THE DIGNITY PROJECT- TOWARD A SYSTEM OF INCLUSIVE DIGITAL MOBILITY IN THE BARCELONA METROPOLITAN AREA

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ABSTRACT

Recent developments in the transport and mobility sectors are radically altering mobility patterns; these include digitization, smart mobility applications, and local digital services, which offer a wide range of innovations that are adaptable to rapidly-evolving lifestyles. However, many services currently are offered as an "online" mode or incorporate digital elements, and the lack of adequate digital literacy or of specific competencies / skills can be expected to generate situations of exclusion.

The DIGNITY project (https://www.dignity-project.eu/), a European initiative in the European Union's H2020 framework, aims to promote an ecosystem of digital mobility services that is sustainable, integrated, and user-friendly, and which improves accessibility, social inclusion, daily mobility experiences, and everyday life of all residents. The project selected four pilot studies in five EU countries (Spain, Italy, Belgium, the Netherlands, and Germany) for their innovative proposals in sustainable and inclusive mobility. The case studies apply the DIGNITY approach, which is based on conducting workshops, interviews, and surveys.

Here, we specifically address the study based in Barcelona, which is at the forefront in smart urban transformation. The digital divide in mobility in the Barcelona Metropolitan Area was evaluated using a mixed approach of combining literature review with a quantitative survey. The results reveal the needs and perceptions of people about local mobility, as well as the gaps in the use of technology products and services.

1. INTRODUCTION

Digital transformation has a great impact on the daily lives of people. Public products and services are becoming more interactive and are being increasingly offered online. Nevertheless, some groups in society do not fully benefit from the opportunities of digitization (Loos, E. et al., 2020; Groth, S., 2019), (for instance, women, people who are older or have functional impairments, low education, low income, as well as short-term migrants and ethnic minorities) and are more likely to be excluded from many services and facilities (Durand, A. and Zijlstra, T., 2020).

In the transport and mobility sector, advances such as digitalization, availability of smart applications, and locally-based digital services are disruptive for mobility patterns and offer a range of mobility innovations that respond to rapid changes in lifestyles. New mobility concepts can include a wide variety of elements, such as novel products, data-based processes, and services inspired by new transport dynamics (e.g., mobility-as-a-service [MaaS] and on-demand public transport), as well as new business models, such as pay-as-you-go. However, technology has not yet contributed to universal access, as most of the new transportation technologies have more greatly benefited a specific demographic: urban, young, tech-savvy, and usually well-off (Vandycke, N., 2018).

Therefore, commuting and mobility produces new challenges for the political agendas and the development of the public and private sectors, with a strong presence of information and communication technologies. In this context, synergies appear that can produce social exclusion in the field of mobility and the use of new technologies. More and more studies are examining the digital divide and transport poverty in greater depth; even so, the growing relationship between mobility and the use of new technologies, as well as the tendencies of governments and companies to move towards digitization, require further studies that relate the two concepts and give a precise overview of social exclusion and situations of inequality that are being generated in this area.

2. THE OPPORTUNITY OF THE DIGNITY PROJECT

The DIGNITY project (DIGital traNsport In and for socieTY; https://www.dignity-project.eu/) is a European initiative funded by the European Union's Horizon 2020 Program. DIGNITY aims to contribute to the development of a transport system that is inclusive, digital, and interconnected, and that meets the needs of all residents. The project has fourteen partners from six European countries.

The overall objective of DIGNITY is to foster a sustainable, integrated, and user-friendly digital travel ecosystem that improves accessibility, social inclusion, travel experiences, and daily life of all inhabitants.

The project thoroughly examines the digital mobility ecosystem to understand the full range of factors that could lead to disparities in the adoption of digitized solutions for different user groups in Europe. The idea is to support public and private mobility providers in their conception of general digital products or services, to make these accessible and usable by the largest possible number of people, regardless of their income, location, social or health situation, or age. Further, results from DIGNITY should help policymakers formulate long-term strategies that promote innovation in transportation while responding to global social, demographic, and economic changes, including the challenges of poverty and migration. Four case studies on implementing inclusive mobility solutions have been selected as pilot projects, based on their ambition of working towards these types of solutions: Ancona (Italy); Barcelona (Spain); Flanders (Belgium), and Tilburg (the Netherlands) (for more information on DIGNITY pilot projects, see https://www.dignity-project.eu/pilots/).

This article is specifically based on the case study of the Barcelona Metropolitan Area (*Àrea Metropolitana de Barcelona*, AMB). The objectives are to: i) characterize the context of digital exclusion with respect to mobility in the AMB, and ii) to understand the patterns of use of digital technologies by residents for their daily mobility.

3. METHODS

The proposed objectives of this study are based on i) a bibliographic review collected in an academic study of a Master's thesis (Bella, R., 2020), as its considerations and recommendations advance the knowledge of the current situation in the field of study; and ii) the preliminary results of a quantitative survey carried out in November and December, 2020.

The fieldwork of collecting interviews was entrusted to the GESOP Institute (*Gabinet d'Estudis Socials i Opinió Pública*, Cabinet of Social Studies and Public Opinion) of Barcelona. The questionnaire with 96-questions/variables is divided into eight parts, each of which addresses specific issues related to mobility and technologies and includes several questions and variables, such as: access to and use of technology; technology for public transportation; general computer and mobile device activities; attitudes toward technology, technology symbols, and interfaces; personal abilities / skills; demographics; and specific questions about daily mobility. The work presented here is mainly focused on specific topics of the survey:

- Technology access and use: related to the access to and frequency of use of different devices;
- Technology for public transport: addresses issues related to the use of digital public transport services;

- Demographics: describes characteristics of the population (e.g., social, educational, residential, etc.);
- Questions about daily mobility.

Although two subsamples were defined (one for the city of Barcelona, and the other for the remaining metropolitan area), this article only presents grouped data. Interviews were stratified by district, and the potential interviewees were selected randomly after taking into account gender, age, and nationality quotas.

4. RESULTS AND ANALYSIS

The bibliographic analysis (Bella, R., 2020), provides essential information to understanding the context of the digitization of mobility in the AMB. The population of Barcelona is uniquely situated with respect to the use of digital tools. In the comparison of the Digital Economy and Society Index (DESI) regarding internet access, use, and connectivity, the city of Barcelona is positioned among the European leaders, well above the average for Europe, Spain, and Catalonia (DESI, 2019). Despite this evaluation, an analysis of the aspects of i) mobility and social exclusion; ii) digital divide; and iii) digital exclusion detects groups that are of special interest due to their vulnerability and/or discrimination:

- Women;
- Older people (e.g., ≥65 years old);
- Individuals who are unemployed, retired, or exclusively dedicated to unpaid household work;
- People with lower levels of education;
- Individuals with high degrees of functional impairment and wheelchair users.

Residents who belong to one (or more) of these groups are seen to have a higher risk of social exclusion in terms of mobility.

The results of the survey highlight interesting characteristics in the use of digital technologies and mobility services, as well as the main limitations and concerns of the main groups analyzed in the Barcelona metropolitan area.

The information on the use of digital technologies in mobility, with respect to the different groups identified as vulnerable, is shown in Figure 1. The importance of using of digital services to find travel information is noteworthy. In general, a considerable percentage of the population (82.2%) uses digital sources to find travel information with women using them slightly less (80.1%). On the other hand, the groups with the lowest educational levels and the older population are the ones that are less likely to use these methods to gather information when planning a trip (62.7% and 56.3%, respectively).

Among older people, there is a higher distrust in the use of digital services for trip planning; approximately one out of three older people feels insecure about planning a trip on public transport using a mobile phone. Furthermore, about 60% of people with a lower level of education experienced similar limitations. A much higher level of trust was observed for the group of women (71.5%). In total, around 75% of the population feels quite confident in using a smartphone to plan a trip. The remaining 25% include people who have access to digital technologies but do not feel comfortable using them, which may lead to exclusion from mobility.

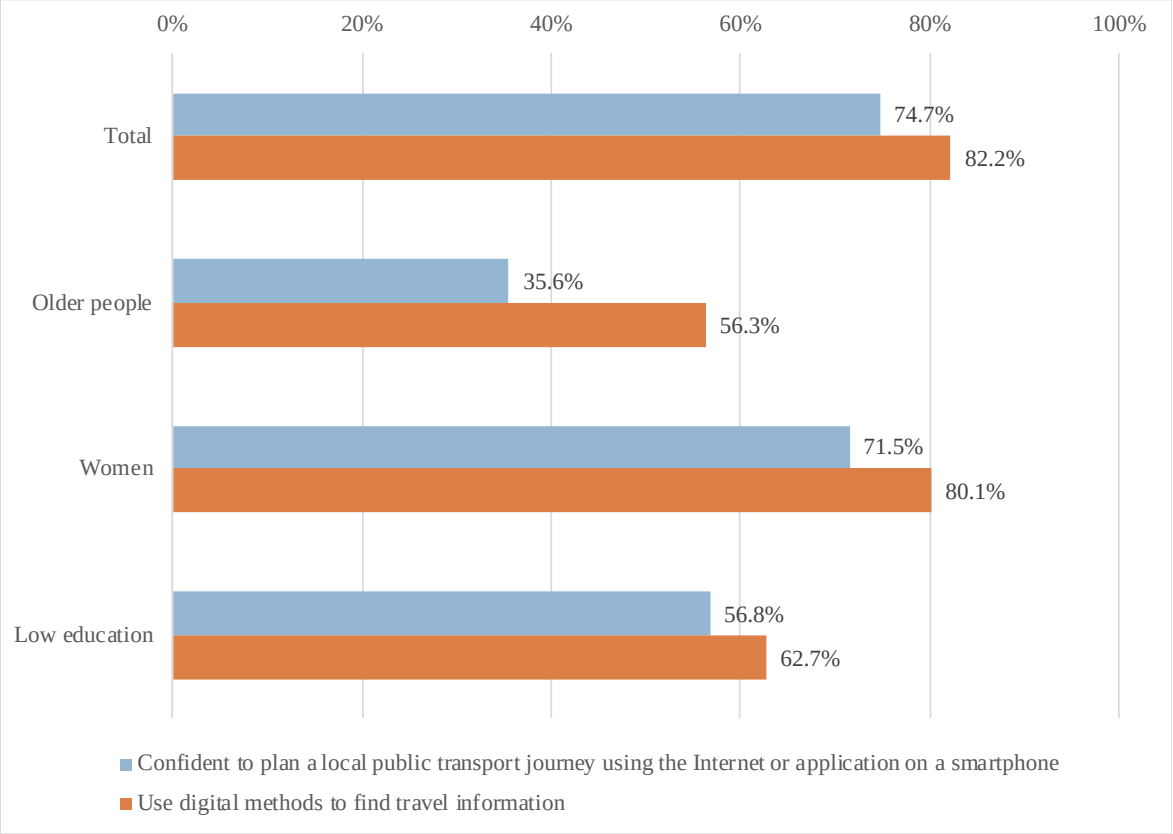

Figure 1. Use of technology for digitally-supported mobility, separated by groups identified as vulnerable

The use of digital transport services by each vulnerable group (Figure 2) revealed that, in general, the percentage of use among all groups is low. The highest percentages are for digital payment for parking and mobile taxi booking. The use of carpooling, carsharing or on-street scooter/motorbike hire services is very low, which shows that these new forms of shared transport remain unpopular among the general population.

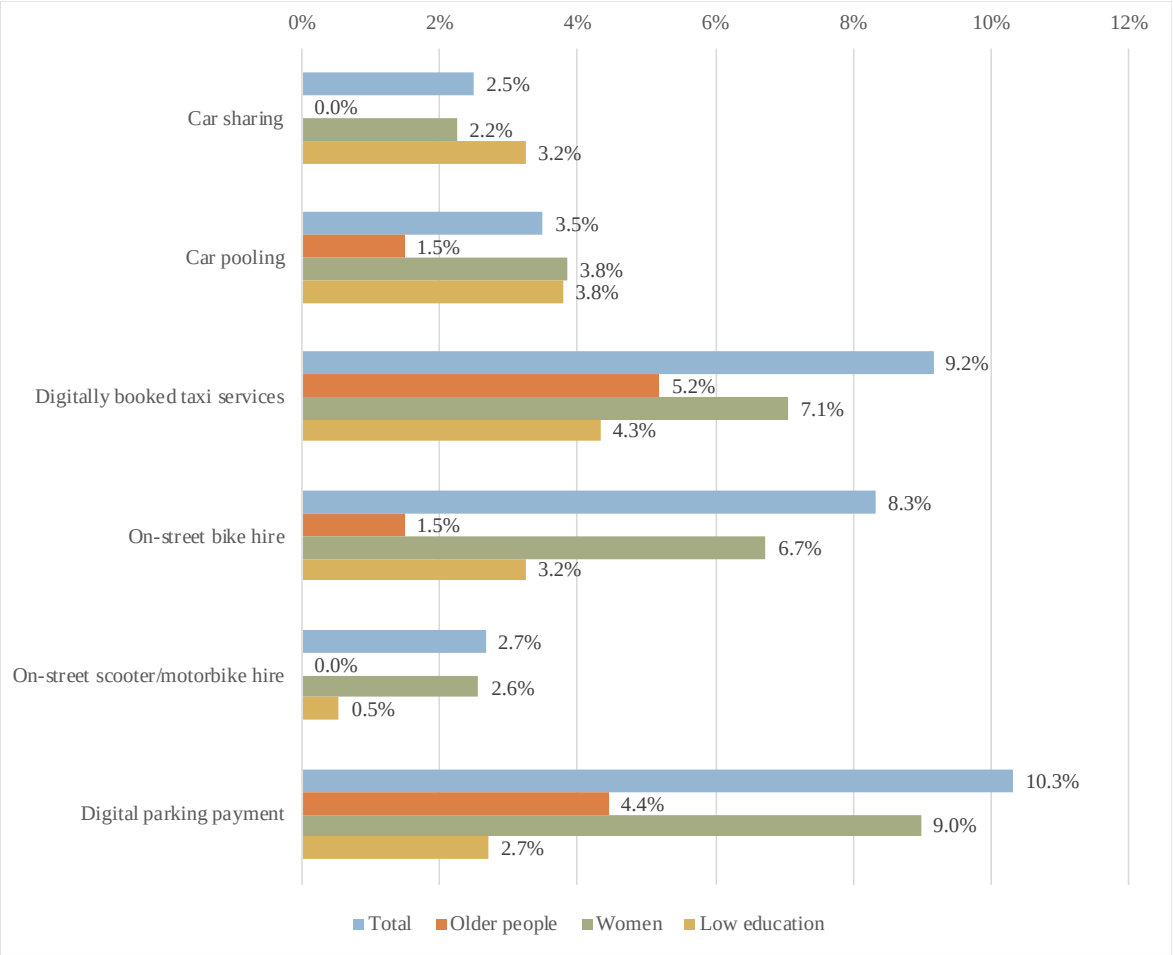

Figure 2. Use of digital transport services per group identified as vulnerable in the past three months (at the time of questionnaire)

Figure 3 analyzes the perceived limitations in regular mobility among the different groups identified as vulnerable. In general, more than 50% of the responses indicate that no particular limitations on mobility are perceived. Of the perceived limitations, safety is among the most important, with a higher percentage of women (50%) and older people (48.1%) perceiving this as a limitation. The cost of transport represents the second-most perceived limitation, cited as the most important one for the groups of the women (47.4%) and the one with the lowest education level (47.0%). Limitations due to lack of digital knowledge are currently less important, although more significant in the case of older and lower-income people.

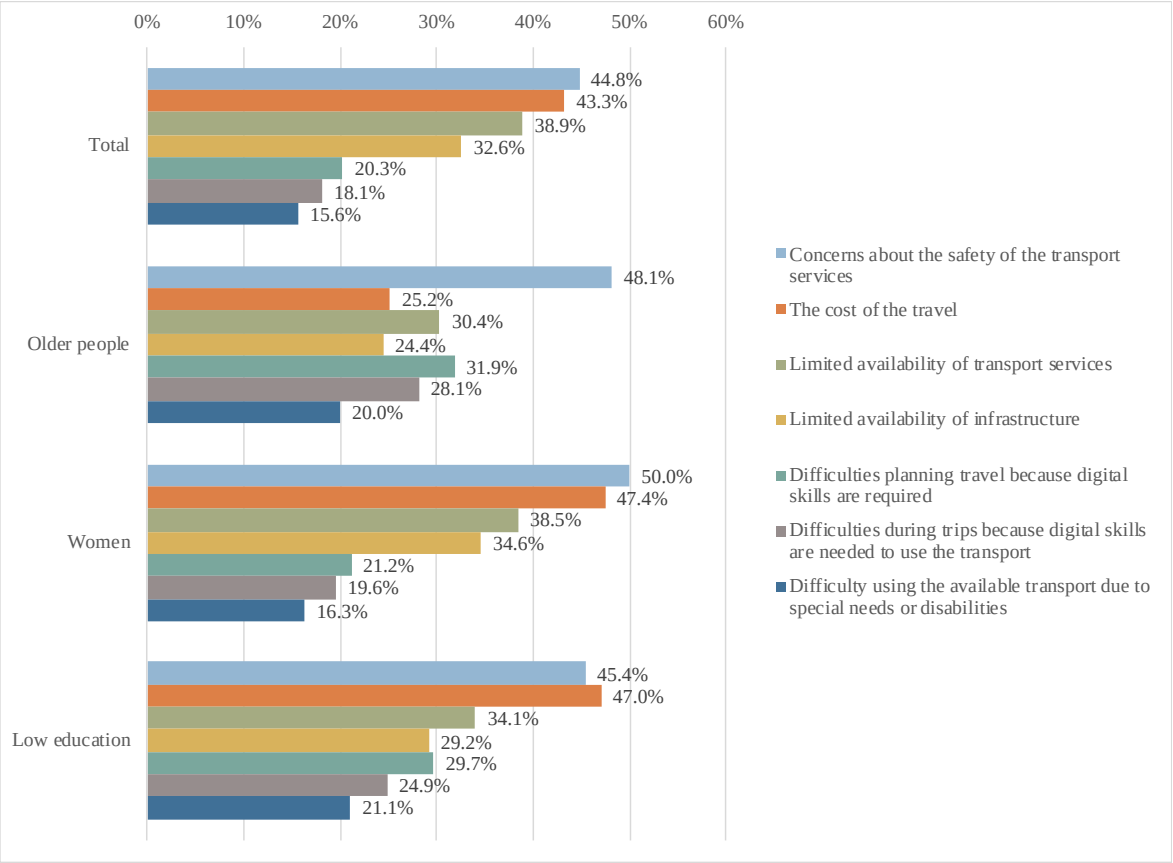

Figure 3. Limitations on regular mobility, per group identified as vulnerable

Figure 4 shows the global perception of the importance that the interviewees assigned to the promotion of different future actions, taking into account that the survey was taking during the COVID-19 crisis of 2020. The post-COVID measure that was indicated as the most important was to an increase in the provision of public transport to avoid congestion (83.5%). This measure is mainly related to perceived safety at the health level and concerns about the risk of contagion, which will be an important issue from now on in the context of public transport that has to be addressed with adequate measures, in order to regain the trust and reliability of this fundamental public service, which is essential for a sustainable urban ecosystem. Notably, the interviewees assigned a high importance to measures that address working conditions—specifically, the flexibility of working hours (75.7%) and an increase of teleworking (73.2%). Promotion of actions such as the implementation of contactless transport tickets or the expansion of pedestrian areas are also considered important for the future of cities, with percentages above 60%. Less importance was assigned to measures such as the expansion of bike lanes (54%) or the promotion of new shared electric vehicle systems (51.4%). Finally, the measure with the lowest perceived importance is the ease of driving to work by car (40.4%).

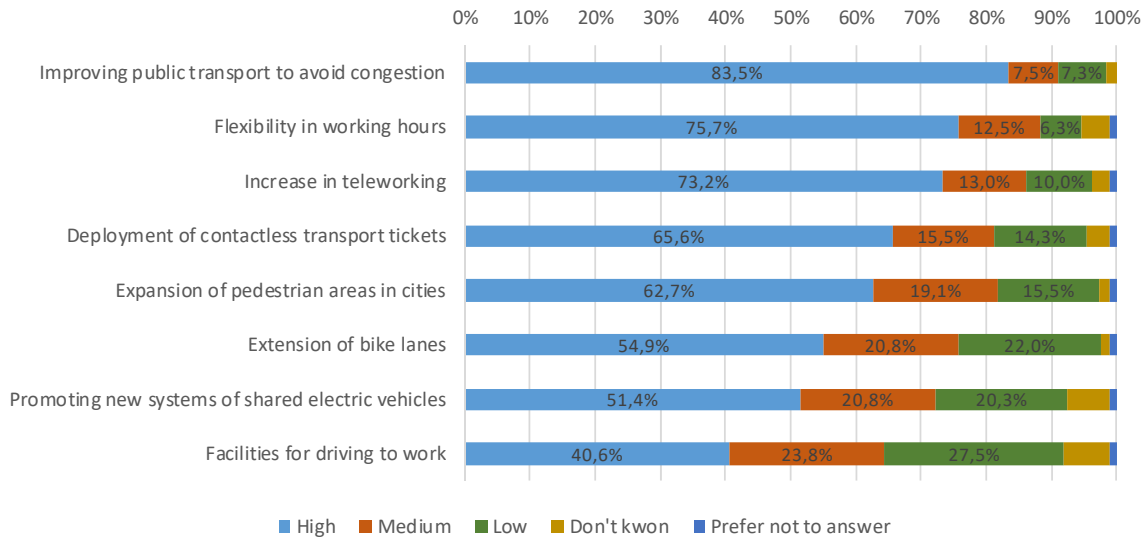

Figure 4. User perceptions about the need to promote specific actions (note that the survey was taken during the COVID-19 crisis in 2020 in Spain)

6. CONCLUSIONS

This study confirmed the problem of potential exclusion related to the mobility of certain social groups in the AMB and recommends that specific studies are carried out to promote a better understanding of the phenomenon, as well as to promote more inclusive policies that better integrate social and technological aspects. In the coming years, an increasingly accelerated development of digital tools focused on mobility—from MaaS to autonomous cars—is likely lead to a total paradigm shift in the way of understanding travel. Therefore, it will be necessary for the entire population to be able to correctly use it, to avoid generating greater social inequalities that strongly limit social development in all its senses. In addition, it will be important to address certain aspects, such as improvement of public transport—with particular attention to categories such as women and older persons, who represent a significant percentage of users—as well as the promotion of working conditions that recognize the flexibility of working hours and the possibility of working remotely. These factors will in turn lead to important changes in the conception of services to be offered and in the conditions of provision of the public transport service.

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