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Mobility as a Feature (MaaF): Why and how ride sharing platforms have evolved into super apps

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Abstract

With Mobility as a Feature (MaaF), transportation scholars propose an extension of the Mobility as a Service (MaaS) concept. Leveraging the ongoing trend of platformization, MaaF intends to integrate mobility with unrelated services such as food delivery, grocery delivery, financial services, or e-commerce and shopping. In this research, I show that some ride sharing platforms basically already provide MaaF functionality. Uber, Grab, Didi Chuxing, Bolt, and others have transformed into super apps, offering a wide range of services beyond their core ride sharing business. The findings of this study offer valuable insights into which ride sharing platforms are actively pursuing the super app strategy and shed light on the motivations driving their expansion into diversified service offerings. While the phenomenon of super apps is already established in the global South, it is now gaining interest in Europe and the US. Indeed, the present study argues that super apps are poised to shape the future of mobility and service provision, representing a significant shift in how people access mobility and other services. It therefore calls for additional research on this topic to better understand the implications of MaaF and super apps in the transportation sector.

Keywords: Urban mobility; platformization; growth strategy; diversification; Mobility as a Feature (MaaF); super app.

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1. Introduction

In the early 2010s, the emergence of ride sharing platforms (also known as transportation network companies) marked a significant development in the transportation industry (Mitropoulos et al., 2021). Initially recognized for their disruptive driver-passenger matchmaking, these platforms have evolved to encompass a broader scope, aiming to provide a wide array of mobility services (e.g., e-scooter sharing, bike-sharing, car sharing, carpooling) as well as services beyond urban transportation (e.g., food delivery, grocery delivery, hotel and flight bookings, e-commerce and shopping, digital payments, financial services). While the concept of bundling different mobility options on a single platform is known as Mobility as a Service (MaaS) (Hasselwander et al., 2022a; Jittrapirom et al., 2017), transportation scholars recently coined the idea of integrating mobility with unrelated services as Mobility as a Feature (MaaF) (Hensher and Hietanen, 2023). The concept behind this integration is a well-studied topic in the business literature known as platform envelopment, which is defined as the "entry by one platform provider into another's market by bundling its own platform's functionality with that of the target's so as to leverage shared user relationships and common components" (Eisenmann et al., 2011, p. 1271). Platform envelopment can lead to the emergence of conglomerate platforms (Eisenmann et al., 2011). More recently, these conglomerate platforms are referred to as super apps, insofar as they aim to offer multiple services under a single brand that encompass various aspects of daily life (Hasselwander, 2023; Steinberg, 2020).

The author of the present study argues that these super apps are poised to shape the future of mobility and service provision, representing a significant shift in how people access mobility and other services. However, there exists a knowledge gap regarding the processes and motivations driving this transformation. Key questions persist regarding the geographical locations where this transformation is occurring, the types of ride sharing platforms that are driving this transformation, the underlying motivations and strategic considerations that lead ride sharing platforms to expand their services, and the prerequisites and facilitating factors that enable the pursuit of a super app strategy:

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RQ1: *Which* ride sharing platforms are turning into super apps?
RQ2: *What* factors determine whether ride sharing platforms are turning into super apps?
RQ3: *Why* are ride sharing platforms turning into super apps?
RQ4: *How* are ride sharing platforms turning into super apps?

By examining these questions, this research aims to shed light on the dynamics, motivations, and strategies driving the evolution of ride sharing platforms into super apps, providing valuable insights into the future trajectory of the mobility service provider landscape and the wider platform economy.

2. Methods and data

This study adopts a mixed-method approach, utilizing both quantitative and qualitative analyses.

2.1. Quantitative analysis

The data for the quantitative analysis were obtained from Crunchbase, a database provider and news portal for corporate and business information. The Crunchbase query builder was employed to filter relevant ride sharing platforms, resulting in a total of 380 observations. Using a desk research approach, I identified 16 ride-sharing platforms among them that have implemented a super app strategy, offering a minimum of two unrelated services apart from ride sharing and mobility (Table 1). The super app status is used as the dependent variable, coded as a binary response. The remaining variables (mostly financial and performance indicators) serve as the independent variables to explain the super app status (Table 2). Due to the dichotomous nature of the dependent variable, a binary probit model is estimated. Initially, a full model with all independent variables is trained. Subsequently, a stepwise variable selection approach (backward selection) is employed to identify significant covariates and confounders. To assess the quality of the final model, I report the following goodness-of-fit metrics: the log-likelihood value, the McFadden Pseudo R-squared, and the correct predictions.

Table 1. Overview of ride sharing super apps (N=16).

Start-up	Founded	Head-quarters	Available in	Integrated services [1]				
				Mobility services	Food delivery	Parcel delivery	Grocery delivery	Payment
Bolt	2013	Estonia	46 countries in Europe, Africa, Asia, and Latin America	●	●		●	
Cabu	2016	USA	USA, Nigeria	●	●	●	●	●
Careem	2012	UAE	12 countries in Africa and Asia	●	●	●	●	●
Didi Chuxing	2012	China	16 countries in Europe, Africa, Asia, Latin America, and Oceania	●	●	●		●
Gett	2010	UK	10 countries in Europe and Asia	●		●		
Gojek	2009	Indonesia	Indonesia, Singapore, Vietnam	●	●	●	●	●
Gozem	2018	Togo	8 countries in Africa	●	●	●	●	●
Grab	2012	Singapore	8 countries in Asia	●	●	●	●	●
Halan	2017	Egypt	Egypt, Ethiopia, Sudan	●				●
Hugo	2016	El Salvador	6 countries in Latin America	●	●		●	●
Ola	2010	India	India, Australia, New Zealand, UK	●				●
Pathao	2015	Bangladesh	Bangladesh and Nepal	●	●	●		●
Pronto	2017	Mexico	Mexico	●	●		●	
Safeboda	2015	Uganda	Uganda, Nigeria	●		●		●
Uber	2010	USA	approx. 72 countries in North America, Europe, Asia, Africa, Latin America, and Oceania	●	●	●		●
Yandex Go	2011	Russia	19 countries in Europe, Asia, Africa, and Latin America	●	●	●	●	

[1]Note that the availability of services may vary across different geographical markets. Source: Crunchbase and desk research

Table 2. Study variables and descriptive statistics (N=380).

Variable	Description	Category	Observations (% of sample)	Min.	Max.	Mean (SD)
Age	Platform age in years	-	-	4	24	9.13 (4.77)
NoEmployees	Total no. of employees	51-100	130 (34.2)	-	-	-
		101-250	107 (28.2)	-	-	-
		251-500	53 (13.9)	-	-	-
		501-1,000	34 (8.9)	-	-	-
		1,001-5,000	33 (8.7)	-	-	-
		5,001-10,000	9 (2.4)	-	-	-
		10,001+	14 (3.7)	-	-	-
NoPortfolioOrg	Total no. of portfolio organizations	-	-	0	25	0.31 (1.97)
NoProductsActive	Total no. of products active	-	-	1	91	12.27 (14.23)
NoTrademarksReg	Total no. of registered trademarks	-	-	0	189	2.79 (13.42)
NoPatentsGranted	Total no. of patents granted	-	-	0	975	6.22 (57.14)
NoActiveTech	Total no. of technologies in use	-	-	1	142	35.21 (28.98)
NoApps	Total no. of apps	-	-	1	137	3.44 (9.71)
SuperApp	Super app status (=1 if considered a super app)	-	16 (4.2)	-	-	-
TotFunding	Total founding amount raised in USD (log scale)	-	-	8.99	23.95	17.61 (1.87)
TotEquityFunding	Total equity funding amount raised in USD (log scale)	-	-	8.99	23.64	17.29 (1.73)
NoInvestors	Total no. of investors	-	-	1	116	6.07 (11.17)
NoLeadInvestors	Total no. of lead investors	-	-	0	28	1.74 (3.25)
NoFundingRounds	Total no. of funding rounds	-	-	0	34	2.86 (4.36)
NoInvestments	Total no. of investments	-	-	0	30	0.38 (2.54)
NoLeadInvestments	Total no. of lead investments	-	-	0	10	0.17 (1.05)
NoAcquisitions	Total no. of acquisitions	-	-	0	29	0.77 (2.91)
Acquired	Acquisition status (=1 if the organization was acquired)	-	57 (15.0)	-	-	-
NoExits	Total no. of exists	-	-	0	7	0.07 (0.55)
IPO	IPO status (=1 if public)	-	18 (5.0)	-	-	-
NoVisits	Total no. of website visits in the last month (log scale)	-	-	0	21.59	8.33 (3.56)
WebTrafficRank	Global website traffic rank, as compared to all other websites on the web (log scale)	-	-	3.14	16.19	14.41 (2.09)

2.2. Qualitative analysis

The analysis of quantitative data sheds light on the “which” and “what” questions concerning super apps (see RQ1 and RQ2). Qualitative data is considered more appropriate for answering the "why" and "how" questions (Eisenhardt and Graebner, 2007). As Eisenhardt (1989, p. 542) puts it, “qualitative data often provide a good understanding of the dynamics underlying the relationship, that is, the "why" of what is happening”. Hence, to understand why ride sharing platforms aim for a super app status (RQ3) and how they reach it (RQ4), I use a case study approach (Eisenhardt and Graebner, 2007) – a widely used method in qualitative research. Based on a purposeful sampling procedure, I select Uber for the case analysis because I consider it as the most instructive case for twofold reason. First, according to Crunchbase data, it is the largest ride sharing platform in terms of valuation ($82.4B), funding amount ($25.2B), and estimated revenue range ($10B), as well as the most popular in terms of monthly app downloads (18M+) and website visits (89M+). Second, the Uber case has been extensively studied in the scientific literature (e.g., Berger et al., 2018; Hall et al., 2018) and a wealth of available data is accessible from online sources (Table 3).

Table 3. Main online sources used in the case analysis.

Type	Source	URL
Press releases	Uber website	https://investor.uber.com/news-events/default.aspx
Financial reporting	Uber website	https://investor.uber.com/news-events/default.aspx
News blog	Uber website	https://www.uber.com/newsroom/news/
Social media	Uber Twitter account	https://twitter.com/Uber
Investment and funding information	Crunchbase	https://www.crunchbase.com/organization/uber
Newspaper	The Guardian	https://www.theguardian.com/news/2022/jul/10/uber-files-timeline-parisian-eureka-moment-global-domination
Newspaper	TheStreet	https://www.thestreet.com/technology/history-of-uber-15028611
Newspaper	Business Insider	https://www.businessinsider.com/ubers-history

The theoretical foundation for the case analysis is established on the Ansoff matrix (Ansoff, 1957), which provides a framework for firms' strategic growth. Ride sharing platforms, as core facilitators of transactions between previously unmatched demand-side and supply-side participants, primarily generate revenue through transaction fees. Hence, they require consistent and compelling growth in terms of user base and transaction volume (Täuscher and Laudien, 2018). Since their inception, numerous ride sharing platforms have indeed witnessed exponential growth. By examining the various growth strategies outlined in the Ansoff matrix (market penetration, market development, product development, diversification) (Ansoff, 1957), the case analysis aims to provide insights into the trajectory of ride sharing platforms evolving into super apps.

3. Results and discussion

3.1. Model results

Table 4 contains the model results including the average marginal effects (ME). Eight independent variables are included in the final regression model, of which all are statistically significant ($p < 0.10$). The McFadden Pseudo R-squared corresponds to 0.54. The predictive accuracy is 0.98, with the model correctly predicting all "0s" of the dependent variable and about 44% of "1s". Overall, I conclude that the predictive performance of the model is satisfactory.

Table 4. Model results.

Variable	Coefficient	Std. error	Ave. ME
(Constant)	2.1930	1.5880	
Age	-0.1539**	0.0720	-0.0065
NoPortfolioOrg	3.3778**	1.4177	0.1432
NoInvestments	-1.8619*	1.0077	-0.0789
NoLeadInvestments	-1.9431**	0.8964	-0.0824
NoExits	2.4571*	1.2790	0.1042
NoFundingRounds	0.2638***	0.0625	0.0112
TotEquityFunding	-0.2597**	0.1010	-0.0110
NoPatentsGranted	-0.0078**	0.0033	-0.0003
Log likelihood:	-30.36894 (df=9)		
McFadden Pseudo R-squared:	0.542220		
Correct predictions	0.9763158		

The interpretation of the coefficients of the independent variables follows below.

- *Age*: The negative coefficient indicates that rather young ride sharing platforms have reached the super app status. This suggests that platforms that adopt a super app strategy have been able to achieve instant growth from inception. One possible explanation for this result is that younger platforms have a greater need to differentiate themselves from established competitors and gain market share quickly. In addition, they might be more agile and adaptable than older platforms, which can make it easier for them to pivot towards a super app strategy and integrate new services and features into their platform.

- *NoPortfolioOrg*: Since super apps are active in multiple markets, it is not surprising that the total number of portfolio organizations has a positive impact on the super app status. Having a larger number of portfolio organizations can provide the platform with a competitive advantage by enabling it to negotiate better deals with partners and suppliers, which is very beneficial when pursuing a super app strategy.
- *NoInvestments*, *NoLeadInvestments*, *NoExits*: Interestingly, it is a higher number of exits, in combination with a lower number of investments and lead investments that contribute to the super app status. One possible explanation is that platforms pursuing a super app strategy aim for diversification and tend to be more active in non-related markets. Their business practices can therefore be considered more volatile and risk-taking, which includes trial and error. In contrast, a high number of investments combined with few exits could indicate a specialization strategy of firms without super app status. Having a larger number of investments and lead investments may also result in a more complex organizational structure, which can hinder the platform's ability to integrate new services and features into its platform and provide a seamless user experience.
- *NoFundingRounds*, *TotEquityFunding*: The positive coefficient of *NoFundingRounds* indicates that platforms that pursue a super app strategy are backed with a lot of funding and that they have a strong and dedicated investor base, which can provide strategic guidance, networking opportunities, and other resources. Less likely, however, is equity funding, where investors receive shares in the venture in return for their investment and the platform thus has more pressure to achieve short-term financial goals (e.g., profitability) and meet the investors' expectations. Instead, platforms adopting a super app strategy may choose to raise funds through alternative sources, such as debt financing, crowdfunding, grants, or secondary market transactions, which can offer greater autonomy and agility in decision-making.
- NoPatentsGranted: Although statistically significant, the total number of patents granted has a very low contribution to explain the super app status. Nevertheless, it is left in the model as a significant confounder.

3.2. Case study results

Uber initially launched its ride-hailing platform in 2010 in the San Francisco Bay area. The service has been introduced as a faster and more convenient alternative to conventional taxis, which can be hailed via a mobile app. Once the service was successful enough, Uber sought to expand into other cities across the country (Stummer et al., 2018), starting with New York City in May 2011. The subsequent roll-out in the US market is described in Berger et al. (2018) and Hall et al. (2018). Both studies found that Uber largely entered cities in population rank order, suggesting that market size (i.e., both available drivers and passengers) is the most important factor in the entry decision. This supports the assumption that platforms require a sufficient number of users and aim to reach a certain size through fast **market penetration**. Hall et al. (2018), accordingly, cited Uber executives as aiming to cover as much of the nation as soon as possible. Indeed, despite legal battles, fierce opposition by taxi drivers, and several allegations against its business practices (Watanabe et al., 2017), Uber diffused rapidly and was available in the fifty most populous metropolitan areas by 2015.

After establishing itself in its home market, Uber quickly turned its attention to international markets. Following a similar pattern to its domestic growth, it initially targeted major cities in Europe and later expanded to smaller urban areas (Hasselwander et al., 2022b). The company also capitalized on opportunities in populous urban regions of the Global South, despite lower income levels. Hasselwander et al. (2022b) attribute Uber's rapid international expansion to its highly replicable and scalable business model. Ride sharing gained popularity worldwide as a convenient transportation option, particularly in areas with inadequate public transit (Tirachini, 2020). However, while Uber entered many markets as a first-mover, it faced tough competition from local start-ups - especially in developing countries - hindering its scaling efforts. Additionally, stringent local regulations posed challenges to establishing ride sharing in some Global North countries like Germany, Denmark, and South Korea. As a result, Uber's growth potential through **market development** was limited, and the company even exited certain regions entirely, such as China and Southeast Asia.

As Uber's growth rate increased, its **product development** efforts accelerated (Watanabe et al., 2016). Initially, Uber offered services with luxury cars at a higher price compared to traditional taxis. However, in July 2012, it introduced the more affordable UberX service, utilizing lower-cost hybrid vehicles, and later expanded to include drivers' personal vehicles. Subsequently, Uber introduced various product developments, including UberXL (larger vehicles for up to 6 passengers), UberBLACK (luxury black cars with leather interiors), and UberGo (smaller, fuel-efficient vehicles). In August 2014, it announced UberPool, enabling passengers to share rides based on proximity. In April 2018, Uber acquired shared mobility provider JUMP, integrating shared bicycles and e-scooters into its platform. Hence - despite the potential threat of cannibalization - Uber expanded beyond its core ride sharing business to offer competing services for urban mobility purposes. This continuing expansion into other mobility services allows Uber to reach a broader customer base and achieve lock-in effects. According to Watanabe et al. (2016). The product development strategy it is part of the natural spin-off dynamics of digital platforms that is driven by people's preferences shift, ICT advancement, and paradigm change (Watanabe et al., 2016).

Uber's **diversification** efforts began in April 2014 when it launched Uber Rush, a parcel delivery service, and later introduced UberFRESH (later rebranded as UberEATS) in December 2014 as a food delivery service. These services marked Uber's expansion beyond transportation of people and represented horizontal extensions of its business. Notably, these services leveraged the existing platform infrastructure, and existing drivers could potentially serve both ride sharing and delivery services, known as multihoming. In October 2019, Uber ventured into vertical diversification with Uber Money, offering financial services to drivers, including instant access to earnings and a wallet for tracking financial transactions. Uber Travel, another newly integrated feature, enabled users to organize reservations for hotels, flights, and restaurants. To further capitalize on demand spillovers and enhanced lock-in effects (Li and Agarwal, 2017), it is anticipated that Uber will integrate similar complementary services in the future. Indeed, Uber officially announced its super app strategy in April 2022, emphasizing the consolidation of multiple services into a single platform (Fig. 1).

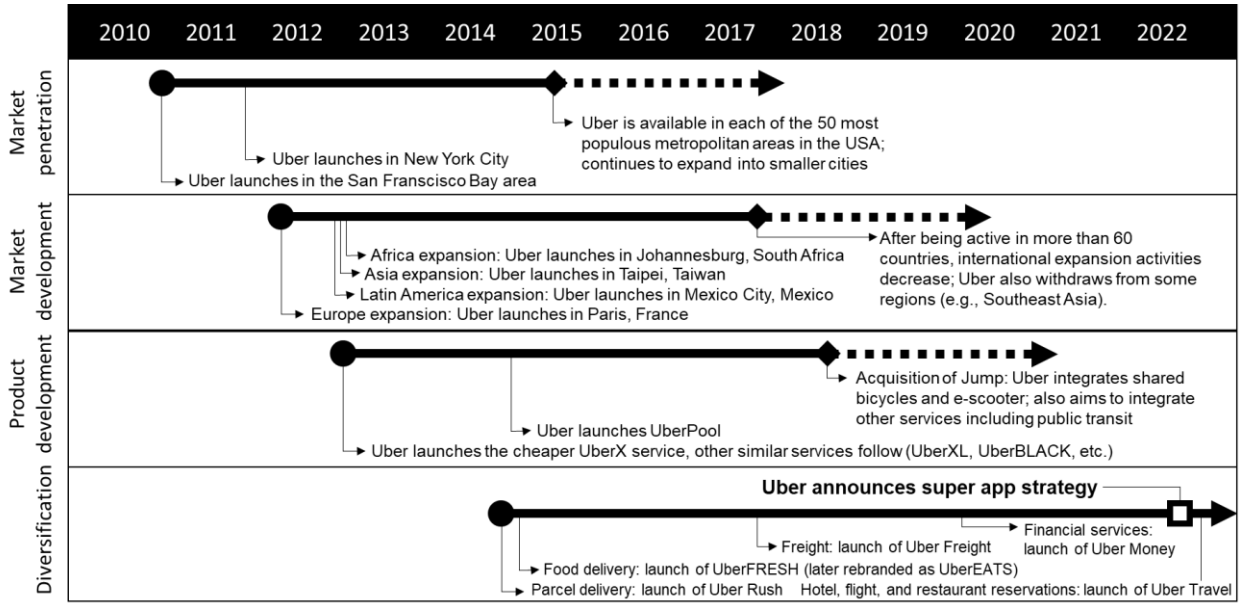

Fig. 1. Uber's growth strategies: the path towards a super app.

4. Conclusion

This study has analyzed the emergence of super apps in the mobility sector through regression and case analyses. The results of the regression model suggest that young, agile, and risk-taking firms are more likely to adopt a super app strategy, driven by the need to differentiate themselves and gain market share quickly. Additionally, having a larger number of portfolio organizations and a strong investor base positively influences the super app status. Seeking for continual growth, the case study of Uber exemplifies how ride sharing platforms develop into super apps through market penetration, market development, product development, and diversification.

These super apps provide an initial glimpse of the potential functionality that MaaF, as proposed by Hensher and Hietanen (2023), could embody. Considering the limited success of the first generation of MaaS in achieving meaningful changes in users' travel behavior, both public authorities and MaaS providers could indeed adopt a similar shift as ride sharing platforms towards a multi-service perspective that encompasses the integration of non-related services. If implemented correctly, this transformative shift has the potential to significantly enhance scalability, profitability, and sustainability, while aligning with social development goals.

Overall, the findings of this study contribute to a better understanding of the future trajectory of mobility and service provision. As super apps continue to shape the way people access mobility and other services, further research in this area will be essential to keep pace with this evolving phenomenon.

In particular, transportation scholars should focus on the willingness-to-pay (WTP) and preferences for MaaF services. Are mobility services being valued more when offered together with unrelated services in the same app? Which services do users in which combination demand? Does the integration of new services have a positive effect on the use of other complementary services in the same app?

Finally, future research should also explore the potential of "MaaF bundles". This involves going beyond the integration of mobility services with unrelated offerings and instead focusing on bundling these services into diverse subscription plans. By creating comprehensive packages that combine various everyday services, MaaF can offer users a more integrated and customizable experience that aligns with their individual needs and

preferences. Understanding the possibilities and implications of such bundled subscription plans can contribute to the development of more inclusive and user-centric mobility ecosystems that provide holistic solutions for urban transportation challenges.

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