minute city (15mC). The 15mC concept maintains that daily necessities and services, such as shopping, healthcare, and leisure should be accessible without private cars within 15 minute. In line with MaaF, these services could be integrated with a variety of mobility options into a single app. This novel approach is poised to offer a seamless customer experience, better resource utilization, enhanced urban mobility, improved and more inclusive access to services, and greater community connectivity. We call them local super apps: a new model to drive equitable and sustainable urban transitions. We substantiate this preliminary idea with evidence from literature, practical applications, and a user survey (N = 1,019), while also discussing future research avenues to further develop the concept of local super apps.

KEYWORDS

super apps, digitalization, innovation, vertical integration, multi-service perspective, transportation and urban planning, smart city, urban transition

1 Introduction

The transportation sector, with its high fossil fuel consumption and dependence on carbon-intensive infrastructures, ranks among the largest and fastest-growing contributors to global greenhouse gas (GHG) emissions (Lamb et al., 2021). Smart and sustainable urban services and ecosystems are therefore needed to address climate change and achieving the 1.5 degrees Celsius target of the Paris Agreement (Schröder, 2022; Pandey and Ghosh, 2023).

The 15-minute city (15mC) and Mobility as a Service (MaaS) have emerged as two of the most prominent solutions that can contribute to achieving this goal and have garnered significant attention globally in terms of scientific publications and practical applications. This shift is illustrated by both changing mobility behaviors and the growing trend of platformization in the transportation sector.

Developed in 2016 and gaining prominence as a response to the ongoing climate crisis and the challenges brought about by the COVID-19 pandemic, the 15mC concept is an urban planning paradigm designed to foster more compassionate and people-centric urban environments (Moreno et al., 2021). Anchored in four key dimensions—Density, Proximity, Diversity, and Digitalization—the concept envisions urban spaces where daily necessities and services, such as shopping, healthcare, and leisure should be accessible without private cars within 15 minute.

Similarly, the MaaS concept has the potential to reduce car dependencies (Hasselwander et al., 2022; Alyavina et al., 2024). Its core objective is to offer seamless, intermodal travel

options by integrating various public and private transportation modes within a single, on-demand platform (Lopez-Carreiro et al., 2020). Nevertheless, there is currently a lack of definitive evidence showcasing MaaS schemes' capacity to reduce private car use and bring about substantial changes in mobility behaviors (Pangbourne et al., 2020). Furthermore, the recent bankruptcy of the trailblazing MaaS provider and creator of the *Whim* app in Helsinki, *MaaS Global*, underscores doubts regarding the financial viability of this model (Smith, 2024).

Hensher and Hietanen (2023) therefore propose an extension of MaaS that instead of a multi-modal perspective incorporates a multi-service perspective. Referred to as Mobility as a Feature (MaaF), this concept envisions a broader activity-based paradigm of service delivery, integrating a wide range of non-transportation services (Hensher and Hietanen, 2023).

Ride-sharing unicorns like *Uber*, *Bolt*, *Grab*, or *DiDi Chuxing* have already adopted a similar strategy and incorporated some MaaF functionalities (Hasselwander, 2024b). Originally known for their innovative driver-passenger matchmaking, these platforms have transformed into comprehensive service providers, extending their offerings well beyond urban transportation. This trend has given rise to what is known as super apps within the transportation sector, drawing an analogy to dominant social media and communication super apps like *WeChat*, *KakaoTalk*, or *LINE* (Steinberg, 2020). Unlike the concept of an app for a specific service (e.g., online shopping, food delivery, ride-sharing, etc.), super apps are solutions that offer a wide range of personalized services, taking full advantage of platform-side scale and network effects to optimize for profitability while significantly enhancing user convenience.

The existing examples of super apps are driven by profit-oriented, often globalized private companies, which potentially can lead to increased transportation volumes and distortions of competition between service providers (Tirachini, 2020). Ultimately, the widespread adoption of super apps in Europe could therefore amplify negative externalities, posing significant challenges to sustainability and the principles of the 15mC. Moreover, the accelerating trend of platformization in the transportation and logistics sectors, as seen with companies like *Uber*, *Bolt*, *Flink* and *Wolt*, highlights the necessity of incorporating a regulatory strategy within the EU's Digital Markets and Digital Services Act framework. This will be crucial for the effective regulation of integrated services, especially aiming to address challenges such as monopolistic tendencies and data governance, ensuring a balanced and fair digital marketplace.

2 The local super app model

In this perspective paper, we posit that the development and operation of super apps should rather be driven by public authorities (potentially as an enhancement to existing MaaS applications). This would ensure that these apps align with urban mobility policies and objectives, comply with the EU's digital platform regulatory framework, promote regional value creation, and effectively contribute to positive environmental and social outcomes.

A respective alternative pathway for a super app transition and very novel solution could therefore involve locally built super apps that are developed bottom-up and regulated by the public sector. That is, an app that is designed based on diverse local stakeholder needs and tailored to the unique characteristics of each community, which are key requirements to foster sustainable mobility behaviors through the use of apps (Sunio and Schmöcker, 2017; Andersson et al., 2018).

By integrating the concepts of MaaF and the 15mC, we envision locally embedded super apps as tools that provide a seamless customer experience, better resource utilization, enhanced urban mobility, improved and more inclusive access to services, and greater community connectivity. Moreover, with the development and regulation of locally built super apps, we envision to empower communities, enhance service optimization based on sustainability goals, and contribute to the broader goals of equitable and sustainable urban development.

This proposed vision is based on our initial hypothesis that MaaF and 15mC have similarities that make them complementary and can be used to reinforce each other. Most importantly, both concepts aim to provide a full range of services to consumers and citizens in the same space—either digital, in the same application, or spatial, within a narrow/walkable urban distance.

In envisioning local super apps, we conceive a landscape where essential daily necessities and services—ranging from supermarkets, restaurants, cinemas, gyms, to hospitals, libraries, museums, and so forth—should be conveniently accessible within a 15-minute radius, whether by foot, shared or private micro-mobility options, or public transit. Moreover, the versatility of the local super app model extends beyond physical proximity. Users should be able to seamlessly order groceries or food for delivery, book and pay for tickets and admissions, and schedule appointments for the mentioned services, all seamlessly integrated within a single app (Figure 1). Note, therefore, that "super" in our context does not refer to the app's dominance or superiority but rather to its comprehensive offering of functionalities and services.

Currently, the services offered by most of the major mobility and delivery platforms are designed to meet the preferences of young urban residents, overlooking broader societal advantages and disregarding those who could benefit the most from such services (Frank, 2024). This includes older or physically limited individuals who rely on support for grocery shopping and other errands. At the same time, the focus of service providers on urban areas, leaves out individuals in remote or underserved locations. Consequently, existing business models fall short in meeting the fundamental needs of these demographics, exacerbating disparities in access to critical services and commodities. Local super apps have the potential to address these issues by explicitly catering to the needs of underserved demographics and remote communities. Through strategic planning and collaboration as well as targeted subsidies and incentives, these apps can be designed to prioritize accessibility and inclusivity, ensuring that essential services are readily available to all residents.

Moreover, this innovative approach promises users a comprehensive overview of available options, fostering better comparison, informed decision-making, convenience, and time savings. Meanwhile, service providers and suppliers engaging in the local super app ecosystem, particularly SMEs, benefit from a better access to customers, higher visibility, and opportunities for collaboration with other local businesses. This collaboration might include shared delivery drivers or the provision of discounts or combined services. Consider the prospect of purchasing tickets for the cinema or a museum that already include the fare for public transit or the costs for a shared e-scooter ride. Imagine the convenience of placing orders at different stores and restaurants, all

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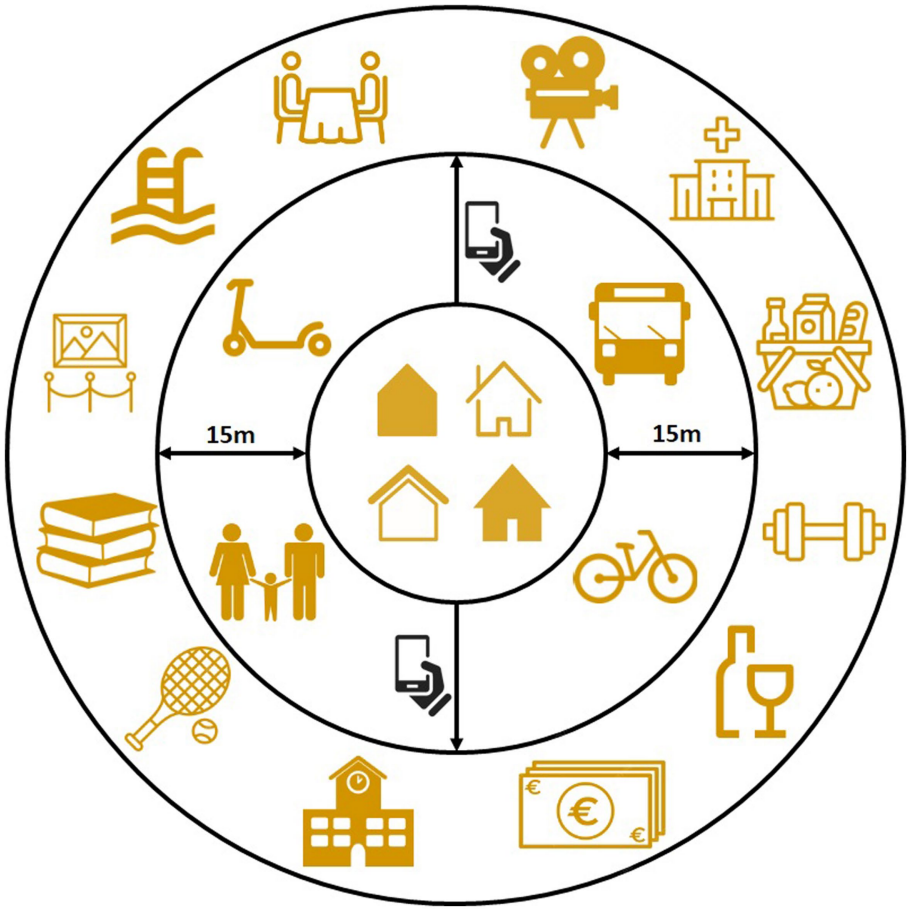

FIGURE 1
The local super app model (own illustration).

consolidated into a single delivery. These examples illustrate how the local super app not only simplifies the user experience but also fosters synergies among local businesses, creating a dynamic ecosystem that benefits both users and service providers.

The key features of the local super app model are therefore the following:

- **15-minute accessibility**: essential services available within a 15-minute radius.
- **Multi-modal mobility and delivery**: accessible by foot, (e)bikes, e-scooters, cargo bikes, and public transit, or delivered using the same means.
- **Inclusiveness:** designed to serve all demographics, including older or physically limited individuals and residents of remote or underserved areas.
- **Integrated services**: one application for diverse needs, fostering convenience and ease.
- **Seamless transactions**: users can order, book, and pay within the same app.
- **Leveraging platformization**: full exploitation of platform advantages like scale and network effects for both the demand and supply side.
- **User-centric design**: tailored to meet diverse local stakeholder needs.
- **Sustainability focus**: promoting sustainable mobility and consumption behaviors.
- **Empowerment of communities**: local development and regulation for community-specific solutions.

3 Practical insights and examples

Combining transportation with unrelated services is not a novel concept, and there are examples from public transit providers in Asia that implement such strategy, albeit using smartcards instead of apps (e.g., the *Octopus card* in Hong Kong). These smartcards are not only valid for public transit but also for convenience stores, supermarkets, fast-food restaurants, and more (Ming, 2011). In this context, it should be considered that accessing these services is one of the main reasons why people travel.

In Germany, there are at least three specialized tickets associated with significant trip-generating activities, showcasing how integration extends beyond traditional transportation services:

- **Kombi tickets** for major events like football games or concerts, where the public transit fee is already included;

- **Semester tickets** for university students which are also valid for public transit; and
- **Tourist tickets** such as the *Berlin WelcomeCard* that not only serve as public transit passes but also offer free entrance and discounts at tourist attractions such as museums and theaters.

In addition, also the latest addition to Germany's fare landscape, the *DeutschlandTicket*, mirrors the broader trend of platformization and vertical integration. Unlike traditional fare systems, this nationwide ticket is not restricted to dedicated apps or those of regional transport authorities and operators. Instead, it seamlessly integrates into multimodal mobility platforms like *FreeNow* and *mo.pla*. Moreover, it is also available in unrelated platforms such as *DeutschlandCard*, a bonus program offered by supermarkets and retailers, or the *ADAC Trips App* from the German automobile association, showcasing its adaptability across diverse platforms.

Consequently, offering a seamless customer experience by integrating a diverse range of activities and services within a single app appears to be a logical progression in meeting the derived demands of individuals. Moreover, local super apps could help fostering a more integrated land-use and transportation planning paradigm, prioritizing citizens' needs, promoting local businesses, and nurturing community growth. Moving forward, the generation of substantial big data within local super apps could emerge as a cornerstone, facilitating holistic and long-term monitoring, data analysis, and informed decision making to drive sustainable urban developments.

4 'App fatigue' and preferences for all-in-one solutions

The phrase 'There's an app for that', coined by Apple in 2009, is now more relevant than ever. There is a suitable app for virtually every conceivable purpose, more than 7 million in total in the Apple App Store and Google Play Store. Meanwhile, however, a certain 'app fatigue' has emerged. With each new installation, permissions must be granted again, a new account may need to be created and verified, personal and payment information must be entered again, while smartphone users end up with more apps than they can effectively use.

To empirically sketch out the super app landscape, we conducted a representative online survey (with respect to gender, age, and household income) among smartphone users in Germany ($n = 1{,}019$) in December 2023[1]. The results show that, on average, smartphone users have 48.6 apps installed on their devices (both pre-installed and newly installed), yet effectively utilize only about 13.0 of them (i.e., at least once a week). Notably, about 49% of respondents express concerns about having too many apps installed, this sentiment is particularly prevalent among younger cohorts, where 57% of individuals aged 18–29 share this concern. These apprehensions stem from a combination of factors, including information and communication overload, social network exhaustion, and perceived privacy invasion (Pang and Ruan, 2023). Unsurprisingly, the majority of respondents (58%) therefore admits to being somewhat hesitant when it comes to installing new apps.

From a user standpoint, the super app concept holds promise in addressing these challenges, as evidenced by 41% of respondents expressing a likelihood to adopt super apps if they were made available. We identified a clear correlation between super app adoption intention and current app usage behaviors. This correlation also manifests between app usage behaviors and smartphone users' age, with younger users exhibiting a clearly higher app usage (Figure 2). Taken together, this part of our findings underscores the potential for customized super apps that cater to diverse usage patterns and needs.

While super apps certainly offer a plethora of benefits—such as the seamless access to a multitude of services and new functionalities, scoring a respectable 3.51 on a 5-point Likert scale—the survey also uncovered some concerns and barriers that could impede their widespread adoption. These include concerns about the potential risks associated with sharing personal data while using super apps (3.56), concerns about the reliability and trustworthiness of the services provided through super apps (3.53), fears that a single super app could dominate the market, which could limit competition and consumer choice (3.40), and fears that the use of super apps could adversely impact local businesses and traditional commerce (3.44). The concept of local super apps holds promising potential to mitigate the latter concerns. The findings, however, also underscore the essential need for a robust, complementary regulatory framework specifically designed to fit the unique socio-economic and data security landscapes.

5 Concluding remarks

Considering that super apps represent the latest evolution of the platform business model, replacing incumbent pipeline business models in an increasing number of sectors including transportation, logistics, and e-commerce (Van Alstyne et al., 2016), as well as mechanisms and strategies of platform firms in the sharing economy (Hasselwander, 2024a), we expect super apps to become the next global megatrend. With a firm foothold in Asia and other regions of the global South, the inevitable expansion of super apps into Europe is anticipated. The results of our online survey further suggest that smartphone users are ready to adopt super apps. Therefore, we argue that stakeholders in Europe need to prepare for the super app disruption, providing cities and municipalities with insights into effective strategies how to build own super apps in line with the 15mC principle, offering local businesses opportunities to adapt and thrive in the evolving digital landscape, and empowering society with the knowledge needed to navigate the transformative impact of super apps on everyday life.

In this perspective paper, we propose the concept of local super apps as a distinctive vision of a future development path, which merges existing ideas from transport (MaaS/MaaF) and urban planning (15mC) to foster equitable and sustainable urban transformations. Contrary to the prevalent notion that mobility primarily serves to fulfill demands outside

1 For more details regarding the survey design, data collection, sample characteristics, and data limitations, the reader is referred to Hasselwander and Weiss (2024b).

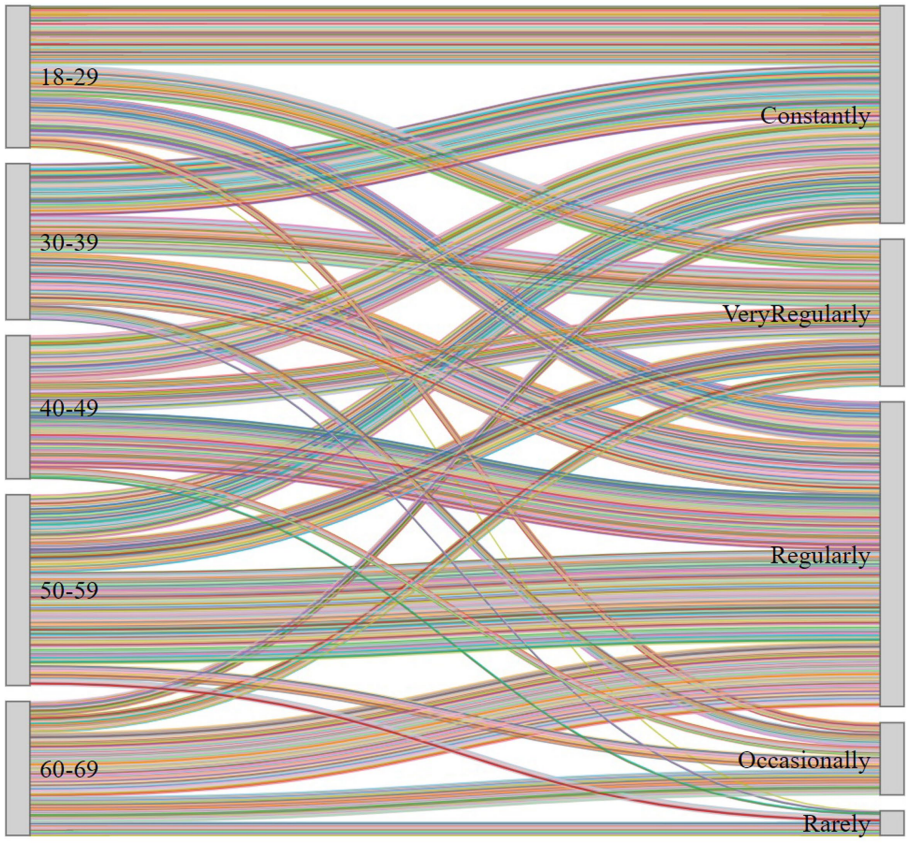

FIGURE 2
Sankey diagram of app usage by age group.

of one's immediate surroundings, local super apps aim to realign mobility with the objective of satisfying demand locally. To make this a reality, additional research findings are needed to provide an evidence-based foundation for the conceptualization of local super apps and how to design and implement them.

Hence, in future work we plan to analyze the mechanisms and functionalities of existing super apps and how they can be aligned with the 15mC principles. In addition, we aim to explore the demand and preferences for local super apps among diverse end user groups in different geographical contexts (Hasselwander and Weiss, 2024b). Drawing upon the existing literature on app adoption [e.g., Kumar et al. (2018)] and MaaS users [e.g., Caiati et al. (2020) and Schikofsky et al. (2020)], future research should dive deeper into the factors that explain both the adoption and non-adoption intentions for super apps. While the limited success of commercial MaaS apps in Europe suggests that end users are not willing to subscribe to mobility bundles, we have found initial evidence indicating the existence of a consumer segment with preferences for mobility in combination with other services such as healthcare, maps and navigation, restaurant reservations, hotel and flight bookings, as well as banking and financial services (Hasselwander and Weiss, 2024a). Therefore, studying how different services in the super app landscape can be combined and bundled is a very promising field for future research.

We also advocate for an assessment of the regulatory challenges and potential conflicts stemming from the growing trend of platformization in the transportation and logistics sectors, emphasizing the analysis of current pioneering frameworks like the EU Digital Markets and Digital Services Acts. Arguably, these regulatory frameworks need to be expanded to adequately address the emerging dynamics of super app business models, especially with regards to local socio-economic contexts. Such an expansion is crucial to ensure that regulations stay relevant and effective amidst the fast-evolving digital service landscapes, while also maintaining fair competition on the national and international stage.

Data availability statement

The datasets analyzed in this study can be found here: https://dx.doi.org/10.2139/ssrn.4784554.

Author contributions

MH: Writing – original draft, Visualization, Investigation, Funding acquisition, Conceptualization. DW: Writing – original draft, Project administration, Investigation, Conceptualization. SW: Writing – original draft, Validation, Investigation, Conceptualization.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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