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Case study on the use and adaptation of SEAT MÓ motorbike sharing service in Barcelona in COVID-19 pandemic year

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ABSTRACT

Worldwide, cities are combating the negative impacts of extensive private motorised vehicle travels and are thus striving to accelerate a shift towards the predominant use of sustainable mobility options. Thereby, shared mobility services are emerging transportation modes, which opt as a complementary mean of transport in urban cities. Amid the current advancements of shared mobility services, the SARS-CoV-2 pandemic accelerated an immense shift in consumer demand and preferences, consequently posing new challenges. In this instance, the testing and validation of implementable hygienic measures has become a key factor for service providers to continuously ensure an increase in clientele. Hence, this research aims to identify the service factors required to accelerate the use of shared micromobility, thereby setting strong focus on hygienic measures. The aforementioned is fulfilled by the means of a quantitative study. Results have indicated an interest in hygiene; however, respondents’ main requirements lie in factors that are not particular to the service provider.

1. Introduction

In recent years, shared mobility services have generated a growing interest and demand, which has resulted in a rapid geographical and business model expansion (Gilibert & Ribas, 2019). These services offer users the convenience of a private vehicle, yet greater flexibility than public transportation, making them an accessible, alternative mean of transport. Despite their popularity and rapid integration within transport networks, COVID-19 interrupted the market’s growth, accelerating an immense shift in consumer demand. Thereby, the world was put to a halt in a matter of days, causing uncertainty, jeopardizing businesses and financial viability, sparking job losses and salary cuts, yet creating opportunities to adapt, grow and rethink (Hossain, 2021).

Electric free-floating motorcycle sharing services (commonly referred to as e-moped and e-scooter shared services, or e-motosharing services), as well as other services such as e-kick scooter sharing and e-bikesharing, have demonstrated an ideal approach to complement personal mobility in dense cities. Furthermore, cities are keen on promoting and encouraging these types of on-demand sustainable means of transport. Services’ mobile application enables individuals to locate a nearby vehicle and claim it for use. Once the desired destination has been reached, the vehicle is dropped off in the designed station or public area where parking is permitted (within the providers’ operation area), without having to worry about parking accessibility or alternating routes to source a designated charging infrastructure, since the providers of the sharing services are responsible for the charging of the vehicles.

Aguilera-García et al. (2020) ascertained that motosharing is primarily used due to its simple parking (dropping-off) system and the flexibility it offers when driving within the city. Also, the service is favoured for leisure purposes, to go to areas which are not easily accessible by private vehicles (i.e. city centres), and for trips with a maximum duration of 10 to 15 min. In addition, the analysis revealed that users are keen on a reduction of current fares, an expansion of the service area, and concretely frequent users would particularly value an improvement of helmet-related issues, which includes having enough hygienic caps. This research did not consider other user requirements that are particularly relevant at the time of the COVID-19 pandemic, such as cleaning and disinfecting seats, handlebars and grips.

As of 2018, Spain disposed of the largest deployment of motorcycle sharing services with approximately 9,000 vehicles spread across 11 cities (Aguilera-García et al., 2020). By the end of 2020, Spain counted a total of 23,000 motorbikes to share, the world’s second largest fleet, only surpassed by India with 25,000 motorbikes (Howe & Jakobsen, 2020).

Despite urban motorbike sharing services being a sustainable
Among passengers and the reduced spending on transportation pose a major challenge for the future of travelling behaviour. For instance, mobility players had to suspend their services (McKinsey & Company, 2020), service providers are facing usability issues. Furthermore, shared mobility services as well as other transport services have experienced a decrease in demand due to the pandemic mobility restrictions. In addition, the pandemic has accelerated a shift in consumer behaviour and long-standing habits have been altered to align with hygienic measures and precautions. According to McKinsey & Company (2020a), the main reasons for choosing a mode of transport before COVID-19 were time to destination, convenience, price, space and privacy, and avoidance of congestion, whereas today avoiding the risk of infection is the primary concern. Shokouhyar et al. (2021) has identified that the lack of trust among passengers and the reduced spending on transportation pose a major challenge for the future of travelling behaviour. For instance, throughout the first months of the pandemic ride-hailing services’ demand declined by 70%, whilst a number of carpooling and micro-mobility players had to suspend their services (McKinsey & Company, 2020b). However, consumers are likely to take back on using multiple means of transport, while the micromobility market consolidates.

To address urban mobility challenges posed by the pandemic, the EIT Urban Mobility1 launched a crisis response call, which funded, among others, the project named “COVID Adapted Motosharing Services”2. The project aimed to prove that a convenient and safe use of sharing services can be provided, without the requirement of users needing to take additional safety precautions. Within this framework, a fleet of 632 SEAT MÒ electric motorbikes was launched between August and September 2020 and was used to pioneer the hygiene solution Liquid Guard®,3 which according to its manufacturer, permanently protects users against viruses (including COVID-19) and bacteria.

In defiance of the decrease in user engagement, the increasing operational costs due to sanitation expenses and the decrease in revenue, free-floating motorbike sharing has a chance of persevering. However, a limited amount of research has been conducted to date. Thereupon, this research aims to provide the key findings to accelerate the service design of shared micromobility. These include users’ importance valuation of hygiene (i.e. measures to prevent the virus spreading) in comparison to other service factors, the awareness and confidence of permanent hygienic solutions, and respondents’ current mobility patterns and requirements.

The rest of the paper is organised as follows: the second section outlines the methodology utilised throughout the research process and provides an overview of the case study, the third section presents the results, and the fourth section encompasses the derived conclusions.

2. Case study and methodology

Within the framework of the project “COVID Adapted Motosharing Services”, a pilot application and study of a permanent hygienic protection for the SEAT MÒ motosharing fleet was conducted and analysed. The project kicked-off on the 1st of July 2020 and ended on the 31st of December 2020. The service operates in Barcelona, which is the second largest city in Spain, with a population of 1,664,182 inhabitants and an area coverage of 101.35 square kilometres (Statistical Institute of Catalonia, 2020). In addition, Barcelona is the city with the highest vehicle density in Europe (Barcelona City Council, 2021) and, in terms of population density amongst cities with more than one million inhabitants, it is placed second after Paris (Eurostat, 2016). Furthermore, it has the highest number of motorbikes per inhabitant in Europe and it is ranked second behind Rome in regards to the absolute number of registered motorbikes (Albalate & Fernández-Villadangos, 2010).

On a working day, prior to the pandemic, 54% of Barcelona’s inhabitants travelled by bike, foot or other means of active transport, 28% utilised public transport, and the remaining 18% used their private motorised vehicles (IERMB, 2019). In March 2020, public transportation experienced a 90% decline in demand, however slowly endured a steady demand increase as of May 2020 (Barcelona City Council, 2020a). The city is comprised of an extensive public transport network, including the underground, which covers Barcelona and its surrounding suburbs, the city bus, tramway, taxi services, commuter trains and buses. In addition, shared mobility services are at inhabitants’ disposal. These include station-based and free-floating bikesharing, station-based carsharing, and free-floating electric motorcycle sharing. The free-floating bike and motosharing services were regulated in May 2020, respectively granting 3,975 and 6,958 licences (Barcelona City Council, 2020b). The granted operators, including SEAT MÒ, were obliged to kick-off their service within the upcoming 60 days. Fig. 1 comprises of the indication of the entire motosharing operating in the city (indicated on the left), and only the SEAT MÒ fleet (indicated on the right) within the pre-determined service area. There is a total of 10 motosharing providers operating in Barcelona, to this date.

The SEAT MÒ motosharing service is accessible to the general public, functions as a pay-per-use service, and was Spain’s first micromobility provider to pilot a permanent hygienic solution to its entire fleet and accessories. The accelerated shift towards decreased mobility utilisation and the fear of contamination, counteracted the aforementioned and enabled SEAT MÒ to operate, whilst making an effort to condemn the spread of the virus.

To identify implementable service improvements and to attain a broad understanding of the percentile awareness of SEAT MÒ’s measures to condemn the spread of COVID-19 (Liquid Guard®), the confidence it gives users and the importance of the implemented hygienic measures, a questionnaire, consisting of 18 questions, was sent out via email. The survey was solely sent to registered users of SEAT MÒ and had accepted the option of receiving marketing communications. The quantitative study was conducted from the 1st until the 3rd of December 2020. It was broken down into the following five sections: the first set focuses on classification questions, including the survey respondents’ gender, age, private vehicle disposability (car and/or motorcycle) and their current work situation; the second questioned participants’ travelling preferences and behaviour; the third entailed participants’ general use of vehicle sharing services and asked participants about their frequency of use; the fourth focused on the user requirements; and the fifth questioned participants’ awareness of Liquid Guard®, their antiviral measure preferences, and their level of confidence knowing that the motorbikes were treated with the virus and bacteria repellent coating. Questions of the second, third and fourth sections were multiple choice.

3. Analysis of results

In this section, the derived results of the quantitative study are analysed. Firstly, the respondents’ profile is presented. Secondly, participants’ mobility patterns are explored. Thereby, respondents used means of transport for private use and commutes are considered. Thirdly, the use of shared mobility is explored. Then, the key service factors are examined. Lastly, the main findings of the awareness and confidence of Liquid Guard® are evaluated.

3.1. Participants’ profile

The respondents’ profile is shown in Table 1. A total of 210 individuals participated in the quantitative online study. The majority of the participants are male (82%), which corresponds with the high predominance of men being users of motorcycles; between the age of 35 and

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1 https://www.eiturbannmobility.eu
2 https://www.eiturbannmobility.eu/projects/covid-adapted-motosharing-services
3 https://www.liquidguard.de
SEAT MÓ users must be above the age of 18 and, unlike other services, hold an A1 driving permit or a 3-year old car driving license—living in Barcelona (88%), since at the time of data collection SEAT MÓ solely operated in Barcelona; and employed (86%)—in comparison to the prices of Barcelona’s public transport (2.40 € per ride) or public bike-sharing service, SEAT MÓ users pay the highest percentile price (0.26 € per minute). Furthermore, 35% of the participants have a car and a motorbike at their disposal, 44% are owners of either a motorbike or a car, and 21% have neither at their disposal. In that instance, SEAT MÓ opts as an ideal complementary mean of transport.

### 3.2. Participants’ mobility patterns

Participants’ use of different means of transport for ‘private use’ and ‘commutes to work/study’ are shown in Fig. 2. In this study, ‘private use’ refers to the trips that are pursued alone within the city for non-working and non-studying related purposes, whilst ‘commutes to work/study’ refers to the commutes that usually take place from Monday to Friday and are solely pursued to get to and from work or study facilities. The analysis of respondents’ commuting behaviour is based on 189 responses. Thereby, 21 of the 210 total participants do not commute.

The analysis shows that the most favoured mode of transport for both commuting and private use trips is motorbike sharing, meaning that this type of service is the preferred choice among motosharing users—all respondents are registered users of SEAT MÓ, therefore this result cannot be extrapolated to the entire city population. Furthermore, this preference rate might correspond to the enabled avoidance of traffic congestions, the cost of travelling alone in a private motorised vehicle, the difficulties of finding a parking space, and the high average duration of travel. Additionally, this mode of transport could be considered as more infection-safe in comparison to public transport. On the other hand, the 29% decline between private use and commutes is possibly due to frequency of use, since inhabitants are still not relying on a shared mobility transport for a daily usage, and the non-compatibility with longer commuting durations—at the time of the survey, motorbike sharing services only operated within the city (Fig. 1)—. However, in cases where the workplace is located outside the city, motosharing could be used as a complementary feeder service to public transportation. In this regard, it is noted that users of shared mobility services take more public transport than non-users. Likewise, public transport customers use more shared mobility services.

For private use, the utilisation of motosharing is followed by the use of the underground (41%), the own motorbike (31%), and the bus (30%). The privately-owned car is only at 25%. Notice that these results come from a multiple choice question and that ‘private use’ usually entails trips of shorter duration than commuting, wherefore the privately-owned car might not be the most efficient and cost-effective means of transport for travelling alone within the city.

With reference to the commuting use, motosharing is followed by the own car (34%), the own motorbike (30%), the underground (29%), and the bus (24%). As in the private use, these use rates suggest a multi-modal behaviour.

Despite the implementation of hygienic concepts in all transport
means, COVID-19 accelerated a shift in preferences, mind-sets and precautions. Individuals only pursued commutes and travels that were necessary, whilst the avoidance of crowded public transportation was of high importance for many. Thereby, the use of SEAT MÔ and other motosharing providers displayed an ideal solution. Correspondingly, making the service compatible with individuals commuting habits would enforce an according increase in utilisation.

3.3. Experience with the SEAT MÔ service

To identify respondents’ experience with shared mobility services, the survey questioned participants’ general use of vehicle sharing services based on two usage frequency options: have used at least once and used within the last 30 days. Respondents’ utilisation of the different shared mobility services available in Barcelona is shown in Fig. 3.

The graph entails Barcelona’s motosharing (SEAT MÔ, eCooltra, Acciona, Avant, Cityscoot, Gecco, Iberscot, Movo, OIZ, Tucycle and Yego), bikesharing (Bicing, Bolt and Donkey Republic), carsharing (Ubeeqo and SocialCar) and ridesharing services (BlaBlaCar). In all cases, respondents have indicated a higher frequency of the use case ‘have used at least once’.

The majority (78%) of the respondents have driven a SEAT MÔ at least once, whilst 63% have used the service within the last 30 days. In addition, respondents indicate a higher utilisation of motosharing than other mobility services. Moreover, the derived results indicate a high usage of the motosharing providers eCooltra and Acciona. 71% of the respondents have ridden an eCooltra vehicle at least once, and 41% have made use of it within the last 30 days. Acciona has been utilised at least once by 64% of the survey participants, and 47% within the last 30 days. The motosharing providers eCooltra and Acciona were among the first to operate in Barcelona (prior to the municipality’s implementation of a licensing process), thereupon they are among the most popular.

Concerning the other mobility services available in the city, 34% of the respondents have ridden a Bicing bike at least once, whilst only 14%
have used it within the last 30 days. This makes it respondents second favoured shared mobility service. Bicing is the city’s public shared mobility service, wherefore it is the most known and cost-effective. Moreover, 20% of the respondents have used Ubeeqo’s carsharing service and 17% BlaBlaCar’s ridesharing service at least once, whilst 10% of the respondents have used Ubeeqo within the last 30 days. The low use of carsharing is mainly due to Barcelona’s regulation. Currently, carsharing cannot operate as a free-floating service, wherefore it does not opt as a complementary mobility option for travelling within the city. Furthermore, 69% of the survey respondents have a car at their disposal, accordingly there is a low likelihood of respondents needing to rent or share one.

With focus on the use of SEAT MÖ, 6% of respondents use the service almost daily or on a daily basis, 16% more than once per week, 34% one to four times per month, and the remaining 44% use the service less than once per month. Thereby, 42% of the respondents drive a SEAT MÖ motorcycle throughout the whole week, disregarding the day of the week, 35% use it only during the week and 23% only on the weekend.

With the aim of identifying the use intention of SEAT MÖ, participants were questioned on their utilisation purpose (Fig. 4). 49% of the survey participants would use SEAT MÖ for commuting to work or study, 26% for leisure (going out and/or to come home after going out) and 16% for shopping purposes. Only 4% of the respondents would take the shared motorbike to get to or from a public transport station.

3.4. User requirements

To identify the hypothetical improvements that would increase customers’ utilisation frequency of the SEAT MÖ motosharing, several service factors were evaluated on a scale from zero to five (zero being the least important and five being the most important). As shown in Fig. 5, the most valued factor is availability, which is closely followed by an easy use of the application, the proximity of the vehicle, the price, the cleanliness and hygiene. The first three requirements ensure distinctive time efficiency and flexibility, whereas the following three are related to affordability and disinfection. Least valued are the aspects which are particular to the service provider reputation; the integration with other means of transport –suitable for users who would use SEAT MÖ as a complementary feeder service;– and the aesthetic of the vehicle. The low valuation of these factors, which are distinctive to the different service providers, questions whether the acquisition of a frequent and loyal customer base is possible.

Concerning the proximity of the vehicle, 42% of the participants would be willing to walk up to 2 min to access the service, 44% up to 5 min, and 8% up to 10 min. Comparatively, 6% would choose another mobility service as opposed to walking to access a motorbike. The comparison indicates that the majority (86%) of individuals would be willing to walk between 2 and 5 min, which concludes that motorcycles should be distributed demand-accordingly, but accessible within approximately 400 m.

3.5. Liquid Guard®

To reduce the contamination of COVID-19 among users, shared mobility services have implemented a variety of hygienic measures. Thereby, most of the motorbike sharing companies introduced a variety of measures including the frequent sanitisation of helmets and vehicles, the providing of cleaning kits and sanitary towels, the frequent renewal of helmets, and the removal of integrated visors from helmets. Furthermore, users are recommended to use their own helmets and gloves, in case they have these at their disposal. SEAT MÖ, on the other hand, has implemented and tested the nanotechnological solution Liquid Guard®, as opposed to enforcing measures that require constant renewal.

To identify the type of hygienic measures that users prefer, survey participants were asked to choose between ‘Have hygienic measures such as hydro-alcoholic towels’ and ‘That the vehicle and accessories are protected against viruses and bacteria’. The derived results are displayed in Fig. 6. The comparison indicates a relatively even distribution of preferences, however, shows a slight tendency towards ‘Vehicle and accessories are protected against viruses and bacteria’ (38%). 27% solely prefer to have hygienic measures such as hydro-alcoholic towels and the remaining 35% prefer the implementation of both measures. Overall, this concludes that SEAT MÖ users are keen on the implementation of hygienic measures, however, are not specific of the type of measures implemented. In the long run, these results question whether the enforcement of a permanent hygienic measure is necessary.

In addition, 87% of the respondents’ state that their level of confidence increases knowing that Liquid Guard® is applied. However, only 28% of them indicate an awareness of the Liquid Guard® application, despite the implementation of an intensive marketing campaign. Thereby, the entire fleet was equipped with a “NO COVID-19” sticker and facilitated a QR code (see Fig. 7), which enabled the access to the project’s website and entailed an explanation of the implemented hygienic measure.

4. Discussion and conclusions

This paper analyses the case study of the SEAT motosharing service in Barcelona in a pandemic context, to broadly understand the usage and user requirements of motorbike sharing services, which are fairly new and barely studied, to improve this type of services, accelerate its usage, and asses the need for hygienic measures.

The main findings pertain to a high use of motosharing for private trips and commutes. Motorbike sharing has proven idealness for one-way and time-efficient short trips, whereby the pursuance of occasional and improvised private trips is enabled. While the interest of utilising motosharing for commuting is of great interest, the prioritisation of the service integration with public transportation, which would
represent a move towards Mobility as a Service (MaaS), enable longer commutes, and result in a higher demand and utilisation frequency, is momentarily the penultimate factor in level of importance.

The assessment of service factors indicate a high valuation of availability, an easy use of the application, the proximity of the vehicle, and the price. These findings signify that respondents’ main interests lie in factors that are non-specific to the different service providers. Therefore, these results conclude a low differentiation valuation between competitors (most of the respondents are registered clients of at least two motosharing providers) and question whether the acquisition of a frequent customer base is possible. And although cleanliness and hygiene are not the main priorities, they are still of high importance. Concretely, almost all the respondents’ have indicated an increase in confidence knowing that the Liquid Guard® protection is applied. However, only approximately a quarter of the interviewees were aware that Liquid Guard® was applied to the SEAT MÒ fleet, which might correlate to the type of service use, i.e. for an improvised use and/or shorter durations, users are less likely to inform themselves on the providers’ implemented hygienic measures. Hence, the longevity of the service factor must be taken into consideration, as the importance valuation of hygienic measures is likely to lose importance, once back to normal. Additionally, CDC (2020) indicates that the risk of COVID-19 infection via a contaminated surface is less than 1 in 10,000.

On the other hand, the appliance process for the renewal of Liquid Guard® has shown various limitations. The solution requires a six-hour soaking-in duration, whereby the surface is not allowed to be touched and the process is ideally proceeded in a closed environment. The initial appliance process was enabled hassle-free, as recommended circumstances could be ensured. However, once the fleet is distributed...
throughout Barcelona, the process of reapplying the product is costly and time demanding. Moreover, it is difficult to ensure that nobody will touch the vehicles’ surface during the required timeframe. External weathering poses a further limitation, as this is a non-controllable variable. Hence, for the reapplication of Liquid Guard® to a fleet of free-floating micromobility vehicles, the operator should take, during several nights or off-peak hours, some motorbikes each time to the garage, clean them, apply the solution, and then put them back on the streets in the morning.

Hence, it is questionable whether the application accumulates the wanted cost-benefits for the services’ operators. Although Liquid Guard® has demonstrated to be a good safety enhancement element, the absence of surface contamination as a risk, that users rate the different protections similarly, and the high cost of application, leads operators to opt for lower-cost measures such as having hydroalcoholic towels available.

Finally, it should be noted that this study was conducted through an online survey answered by SEAT MÒ motosharing users. Thus, the following limitations apply:

- The survey was solely sent to registered users of SEAT MÒ. The identified mobility patterns are therefore not applicable to the entire population of Barcelona but correspond predominantly to the preferences of motosharing users (not only SEAT MÒ, since, as shown in Fig. 3, SEAT MÒ users are also customers of other motosharing services).
- The study was solely conducted in Barcelona. The city comprises of a well-established public transportation network, free-floating motosharing and bicycle service providers.
- The accelerated shift in mobility preferences and behaviour as a result of COVID-19. Respondents are less likely to travel in general for the fear of infection, going out at night due to governmental regulations, and to commute frequently, given remote working models.

In essence, the thorough analysis has implied a relative importance valuation of the implementation of permanent hygienic measures against SARS-CoV-2. The aforementioned is undermined by the ascertaining of relevant service factors. Thereby, availability, an easy use of the application, vehicle proximity and the price have been found to be factors, which could accelerate the use of these type of services. In addition, an interest in commutes has been identified, however, users do not show an interest in the facilitation of compatibility with other means of transport.

Author contributions

Dr. Mireia Gilibert: Conceived and designed the analysis, Collect the data, Performed the analysis, Wrote the paper, Review the manuscript. Antonia Weymar: Performed the analysis, Wrote the paper.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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