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# THE MAKING OF NEW MOBILITY MARKETS: FRAMEWORKS PROPOSAL CONSIDERING PEOPLE WITH DISABILITIES AND CONNECTED AUTONOMOUS VEHICLES

## *A criação de novos mercados de mobilidade: proposta de frameworks considerando pessoas com deficiência e veículos autônomos conectados*

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**ABSTRACT**

Connected and Automated Vehicles (CAVs) are a recent technology which could promote a major change within automotive industry, creating a new mobility market. This market could bring new possibilities in mobility for people with disabilities (PWDs). Therefore, this essay sought to elaborate frameworks which could initially characterize CAVs market considering the inclusion of PWDs. The frameworks were elaborated in two parts, both considering CAVS as a nascent market: i) The market practices, and ii) its framings or agencements. In this sense, practices should focus on structuring the exchanges and norms of this market (new transport business models and its regulations, such as a universal design for CAVs). We argue that representative practices (offering inclusive mobility, safety, freedom, and independence for PWDs), should guide this market. Also, a correct communication of the benefits and risks of CAVs must structure this market. As for the framings proposed, they must guarantee an inclusive market, as far as pacifying goods, and pricing, should consider different social contexts and PWDs demands. We also mention the importance of governments and scientific societies on providing information that could result on new rules for CAVs inclusive markets.

**KEYWORDS**: automotive industry, constructivist market studies, market practices, sociotechnical agencements, vehicle automation levels.

**RESUMO**

Veículos Autônomos Conectados (VACs) são uma tecnologia recente que pode promover uma mudança significativa na indústria automotiva, criando um mercado de mobilidade. Esse mercado pode trazer novas possibilidades de mobilidade para pessoas com deficiência (PCDs). Portanto, este ensaio buscou elaborar frameworks que pudessem caracterizar inicialmente o mercado de VACs, considerando a inclusão de PCDs. Os frameworks foram elaborados em duas partes, ambas considerando os VACs como um mercado nascente: i) As práticas de mercado; e ii) os seus enquadramentos ou agenciamentos. Nesse sentido, as práticas devem enfatizar a estruturação das trocas e normas desse mercado (novos modelos de negócios em transporte e suas regulamentações, como um desenho universal para VACs). Defendemos que as práticas representativas (que buscam oferecer mobilidade inclusiva, segurança, liberdade e independência para as PCDs) devem orientar esse mercado. Adicionalmente, uma comunicação correta dos benefícios e riscos dos VACs deve estruturar esse mercado. Os enquadramentos propostos devem garantir um mercado inclusivo, bem como os bens de pacificação e o processo de precificação devem considerar diferentes contextos sociais e as demandas de PCDs. Também mencionamos a importância dos governos e das sociedades científicas no fornecimento de informações que possam resultar em novas regras para estes mercados inclusivos de VACs.

**PALAVRAS-CHAVE**: indústria automotiva, estudos de mercado construtivistas, práticas de mercado, agenciamentos sociotécnicos, níveis de automação veicular.

## 1 Introduction

The early works of Michel Callon (1986a, 1986b, 1998, among others) stimulated great debate within socioeconomic studies, emphasizing that markets should be conceived beyond its economic aspects, that is, emphasizing its social features and their dynamic (re)configurations over time. This marketing stream is hence directed towards practices that favor markets performativity (Araujo, & Kjellberg, 2009), therefore amplifying markets perception beyond the traditional producer/consumer relationship (Baker, Storbacka, & Brodie, 2019).

Hence, markets are sociotechnical agencements constantly (re)shaped by translations from the interactions and negotiations of its actants (whether they are human or not – e.g., technologies). Moreover, market exchanges become possible through varied and often contradictory interests (Latour, 2005; Tonelli, 2012; Tureta, Rosa, & Santos, 2006; Leme, & Rezende, 2018).

From this context, two theoretical perspectives stood out: i) the Constructivist Market Studies (CMS), specially drawing from Çaliskan and Callon (2010), analyzing market agencements through its processes of framings and overflows, and ii) the Market-Making Theory (MMT), specially drawing from Araújo (2007) and Kjellberg and Helgesson (2007), which analyze markets from the practices conducted by its actants.

Leme (2015) showed how both perspectives – i.e., CMS and MMT – are complementary, allowing the comprehension of markets on a longitudinal perspective. According to the author, the market practices proposed by Kjellberg and Helgesson (2007) continuously act in the construction of markets and, when analyzing those practices, socio-technical market agencements also co-perform to build markets. These practices can also cause translations in the network structure, and, with that, overflows and new framings can happen. Thus, identifying the five types of market framings proposed by Çalışkan and Callon (2010) becomes possible (Leme, 2015). Therefore, we will hereafter refer to this body of knowledge as “Market Construction Studies” (MCS), drawing from Leme’s (2015) proposal.

One context in which these dynamics could be analyzed is the mobility market, considering the development and evolution of technologies based on electrification and connectivity (Araujo, Mason, & Spring, 2014; Mitchell, Borroni-Bird, & Burns, 2010). Mobility is commonly visualized as a user–market relationship, which creates rules and market images. Also, this interaction can produce sub processes which may (re)configure goods, modes of exchange, actors, market norms and representations, according to specific framings and features (Harisson, & Kjellberg, 2016).

In this sense, some points concerning CAVs’ markets and its respective technologies can be highlighted: the potential market for CAVs; the impact on the traditional mobility markets and finally, CAV’s possibility to create a market for people with disabilities [PWDs] (Araujo, Mason, & Spring, 2012).

Therefore, the research question that guides this essay is: How CAV’s market could be elaborated within MCS approach, focusing on its possible usage by PWDs? In the following sections, we present the main concepts of MCS, and characterize and discuss some general aspects of the mobility market and its connections with PWD’s reality. In sequence, we propose a framework for both practices and respective framings or agencements of CAVs market considering its context of applications for PWDs. Finally, we present our concluding remarks on the subject and list the references cited in this essay.

## 2 The Market Construction Studies

As noted by Leme (2015), to understand markets' construction and its functioning, researchers work on the concept of market agencements, with focus on analyzing the selected markets' frameworks and overflows (Çaliskan, & Callon, 2010) or its practices (Araújo *et al.*, 2008; Kjellberg, & Helgesson, 2006, 2007).

The first empirical approach, especially influenced by the works of Michel Callon, considers that, after their creation or transformation, market agencements undergo stabilization processes, called framings, allowing the classification, and ordering of the myriad of associations among its actors. The occurrence of such processes does not depend on the will of the actors and allows the capture and dissociation of relationships in a network, establishing a limit around which such interactions take place (Araújo, 2007; Callon, 1998; Çaliskan, & Callon, 2010; Leme, 2015).

Such framings, perceived as closed spaces for interaction, define the effectiveness of the market agencement by allowing actors to consider the perspective of others when deciding (Leme, 2015). Therefore, framings can be characterized in a multidimensional aspect (temporal, spatial, content), which delimitate market exchanges between sellers and buyers (Araujo, & Kjellberg, 2009).

However, a complete and immutable framing is impossible to achieve in market agencements since the perspectives and interests of the players are multiple and often opposite or contradictory. Thus, market agencements always present imperfections or failures in the framing process, which lead to overflowing processes (Araújo, 2007; Callon, 1998; Çaliskan, & Callon, 2010; Leme, 2015).

Çaliskan and Callon (2010) and Callon (2015) proposed five types of framings. The first one is the pacification of goods, which refers to the action of making objects passive (i.e., unable to present unexpected characteristics). The second refers to marketizing agencies, composed of structured players that are equipped to carry out valuation operations, and the third refers to market encounters (i.e., the meeting of pacified goods, in all their successive forms, with the different agencies involved in this qualification process, which makes goods unique). There is the price formation framing, resulting from the pricing of goods and the agent's consent to acquire the pacified good through monetary compensation and, finally, the market design and maintenance framing, which means long terms relationships in the markets among actants (Çalişkan, & Callon, 2010; Callon, 2015).

The five framings proposed by Çaliskan and Callon (2010) identify a continuous process of formatting and standardization of transactions, which coexists with unforeseen effects, innovations, and imbalances (overflows and reframing). Furthermore, the understanding of markets as institutions in permanent construction helps to overcome the producer-consumer dichotomy and enables the analysis of the contributions of different agents in the process of qualifying goods and services (Leme, 2015).

The second empirical approach to Market Construction Studies refers to the comprehension of markets as locations of multiple and, sometimes conflicting, sets of practices, which are composed of various material devices and forms of expertise (Callon, 1998). Therefore, it is important to study the efforts to shape markets practices and their impacts on their configuration (Leme, 2015).

Recently, this approach evolved and has transformed markets and marketing literature, observed from the works of Araujo (2007) and Harisson and Kjellberg (2016) which evidence markets not just as economic spaces of exchange, but also as institutions constituted of agents, norms, structures or framings and its respective practices. According

to Souza et al (2022), markets undergo various construction and deconstruction processes along with a diversity of actors, market devices, tensions, different framings, and arrangements.

This debate has generated diverse conceptual contributions for comprehending markets: its formation, shaping and practices (Araujo, Finch, & Kjellberg, 2010; Çalişkan, & Callon, 2010; Geiger, Kjellberg, & Spencer, 2012; Harrison, & Kjellberg, 2016; Kjellberg, & Helgesson, 2007); its agencements (Araujo, Kjelberg, & Spencer, 2008); the value or calculation practices (Cochoy, 2008); the role of users, devices, framings and overflows, and markets' performativity (Hagberg, Kjellberg, & Cochoy, 2020; Mason, Kjellberg, & Hagberg, 2015).

Therefore, different types of practices can describe markets and help understand how they were shaped (Azimont, 2010; Kjellberg, & Helgesson, 2006, 2007). For this end, Kjellberg and Helgesson (2007) propose a theoretical model of analysis centered on the performativity of markets and marketing practices, which are understood as all those that contribute to the formation or modification of these markets. They subdivide market practices into three categories. The first ones are exchange practices, which consist of individual and economic transactions, representing the interactions between the subjects. Second, there are representation practices, directly associated with the performance of markets and related to the way the subject sees the world; and, finally, normative practices, which include the rules and guidelines for the market configuration, reflecting the acceptance and adaptation to its rules (Kjellberg, & Helgesson, 2007; McColl-Kennedy, Cheung, & Ferrier, 2015; Leme, 2015). Recently, Leme (2015) identified a new type of practices named structuring practices, which are essential for the construction of exchange, representation, and normative practices and have a mediating role between market practices, and between them and market agencements. Table 1 describes practices and its features:

| PRACTICE TYPES | DESCRIPTION |
|---|---|
| Exchange practices | Individual and economic transactions, representing the interactions between the subjects |
| Representation practices | Directly associated with the performance and images of markets |
| Normative practices | Guidelines for the market configuration, reflecting the acceptance and adaptation to rules |
| Structuring practices | Essential for the construction of exchange, representation, and normative practices |

**Table 1**: Practices and its features.
Source: Elaborated by the authors based on: Azimont (2010); Kjellberg and Helgesson, (2006, 2007) McColl-Kennedy, Cheung, and Ferrier (2015); Leme, (2015).

As far as market practices are diverse, they are dynamic and can be viewed as source of new ideas into business models. These ideas create opportunities for innovation in markets via multiple actors (Storbacka, & Nenonen, 2011). In this sense, the automotive industry is adopting new practices considering the emergence of digital technologies. Connected and Automated Vehicles (CAVs) could represent a transformation in the mobility market with the rise of new rules, practices and technologies derived from it (Araujo *et al.*, 2014). The next topic discusses these aspects.

## 3 The digital Mobility Market: the rise of a new automotive industry from CAVs

Mobility markets which entail the automotive industry are currently undergoing a transition towards sustainable practices and technologies (Wells, 2010; Kemp, Geels, & Dudley, 2012). In this perspective, consumers play an important role, demanding more sustainable products and services from the respective companies (Wells, 2010). The investments of the industry in electric vehicles emerge because of this transition (Orsato, Dijk, Kemp, & Yarime, 2012).

Recently, new "mobility cultures" are rising, in which vehicles, its technologies, and cities demand more digitalization, increased options for mobility and shared cars. These features represent both new possibilities for already existing automotive markets, as for the future ones (Sheller, 2012). The possibilities brought by digitalization allow the creation and development of markets and firms based on autonomous vehicles and digital mobility services within the automotive industry (Seiberth, & Gründinger, 2018).

Hence, new mobility markets are now constructed and shaped through the development and growth of the digital technologies within the automotive industry. This process allows interconnectivity in products and services, stimulating the creation of new business models based on the presence of electric and autonomous systems in vehicles (Cavazza *et al.*, 2019; Covarrubias, & Ramírez Perez, 2020a).

This digital context combined with sharing mobility consumer practices are also affecting traditional automaker companies, which developed new business models based on service technologies and mobility on-demand systems (Lasmar Júnior, Gandia, Sugano, Souza, & Rodriguez, 2019). Some examples are Uber, which introduced a small fleet of autonomous vehicles in Pittsburgh, and General Motors, Volkswagen, and Ford, which announced plans to deploy fully autonomous vehicles (Claypool, Bin-Nun, & Gerlach, 2017).

This context of the automotive industry is coherent with the predominance and advance of marketing logics which are currently mostly based on the offer of services (Akaka, Koskela-Huotari, & Vargo, 2021). In this sense, the digital platforms are transforming market arrangements and consumption patterns (Dalmoro, Wegner, & Schiavini. 2023).

Economically, the global automotive industry revenues have reached US$ 3.8 trillion in 2018, with China and the United States, Japan, and Germany leading the production. On the other hand, emerging countries are consuming most of the vehicles produced in the world (55%): China, India and Brazil are now among the largest consumer markets, which modifies the geography of this traditional industry towards the emerging nations (Covarrubias, & Ramírez Perez, 2020b).

Nevertheless, the global automotive industry was affected by the economic impacts of the COVID-19 pandemic, starting in 2020. These impacts have diminished its revenues projections around US$ 2.95 trillion in 2022 (Carlier, 2022). Therefore, the automotive industry has been expanding to include electric, autonomous, semi-autonomous, and connected vehicles. Data point out that, by 2030, 96% of all new cars will have connectivity built in (State of Automotive Software Development Report, 2024).

Technologically, the traditional automobile and its respective industry are undergoing a huge transformation that may affect its products, services and eventually consumers. The main transformations are based on electrification, autonomy, and sharing vehicles (Klier, & Rubenstein, 2020). Additionally, in 2030, around 26% of the industry global sales are expected to be of electric vehicles (Carlier, 2022). The comparison of technical features between traditional and future automobiles is presented on Table 2:

| TRADITIONAL AUTOMOBILES | FUTURE AUTOMOBILES |
|---|---|
| Mechanically driven | Electrically driven |
| Powered by internal combustion engine | Powered by electric motors |
| Energized by petroleum | Energized by electricity and hydrogen |
| Mechanically controlled | Electronically controlled |
| Stand-alone operation | Intelligent and interconnected |

**Table 2.** Features of Traditional and Future Automobiles.
Source: Adapted from Mitchell *et al.* (2010:3).

Table 2 forecasts the transformation of the traditional mobility industry, which is moving towards a more connected, safe, interactive, electronic, and less pollutant automobile. In this sense, CAVs have emerged as a technology that promises to address all those needs (Antonialli *et al.*, 2017). Gandia *et al.* (2019) highlighted the evolution of CAV's research in the academy and pointed out that this technology should also be analyzed from its market and managerial perspectives.

At last, sharing mobility has risen as a new possibility both for the mobility market and from consumers' perspectives. Hence, new experiences in mobility services (e.g., Uber and Easy Taxi) provides the vehicle's use without the ownership of the automobile and the possibility of using mobility on demand services through mobile applications (Lasmar Júnior *et al.*, 2019). Silva *et al.* (2020) state that CAVs present a recent market trend embedded in a service mobility system.

According to Carlier (2022), around 58 million of CAVs are expected to be in the global market by 2030. Regarding CAVs' spread and development, 30 countries were ranked into a global index to measure the level of preparedness for adoption of autonomous vehicles based on four main indicators: policy and legislation, technology innovation, infrastructure, and consumer acceptance. The ten best-placed nations were Singapore, the Netherlands, Norway, United States, Finland, Sweden, South Korea, United Kingdom, United Arab Emirates, and Denmark, respectively. On the other hand, CAVs' development in emerging countries is led by China, Hungary, Russia, Mexico, India, and Brazil, which appears on the last position of the ranking among all countries (KPMG, 2020). Despite that, Brazil has a potential for CAVs' adoption as far as it represents more than half of the vehicles sold in Latin America (Cavazza, Zambalde, & Souza, 2021).

Mitchell *et al.* (2010) provided a sketch of the main ideas behind CAVs, along with its main benefits and respective transformational changes in mobility (Table 3):

| CONVERGING IDEAS | TRANSFORMATIONAL CHANGE IN PERSONAL MOBILITY | BENEFITS |
|---|---|---|
| **New automotive structure** | No pollutant emissions | **Enhanced freedom*** |
| (electric + connected mobility + internet) | Renewable energy | **Sustainable mobility** |
| Clean, smart energy | **Crash avoidance*** | **Sustainable economic growth and prosperity** |
| Dynamically priced Markets | **More equitable access*** | |

**Table 3:** Main ideas behind CAVs.
Source: Adapted from Mitchell *et al.* (2010:6)

*__Authors' highlight__: In our perspective, these are some of the possible benefits from features of CAVs for PWDs, based on the following studies: Bennett, Vijaygopal, and Kottasz (2019a; 2019b; 2020); Choromański, and Grabarek (2015); Merat, Madigan, and Nordhoff (2017); Milakis, Van Arem, and Van Wee (2017); Claypool *et al.* (2017); Hwang, Stough, Lee, & Turnbull (2020); Brinkley, Posadas, Woodward, and Gilbert (2017).

Betz, Betz, Kim, Monks, & Phillips (2019), when evaluating the future of science and business, state that customers desire new products in transportation. In this sense, there are potential benefits associated in transportation with the introduction of CAVs: improvements in traffic flows, no pollutant emissions, traffic safety, cost efficiency of public and private transportation, among others. Additionally, improving inclusion of PWDs have been identified as one potential benefit of CAV's adoption (Bahamonde-Birke, Kickhöfer, Heinrichs, & Kuhnimhof, 2018; Fafoutellis, & Mantouka, 2018; Milakis, 2019; Milakis *et al.*, 2017; Bagloee, Tavana, Asadi, & Oliver, 2016).

In terms of policies and legislation, future businesses models based on CAVs must be aligned with the society's ethical and moral precepts, as well as with government policies for future transport planning (Cavazza *et al.*, 2019). Governments' role might also provide an essential point that could bring economic structure for CAVs' markets, via public intervention

to reduce costs of this technology (Cohen, & Cavoli, 2019). In the next topic, we present an overview of CAVs and their possible impact in PWD's lives.

## 4 PWDs and the mobility market: Overview and CAVs adoption

Within the new contexts of urban mobility and transportation, such as shared mobility, CAVs have the potential of life improvement and increasing of mobility capabilities of PWDs (Bennett *et al.*, 2019a, 2019b; 2020). In terms of automation, SAE (2016) considers five levels of vehicles' automation (0 to 5). In the highest levels of automation (4 and 5), vehicles do not necessarily require driver's intervention (Milakis, 2019). This CAV's feature can represent an advantage for those PWDs who have more difficulties or are unable to drive (Merat *et al.*, 2017).

Disability is a result of the interaction between people's health conditions and their environment (World Health Organization - 2011; International Classification of Functioning, Disability and Health – ICF, 2013). According to the World Health Organization (WHO), over a billion people, about 15% of the world's population, have some form of disability (WHO, 2018). In this sense, accessibility represents the right to enable PWDs to live independently and participate fully and equally in all aspects of life. Accessibility policies shall include the identification and elimination of obstacles and barriers. For the transportation sector, it means promoting the availability and usage of new technologies, including informational and communicational ones, such as mobility aids, devices, and assistive technologies. All these technologies must be suitable for PWDs at an affordable cost (United Nations, 2006)

Choromański and Grabarek (2015) state that not only PWDs could benefit from this reality: although most people are not disabled, populations lose their mobility' capacity by the increase of elderly ones. Urbanization and aging have become a significant problem in many cities, so it is necessary to provide an accessible environment for all, including PWDs. Hence, a safe, accessible, and efficient transportation system is essential for community integration (Sze, & Christensen, 2017). This fact also prompts the development of new technologies, organization, and regulation features within new urban mobility systems (Choromański, & Grabarek, 2015). Some of these elements are depicted in Table 4:

| ASSUMPTIONS ON NEW URBAN MOBILITY SYSTEMS AND TECHNOLOGIES | MAIN FEATURES |
|---|---|
| Mobility for all | Mobility is essential for human existence.<br>Need for improving the already existing mobility systems.<br>Create new technologies and organizational structures. |
| Aging and/or the presence of disabilities | Increase in the percentage of elderly and people with reduced mobility.<br>Integration of public and private mobility systems to attend this population. |
| New trends in mobility technologies | Reducing individual and increasing public transportation.<br>Demand for social acceptability of CAVs.<br>New forms of sharing vehicles.<br>Safety, reliability, and ergonomic designing of CAVs<br>Reduction of pollution, energy, and material consumption. |
| New organizing practices within mobility systems | Matching organizational structures of mobility systems to individual needs reaching a compromise**. |
| New regulation into mobility systems | Lack of standardization, legal conditions, certification, and approval procedures for mobility solutions. |
| New business models in cities | Innovative transport solutions.<br>Growth in the number of small companies with innovative potential. |

**Table 4:** Main features for new urban mobility systems and respective technologies.
Source: Adapted from Choromański and Grabarek (2015).
**Author's highlight****: In our perspective, this feature could unite CAVs to mobility services and products adjusted to PWD's specific demands, e.g., disability type.

As observed, CAVs represent a possibility of transportation for this population segment (Choromański, & Grabarek, 2015). Currently, CAVs' technology is not fully ready; however, it can help individuals with disabilities. CAVs classified within SAE International (2016) automation levels 4 or 5, could benefit PWD's community through enhanced mobility. Some of these vehicles that can operate autonomously at lower speeds have already been trialed on roads in the United Kingdom (Claypool *et al.*, 2017).

CAVs, according to Ferati, Murano and Giannoumis (2018), should provide essential elements that could offer more benefits for elderly and PWD's, such as a universal design, and interactive interface of the vehicle according to different kinds of disabilities. Therefore, the involvement of PWDs with mobility service providers is fundamental and could benefit a wide range of passengers (WHO, 2011). After all these considerations, the possibilities of elaborating a market of CAVs, which include PWDs, become clearer.

## 5 CAVs Market for PWDs: Framework Proposal based on MCS approach

Following the analytical bases proposed by Leme (2015), we theoretically identified both framings and practices features that should be present in the future CAVs' markets for PWDs. Firstly, the **practice** elements are analyzed and then the identified **agencements or framings** are described and theoretically discussed.

Practices can help to describe markets and understand how they were shaped (Azimont, 2010; Kjellberg, & Helgesson, 2006, 2007). In the mobility sector, new market rules and images are elaborated through user–market relationship, therefore, generating new technologies, practices, and regulations (Harrisson, & Kjellberg, 2016). For PWDs and CAVs market construction, this feature could generate **exchange practices** by combining business models that entail new and traditional transport systems. These future markets could be based on apps, and on private and public transport integration (Snellen, & de Hollander, 2017). In this sense, **exchange practices** of this market should contain possibilities for offering new products and services in mobility. Antonialli (2021) brings evidence on CAVs projects mostly on public transportation and depicts most possibilities of usage within regular lines and in minority of on demand projects.

At last, the interaction between human and autonomous features could provide new insights about CAVs technologies and these future markets (Marletto, 2019; Wolf, 2016). New markets should be entailed and identified within structuring practices (Leme, 2015).

Leme (2015) identified **structuring practices** that sustain and create all other kinds of practices in a market and are essential for the construction of exchanges. Hence, the **structuring practices** of CAVs market for PWDs should provide a correct communication of the benefits and risks of CAVs for PWDs' adoption and emphasize the interdependence between humans and autonomous technologies (Goggin, 2019).

These practices are essential for creating a stable market because there are still doubts and even criticism about the real benefits of CAVs adoption for PWDs and for non-disabled users (Milakis *et al.*, 2017; Wolmar, 2018). Additional concerns are related to this market's size and profit potential (Araujo *et al.*, 2014). To address this, manufacturing companies need to recognize the substantial size of the commercial market for CAVs potentially bought or leased by PWDs (Bennett, *et al.*, 2019b).

Currently, the right to mobility is fundamental for life quality in the cities. Therefore, future market configurations based on shared mobility, with less or even without automobile possession have become relevant (Iacobucci, Hovenkotter, & Anbinder, 2017). Practices supported on access-based consumption and car sharing have reconfigured the mobility market (Bardhi, & Eckhardt, 2012). New markets for PWDs based on CAVs should consider the social implications of these markets (Gandia *et al.,* 2019), which includes analyzing if the spread of CAVs into the mobility market could bring up real benefits for PWDs, especially those who present severe difficulties or are unable to drive (Milakis *et al.*, 2017).

CAVs insertion will be amplified in the market and society; however, it is still unclear how its insertion will take place, due to uncertainties on governmental planning (Cavazza *et al.*, 2021). So, **normative practices** are required to ensure and stablish rules and guidelines for the market configuration, hence promoting acceptance and adaptation of actors (Kjellberg, & Helgesson, 2007; McColl-Kennedy *et al.*, 2015; Leme, 2015). For PWDs and CAVs markets construction, these are represented by: norms and criteria for universal design, usable interfaces, manufacturing, and safety of CAVs (Ferati *et al.*, 2018; SAE, 2016); laws and regulations for adequate CAVs manufacturing and its respective operation in cities (Heinrichs, 2016; Winkle, 2016) and governmental policies to stimulate CAVs adoption and enable an accessible and affordable market for PWDs (Cohen, & Cavoli, 2019).

Future CAVs markets will have to deal with strong ethical issues related to its commercialization (Gerdes, & Thornton, 2016; Lin, 2016), among which safety seems to be highly relevant (Reschka, 2016). As discussed by Sparrow and Howard (2017:206) "(…) *As long as driverless vehicles aren't safer than human drivers, it will be unethical to sell them*". The same authors emphasize the need for effective regulatory systems to obtain maximum social benefits of CAVs for society.

Therefore, new CAVs markets and its respective mobility models need proper regulation systems to attend economic feasibility and become accessible for PWDs (Iacobucci *et al.*, 2017). Regarding CAVs and mobility markets, the technologies have advanced faster than its regulations and policies for these markets (Grush, & Niles, 2018).

The last type here analyzed are **representation practices**, which are associated with the images of markets (Kjellberg, & Helgesson, 2007; McColl-Kennedy *et al.*, 2015; Leme, 2015). Therefore, CAVs still represent a nascent market shaped by future expectations of various actors, composed by narratives in media, academic or professional reports, that focus on future social and economic values of this market (Araujo *et al.*, 2014). Moreover, when it comes to the rise of emergent technologies, Simakova, & Neyland, (2008) state that marketers create narratives which can sustain markets features and project their perspectives in technology and consumption in different markets.

In this sense, as a nascent market, we have considered CAVs possibilities for inclusion of PWD into mobility systems and in society (Merat *et al.*, 2017). These representational practices of freedom and independence might vary according to the disability level and prior knowledge of CAVs technology by PWDs; therefore, all these studies are deriving from a PWDs standpoint in their relationship with CAVs (Bennett *et al.*, 2019a, 2019b, 2020; Hwang, *et al.*, 2020; Brinkley, *et al.*, 2017).

Summarizing, more severe degrees of disabilities might hamper the potential benefits or difficult the knowledge level of CAVs technologies by PWDs (Bennett, *et al.*, 2019a, 2019b). One way to address these matters is that future markets must guarantee all the safety aspects of CAVs for PWDs (Bennett *et al.*, 2019a; 2020). Figure 1, summarizes a framework proposal of practices for CAVs future markets which includes PWDs:

| PRACTICES | CAVS MARKETS FOR PWDs |
|---|---|
| Exchange Practices | • Support future business models that combine CAVs and traditional transport.<br>• Provide CAVs products and services based on apps.<br>• CAVs should be integrated in private and public transport systems.<br>• CAVs commercialized in shared and private models for PWDs |
| Normative Practices | • Universal Design, Usable Interfaces and Safety of CAVs.<br>• Laws And Regulations for CAVs operation in cities.<br>• Laws To Provide Access of Cavs by PWDs.<br>• Governmental Support to Guarantee an Affordable Market for PWDs |
| Structuring Practices | • Correct Communication of The Benefits and Risks of CAVs FOR PWDs.<br>• Estimate CAVs market's size and the profit potential. Considering PWDs.<br>• CAVs form of acquisition by PWDs (buy or lease); |
| Representation Practices | • CAVs offering inclusive mobility, safety, freedom, and independence for PWDs; |

**Table 5**: Practices Framework for CAVs markets and PWDs.
Source: Proposed by the authors from the literature discussion.

Table 5 intends to stablish criteria which might guide future business models of CAVs. It depicts both technical and monetary aspects (exchange and structure) as well as its norms and values (normative and representation practices) when it comes to a market towards inclusion of PWDs. It is expected that this sketch of practices could provide a better visualization of this market.

As for the market's **framings**, we have **pacifying goods**, which means that goods are unable to present unexpected characteristics (Çalişkan, & Callon, 2010; Callon, 2015). For PWDs and CAVs markets those may vary across different countries. Henderson, and Golden (2015) evidence these aspects for the United States reality (e.g., different automation levels - four levels) when compared to SAE (2016) norms and the KPMG (2020) report exhibit evidence across 30 different countries. Scandinavian countries, according to the KPMG (2020) report, are more prepared for CAVs implementation.

**Marketizing Agencies** are composed by structured players that are equipped to carry out valuation operations (Çalişkan, & Callon, 2010; Callon, 2015). Antonialli (2021) identified a range of actors in the possible applications of CAVs for public transport, such as: private entities, public entities as governments; research institutions, universities, foundations, etc. As for private vehicles, the KPMG (2020) report evidence different levels of infrastructure, technologies, and consumers acceptance in different countries. All these **Marketizing Agencies** emerge as possible agents on new markets agencements for PWDs.

**Market encounters** involve the different agencies involved in this qualification process (Çalişkan, & Callon, 2010; Callon, 2015). In this sense, projects such as Gateway (2018) and the Institution of Engineering and Technology (IET, 2017) represent prospects for this market and PWDs. Also, the presence of scientific societies as Gerpisa (2020) discusses possible advances on agencements of CAVs markets for PWDs.

The **price formation** framing results from the pricing of goods and the agent's consent to acquire the pacified good through monetary compensation (Çalişkan, & Callon, 2010; Callon, 2015). For PWDs and CAVs markets, models of product or mobility services should be affordable for PWD's with the need for elaboration of flexible demand models for CAVs consumers. Perceived utility of CAVs is also an important factor for general consumers' demand. In addition, the more knowledge or awareness of CAVs technology consumers have, more prone they are to buy it (Daziano, Sarrias, & Leard, 2017; Panagiotopoulos, & Dimitrakopoulos, 2018) Table 6 summarizes a framework proposal of framings for CAVs future markets which includes PWDs:

| FRAMINGS | CAVS MARKETS FOR PWDs |
|---|---|
| Price formation | • Elaboration Of Flexible Demand Models for CAVs Consumers<br>• More Awareness of CAVs Technology by Consumers |
| Pacifying goods | • Might Vary Across Different Countries and Regions (Europe, USA) - According to Specific Normalization |
| Marketizing agencies | • Private entities, governments; universities<br>• Private reports |
| Market encounters | • Projects such as Gateway (2018) and the institution of engineering and technology (IET, 2017).<br>• Presence of scientific societies discussing possible advances on arrangements of CAVs markets |

**Table 6**: Framings Framework for CAVs markets and PWDs.
Source: Proposed by the authors from the literature discussion.

These framings entail an inclusive market, as far as in pacifying goods, for example different contexts and demands might prompt distinct framings. We also mention the importance of scientific societies on providing information that could result on new frames in markets.

Market design and maintenance agencements are not described in the frameworks proposed. These involve a trend for keeping markets stable along time until new overflowing features become present (Çalişkan, & Callon, 2010; Callon, 1998). As this paper delineates features for a future and possible market, market design and maintenance agencements could not be a part of the frameworks proposed.

We summarize our contribution given in frameworks considering the ideas of Mele, Pels, & Storbacka (2015) when analyzing markets. In this sense, these authors characterize four elements in which markets could be described: i) Market entities - which actors are involved; ii) Market representation - how markets are signified; iii) Market performing - what actions are carried out in markets); and iv) Market sense-making - how markets emerge and evolve. Therefore, Table 7 combines the practices and agencements described in both frameworks along with the concepts of Mele, Pels, & Storbacka, (2015).

| MARKET ELEMENTS | INFORMATION FROM CAVs FRAMEWORK | PRACTICES AND AGENCEMENTS MOST DEMANDED IN THE MARKET |
|---|---|---|
| Market entities | CAVs markets are emergent, and inclusion should be analyzed in a systemic way considering a wide range of actors | • *Marketizing Agencies (universities, governments, etc.)*<br>• *Structuring and normative practices (definition of rules and exchange patterns of the market)* |
| Market representations | CAVs markets could represent autonomy and new options of transport services for PWDs, considering their demands in an inclusive perspective | • *Structuring practices* (communication of CAVs risks for PWDs)<br>• *Normative practices* (search for universal design, legislation improvement)<br>• *Representation Practices*<br>• (Correct communication and inclusive narrative of CAVs for PWDs |
| Market performing | CAVs markets should present flexibility in mobility services/products. The economic exchanges should consider cultural and social contexts of PWDs | • *Exchange Practices (possibilities for offering new products and services in mobility for PWDs).*<br>• *Price formation (consider flexible demand)*<br>• *Pacifying Goods (different cultural and social contexts and varied disabilities* |
| Market sense-making | CAVs markets could evolve and adopting inclusion practices and agencements considering the role of scientific societies industries, governments, and consumers (PWDs) | • Market encounters (scientific societies automotive and mobility industries, governments, and consumers (PWDs)<br>• *Structuring and Normative practices* (adoption of Inclusive rules and norms in market exchanges)<br>• Representation Practices<br>• (Adoption of inclusive practices) |

**Table 7:** Combining Practices and Agencements of frameworks proposed
**Source:** Elaborated by the authors based on research results and the on concepts of Mele, Pels, & Storbacka, (2015).

We understand that Table 7 contributes to identify proper strategies of market shaping for CAVs markets. According to Baker, Storbacka & Brodie, (2019) when markets are shaped, intentional actors (firms, suppliers, etc) and institutional actions (governments, research entities, cultural norms etc) act in interdependence, but not necessarily coordinated. As an emergent market, CAVs industry may require a high coordination among actors to achieve its economic and social benefits for PWDs.

Hence, a better way to achieve this coordination might be possible when multiple actors adopt synchronized and collective engagement when considering the institutional practices in markets (Kleinaltenkamp, Conduit, Plewa, Karpen, & Jaakkola, 2021). We believe that the same reasoning could be applied to CAVs markets, considering our frameworks and the following aspects described in Table 7 to a proper market shaping.

## 6 Concluding Remarks

As far as the possibilities to elaborate markets are dynamic and diverse (Nenonen, & Storbacka, 2021), this paper sought to elaborate frameworks which could characterize CAVs market considering the inclusion of PWDs. The frameworks were elaborated within two parts: **market practices and its framings or agencements**.

Mobility market is moving towards mobility based on data, which is the base for CAVs development (Seiberth, & Gründinger 2018). Therefore, it could be argued that this market presents an overflowing feature (Callon, 1998). This element could prompt new studies on

CAVs markets and its overflowing element. Considering the aspects of transport digitalization and artificial intelligence (AI) there is a research demand on AI for the benefit of society (Wamba, Bawack, Guthrie, Queiroz, & Carillo, 2021).

Another element of this market is related to CAVs availability, since levels 4 and 5 are still not available in the market (Fagnant, & Kockelman, 2015). Pricing strategies and its formation are still focused on levels 2 or 3 of CAVs. In this sense, CAVs markets are considered as still under development (i.e., nascent, without consolidated structures).

According to the frameworks proposed, both practices and framings delineated consider CAVs as a nascent market. In this sense, **practices** should be focused on structuring the **exchanges** and **norms** of this market (new transport business models and its regulations, such as universal design for CAVs). For PWDs, we argue that **representative practices** (offering inclusive mobility, safety, freedom, and independence), should guide this market. Also, we consider that correct communication of the benefits and risks of CAVs must structure this market, along with the definition of market size, subsides for PWDs and the form of access of CAVs by them (to buy or to lease a CAV).

As for the framings proposed, CAVs markets should be arranged (**pacifying goods**) according to distinct norms and context as Europe and the USA (e.g., different automation levels). For **price formation** there is a need for flexible models and more awareness for consumers (Daziano *et al.*, 2017; Panagiotopoulos, & Dimitrakopoulos, 2018), which could impact access for PWDs. As for **Marketizing Agencies,** we draw upon Antonialli's (2021) work, which identified private and public agents that could promote agencements on CAVs market within public transport. We argue that this could benefit PWDs in a future market integrated with private systems via shared models. At last, **Market encounters** in a nascent market as CAVs, scientific societies play an important role on spreading new information.

As for future studies, we hope that these frameworks could be validated qualitatively or in quantitative models. We suggest that members of industry, PWDs, universities, governmental entities, could provide essential information on practices and agencements of this market. We also suggest studies focusing on each element of practices and framings proposal.

This research contributes to the requirement of market engagement and coordination of diverse market actors and different institutional contexts to shape market innovations (Kleinaltenkamp et al 2021, Fehrer, Conduit, Plewa, Li, Jaakkola, & Alexander, 2020; Baker, Storbacka, & Brodie, 2019). For CAV markets, we observed that this is a demand for the achievement of economic and social benefits.

Based on the arguments exposed by Andersson, Aspenberg, & Kjellberg, (2008) in which actors configuration influence on market practices, we suggest research which could investigate how diverse actors could influence on CAVs markets shaping and their respective practices).

As for research limitations we highlight the limits when studying new markets. In this sense, CAVs markets are still under development around the world. This fact prompts the need of gathering additional information of this market. Additionally, we considered these frameworks of CAVs market as a proposal. Due to its initial stage, a timeframe analysis of this technology was not developed. This element is important on market making approach. Other studies should consider time-frame analysis on these frameworks when these markets get more developed.

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## References

Akaka, M. A., Koskela-Huotari, K., & Vargo, S. L. (2021). Formalizing service-dominant logic as a general theory of markets: Taking stock and moving forward. *AMS Review, 11*, 375-389. doi: https://doi.org/10.1007/s13162-021-00214-y

Andersson, P., Aspenberg, K., & Kjellberg, H. (2008). The configuration of actors in market practice. *Marketing Theory, 8*(1), 67-90. doi: https://doi.org/10.1177/1470593107086485

Antonialli, F. (2021). Autonomous shuttles for collective transport: a worldwide benchmark. *International Journal of Automotive Technology and Management, 21*(1-2), 5-28. doi: https://doi.org/10.1504/IJATM.2021.113349

Antonialli, F., Cavazza, B. H., Gandia, R. M., Nicolaï, I., de Miranda Neto, A., Sugano, J. Y., & Zambalde, A. L. (2017). Autonomous Vehicles, are They "Riding" in a Blue Ocean? In 12th European Conference on Innovation and Entrepreneurship - ECIE 2017, Sep 2017, Paris, France.

Araujo, L. (2007). Markets, market-making, and marketing. *Marketing theory, 7*(3), 211-226. doi: https://doi.org/10.1177/1470593107080342

Araujo, L., & Kjellberg, H. (2009). *Shaping exchanges, performing markets: The study of market-ing practices*. SAGE Publications Ltd, https://doi.org/10.4135/9781446222454

Araujo, L., Finch, J., & Kjellberg, H. (2010). Araujo, L., Finch, J., & Kjellberg, H. (2010). (Eds.). Reconnecting marketing to markets. Reconnecting marketing to markets. Oxford University Press. 267p

Araujo, L., Kjellberg, H., & Spencer, R. (2008). Market practices and forms: introduction to the special issue. Marketing Theory, 8(1), 5-14. doi: https://doi.org/10.1177/1470593107086481

Araujo, L., Mason, K., & Spring, M. (2012). Self-driving cars. A case study in making new markets–London, UK: Big Innovation Centre, 9.

Araujo, L., Mason, K., & Spring, M. (2014) Expectations in networks: Market shaping devices of the driverless car. In 30th IMP Conference. Bordeaux, France. Submitted to 30th IMP Conference, Kedge Business School, Bordeaux, France. 4th-6th September 2014.

Azimont, F. (2010). Valuation, metrologies, and judgements: a study of market practices (Doctoral dissertation, Lancaster University). Retrieved on December 22nd, 2020. from: https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.551636

Bagloee, S. A., Tavana, M., Asadi, M., & Oliver, T. (2016). Autonomous vehicles: challenges, opportunities, and future implications for transportation policies. *Journal of Modern Transportation, 24(*4), 284-303. doi: https://doi.org/10.1007/s40534-016-0117-3

Bahamonde-Birke, F. J., Kickhöfer, B., Heinrichs, D., & Kuhnimhof, T. (2018). A systemic view on autonomous vehicles: Policy aspects for a sustainable transportation planning. *disP - The Planning Review, 54*(3), 12-25. doi: https://doi.org/10.1080/02513625.2018.1525197

Baker, J. J., Storbacka, K., & Brodie, R. J. (2019). Markets changing, changing markets: Institutional work as market shaping. *Marketing Theory, 19*(3), 301-328. doi: https://doi.org/10.1177/1470593118809799

Bardhi, F., & Eckhardt, G. M. (2012). Access-based consumption: The case of car sharing. *Journal of Consumer Research, 39*(4), 881-898. doi: https://doi.org/10.1086/666376

Bennett, R., Vijaygopal, R., & Kottasz, R. (2019a). Willingness of people with mental health disabilities to travel in driverless vehicles. *Journal of Transport & Health, 12*, 1-12. doi: https://doi.org/10.1016/j.jth.2018.11.005

Bennett, R., Vijaygopal, R., & Kottasz, R. (2019b). Attitudes towards autonomous vehicles among people with physical disabilities. *Transportation Research Part A: Policy and Practice, 127*, 1-17. doi: https://doi.org/10.1016/j.tra.2019.07.002

Bennett, R., Vijaygopal, R., & Kottasz, R. (2020). Willingness of people who are blind to accept autonomous vehicles: An empirical investigation. *Transportation Research Part F: Traffic Psychology and Behaviour, 69*, 13-27. doi: https://doi.org/10.1016/j.trf.2019.12.012

Betz, U. A. K., Betz, F., Kim, R., Monks, B., & Phillips, F. (2019). Surveying the future of science, technology, and business – A 35-year perspective. Technological Forecasting and Social Change, https://doi.org/10.1016/j.techfore.2019.04.005

Brinkley, J., Posadas, B., Woodward, J. and Gilbert, J.E. (2017), "Opinions and preferences of blind and low vision consumers regarding self-driving vehicles: Results of focus group discussions", ASSETS 2017 - Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility, pp. 290–299.

Çalışkan, K., & Callon, M. (2010). Economization, part 2: a research programme for the study of markets. *Economy and Society, 39*(1), 1-32. doi: https://doi.org/10.1080/03085140903424519

Callon, M. (1998). An essay on framing and overflowing: economic externalities revisited by sociology. *The Sociological Review, 46*(1_suppl), 244-269. doi: https://doi.org/ https://doi.org/10.1111/j.1467-954X.1998.tb03477.x

Callon, M. (2015). Performativity, Misfires and Politics. The Limits of Performativity: Politics of the Modern Economy, 25-31. 163-169 doi https://doi.org/10.1080/17530350.2010.494119 Routledge

Callon, M. (1984b). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St-Brieuc bay. In: Law, J. (Ed*.). Power, action, and belief: a new sociology of knowledge* (196-233). London: Routledge. doi: https://doi.org/10.1111/j.1467-954X.1984.tb00113.x

Callon, M. The sociology of an actor network: the case of the electric vehicle. In: Callon, M.; Law, J.; Rip, A. (Ed.). *Mapping the dynamics of science and technology*. London: MacMillian, 1986a. p. 19-34.

Carlier, M. (2022) Statista Website. Revenue - automotive manufacturing industry worldwide 2019-2022. And: Automation and electrification drive market disruption. Retrieved From: https://www.statista.com/statistics/574151/global-automotive-industry-revenue/ on February 24th 2023

Cavazza, B. H., Gandia, R. M., Antonialli, F., Zambalde, A. L., Nicolaï, I., Sugano, J. Y., & Neto, A. D. M. (2019). Management and business of autonomous vehicles: a systematic integrative bibliographic review. *International Journal of Automotive Technology and Management*, *19*(1/2), 31-54. doi: https://doi.org/10.1504/IJATM.2019.10019845

Cavazza, B. H., Souza T. A., Gandia, R. M., Zambalde, A. L., & Nicolaï, I. (2021). Innovation Radar for Disruptive Technology Insertion: The Case of Autonomous Vehicles in Brazil and France. Automotive Technology and Management, 21(1-2), 55-74. doi: https://doi.org/10.1504/IJATM.2021.113351

Choromański, W., & Grabarek, I. (2015). Driver with varied disability level–vehicle system: New design concept, construction, and standardization of interfaces. *Procedia Manufacturing, 3*, 3078-3084. doi: https://doi.org/10.1016/j.promfg.2015.07.854

Claypool, H., Bin-Nun, A., & Gerlach, J. (2017). Self-driving cars: The impact on people with disabilities. Newton, MA: Ruderman Family Foundation.

Cochoy, F. (2008). Calculation, qualculation, calqulation: shopping cart arithmetic, equipped cognition, and the clustered consumer. *Marketing theory*, *8*(1), 15-44. doi: https://doi.org/10.1177/1470593107086483

Cohen, T., & Cavoli, C. (2019). Automated vehicles: exploring possible consequences of opportunities, barriers, and policy recommendations. *Transportation Research Part A: Policy and Practice, 77*, 167-181. doi: https://doi.org/10.1080/01441647.2018.1524401

Covarrubias, A., & Ramírez Perez, S. M. (2020a). Introduction: Changing Geographies and Frontiers of the Automotive Industry. In: Covarrubias V., & Ramírez Perez, S. M. (eds.). *New Frontiers of the Automobile Industry*: Exploring Geographies, Technology, and Institutional Challenges Springer International Publishing (pp. 1-38). Springer International Publishing.

Covarrubias, A., & Ramírez Perez, S. M. (2020b). Wrapping Up: The New Geographies and Frontiers of the AI have Arrived. Who is Taking the Lead? In: Covarrubias V., & Ramírez Perez, S. M. (eds.). New Frontiers of the Automobile Industry: Exploring Geographies, Technology, and Institutional Challenges Springer International Publishing (pp. 455-494). Springer International Publishing.

Dalmoro, M., Wegner, D., & Schiavini, J. M. (2023). Princípios do Cooperativismo de Plataforma na Construção de Arranjos de Mercado. Revista Interdisciplinar De Marketing, 13(1), 47-58. doi: https://doi.org/10.4025/rimar.v13i1.6645

Daziano, R. A., Sarrias, M., & Leard, B. (2017). Are consumers willing to pay to let cars drive for them? Analyzing response to autonomous vehicles. *Transportation Research Part C: Emerging Technologies, 78*, 150-164. doi: https://doi.org/10.1016/j.trc.2017.03.003

Fafoutellis, P., & Mantouka, E. G. (2018). Major Limitations and Concerns Regarding the Integration of Autonomous Vehicles in Urban Transportation Systems. In The 4th Conference on Sustainable Urban Mobility (pp. 739-747). Springer, Cham.

Fagnant, D. J., & Kockelman, K. (2015). Preparing a nation for autonomous vehicles: Opportunities, barriers, and policy recommendations. Transportation Research Part A: Policy and Practice, 77, 167–181. doi: https://doi.org/10.1016/j.tra.2015.04.003

Fehrer, J. A., Conduit, J., Plewa, C., Li, L. P., Jaakkola, E., & Alexander, M. (2020). Market shaping dynamics: interplay of actor engagement and institutional work. *Journal of Business & Industrial Marketing, 35*(9), 1425-1439. doi: https://doi.org/10.1108/JBIM-03-2019-0131

Ferati M., Murano P., Giannoumis G. A. (2018) Universal Design of User Interfaces in Self-driving Cars. In: Di Bucchianico, G., Kercher, P. (eds). *Advances in Design for Inclusion*. AHFE 2017. Advances in Intelligent Systems and Computing, vol 587. Springer, Cham. doi: https://doi.org/10.1007/978-3-319-60597-5_20

Gandia, R. M., Antonialli, F., Cavazza, B. H., Neto, A. M., Lima, D. A. D., Sugano, J. Y. Nicolai I & Zambalde, A. L. (2019). Autonomous vehicles: scientometric and bibliometric review. *Transport Reviews, 39*(1), 9-28. doi: https://doi.org/10.1080/01441647.2018.1518937

Gateway mobility Project (2018) Retrieved from: https://trl.co.uk/projects/gateway-project on December 22nd, 2020.

Geiger, S., Kjellberg, H., & Spencer, R. (2012). Shaping exchanges, building markets. *Consumption Markets & Culture, 15*(2), 133-147. doi: https://doi.org/10.1080/10253866.2012.654955

Gerdes, J. C., & Thornton, S. M. (2016). Implementable ethics for autonomous vehicles. In Autonomes fahren (pp. 87-102). Springer Vieweg, Berlin, Heidelberg.

GERPISA (2020) the international network of automobile http://gerpisa.org/en

Goggin, G. (2019). Disability, Connected Cars, and Communication. International Journal of Communication (19328036), 13.

Grush, B., & Niles, J. (2018). The End of Driving: Transportation systems and public policy planning for autonomous vehicles. Elsevier.

Hagberg, J., Kjellberg, H., & Cochoy, F. (2020). The Role of Market Devices for Price and Loyalty Strategies in 20th Century US Grocery Stores. *Journal of Macromarketing*, 40(2), 0276146719897366. doi: https://doi.org/10.1177/0276146719897366

Harrison, D., & Kjellberg, H. (2016). How users shape markets. *Marketing Theory, 16*(4), 445-468. doi: https://doi.org/10.1177/1470593116652004

Heinrichs, D. (2016). Autonomous driving and urban land use. In Autonomous Driving (pp. 213-231). Springer, Berlin, Heidelberg.

Henderson, S., & Golden, M. (2015) Self-Driving Cars: Mapping Access to a Technology Revolution retrieved from at https://www.ncd.gov/sites/default/files/NCD_AutomatedVehiclesReport_508-PDF.pdf Access in December 22nd 2020.

Hwang, J., Li, W., Stough, L., Lee, C., & Turnbull, K. (2020). A focus group study on the potential of autonomous vehicles as a viable transportation option: Perspectives from people with

disabilities and public transit agencies. *Transportation Research Part F: Traffic Psychology and Behaviour, 70*, 260-274. doi: https://doi.org/10.1016/j.trf.2020.03.007

Iacobucci, J., Hovenkotter, K., & Anbinder, J. (2017). Transit systems and the impacts of shared mobility. In: Disrupting mobility (pp. 65-76). Impacts of Sharing Economy and Innovative Transportation on Cities. Springer, Cham.

IET (2017), Expect the unexpected. Report on the introduction of connected and autonomous vehicles (CAVs) Retrieved From https://www.theiet.org/impact-society/factfiles/transport-factfiles/expect-the-unexpected

International Classification of Functioning, Disability and Health – ICF (2013) 123p Geneva: Switzerland.

Kemp, R., F. W. Geels, and G. Dudley. (2012). "Introduction. Sustainability Transitions in the Automobility Regime and the Need for a New Perspective." In Automobility in Transition? A Socio-technical Analysis of Sutstainable Transport, edited by F. W. Geels, R. Kemp, G. Dudley, and G. Lyons, 3–28. London: Routledge

Kjellberg, H., & Helgesson, C. F. (2007). On the nature of markets and their practices. *Marketing Theory, 7*(2), 137-162. doi: https://doi.org/10.1177/1470593107076862

Kjellberg, H., Helgesson, C. F. (2006). Multiple versions of markets: multiplicity and performativity in market practice. *Industrial Marketing Management, 37*(7), 839-855. doi: https://doi.org/10.1016/j.indmarman.2006.05.011

Kleinaltenkamp, M., Conduit, J., Plewa, C., Karpen, I. O., & Jaakkola, E. (2021). Engagement-driven institutionalization in market shaping: Synchronizing and stabilizing collective engagement. *Industrial Marketing Management, 99*, 69-78. doi: https://doi.org/10.1016/j.indmarman.2021.09.010

Klier, T., & Rubenstein, J. (2020). Overview of the US Automobile Industry. In New Frontiers of the Automobile Industry (pp. 41-66). Palgrave Macmillan, Cham.

KPMG (2020) Autonomous Vehicles Readiness Index Ranking 25 countries in the race for driverless cars and trucks. Retrieved on December 22nd, Retrieved from: https://home.kpmg/xx/en/home/insights/2019/02/2019-autonomous-vehicles-readiness-index.html

Lasmar Júnior, E. L., Gandia, R. M., Sugano, J. Y., Souza, T. A. D., & Rodriguez, D. Z. (2019). New business models and the sharing economy: impacts and challenges for the traditional automotive industry. *International Journal of Automotive Technology and Management, 19*(3-4), 301-320. doi: https://doi.org/10.1504/IJATM.2019.100882

Latour, B. Reassembling the social-an introduction to actor-network theory: reassembling the social-an introduction to actor-network-theory. Oxford: Oxford University Press, 2005. 316 p.

Leme (2015), P. H. M V. A Construção do Mercado de Cafés Certificados e Sustentáveis da Utz Certified no Brasil: As Práticas e os Arranjos de Mercado. 273 p. Tese(doutorado)– Universidade Federal de Lavras, 2015

Leme, P. H. M. V.; Rezende, D. C. de. (2018) A construção de mercados sob a perspectiva da teoria ator-rede e dos Estudos de Mercado Construtivistas (EMC). *Revista Interdisciplinar de Marketing, 8*(2), 133-151. doi: https://doi.org/10.4025/rimar.v8i2.41790

Lin, P. (2016). Why ethics matters for autonomous cars. In Autonomous driving (pp. 69-85). Springer, Berlin, Heidelberg.

Marletto, G. (2019). Who will drive the transition to self-driving? A socio-technical analysis of the future impact of automated vehicles. *Technological Forecasting and Social Change, 139*, 221-234. doi: https://doi.org/10.1016/j.techfore.2018.10.023

Mason, K., Kjellberg, H., & Hagberg, J. (2015). Exploring the performativity of marketing: theories, practices, and devices. *Journal of Marketing Management, 31*(1-2), 1-15. doi: https://doi.org/10.1080/0267257X.2014.982932

McColl-Kennedy, J. R., Cheung, L., & Ferrier, E. (2015). Co-creating service experience practices. *Journal of Service Management, 26*(2), 249-275. doi: https://doi.org/10.1108/JOSM-08-2014-0204

Mele, C., Pels, J., & Storbacka, K. (2015). A holistic market conceptualization. *Journal of the Academy of Marketing Science, 43*, 100-114. doi: https://doi.org/10.1007/s11747-014-0383-8

Merat, N., Madigan, R., & Nordhoff, S. (2017). Human Factors, User Requirements, and User Acceptance of Ridesharing in Automated Vehicles (No. 2017/10). OECD Publishing.

Milakis, D. (2019). Long-term implications of automated vehicles: an introduction. *Transport Reviews, 39*(1), 1-8. doi: https://doi.org/10.1080/01441647.2019.1545286

Milakis, D., Van Arem, B., & Van Wee, B. (2017). Policy and society related implications of automated driving: A review of literature and directions for future research. *Journal of Intelligent Transportation Systems, 21*(4), 324-348. doi: https://doi.org/10.1080/15472450.2017.1291351

Mitchell, W. J., Borroni-Bird, C. E., & Burns, L. D. (2010). Reinventing the automobile: Personal urban mobility for the 21st century. MIT press.

Nenonen, S., Storbacka, K. (2021). Market-shaping: navigating multiple theoretical perspectives. AMS Review, 11, 336–353 https://doi.org/10.1007/s13162-021-00209-9

Orsato, R., Dijk, M., Kemp, R., Yarime, M., (2012). The electrification of automobility: The Bumpy Ride of Electric Vehicles Toward Regime Transition In Automobility in Transition? A Socio-technical Analysis of Sutstainable Transport, edited by F. W. Geels, R. Kemp, G. Dudley, and G. Lyons, 205–228. London: Routledge

Panagiotopoulos, I., & Dimitrakopoulos, G. (2018). An empirical investigation on consumers' intentions towards autonomous driving. *Transportation Research Part C: Emerging Technologies, 95*, 773-784. doi: https://doi.org/10.1016/j.trc.2018.08.013

Reschka, A. (2016). Safety concept for autonomous vehicles. In Autonomous Driving (pp. 473-496). Springer, Berlin, Heidelberg.

SAE International. (2016). Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles. Warrendale, PA: SAE International.

Seiberth, G., & Gründinger, W. (2018). Data-driven business models in connected cars, mobility services & beyond. [BVDW Research report]. Retrieved on December 22nd, 2020, from https://www.bvdw.org/fileadmin/user_upload/20180509_bvdw_accenture_studie_datadrivenbusinessmodels.pdf.

Sheller, M. (2012). The emergence of new cultures of mobility: stability, openings." In Automobility in Transition? A Socio-technical Analysis of Sutstainable Transport, edited by F. W. Geels, R. Kemp, G. Dudley, and G. Lyons, 180–205. London: Routledge

Silva, J. P. N. D., Gandia, R. M., Sugano, J. Y., Oliveira, C. C., Antonialli, F., Pedrosa, G., Antunes, L. G. R & Cavazza, B. H. (2020). From technology to market: a bibliometric and integrative review on autonomous vehicles. *World Review of Intermodal Transportation Research, 9*(1), 1-26. doi: https://doi.org/10.1504/WRITR.2020.106442

Simakova, E., & Neyland, D. (2008). Marketing mobile futures: assembling constituencies and creating compelling stories for an emerging technology. *Marketing Theory, 8*(1), 91-116. doi: https://doi.org/10.1177/1470593107086486

Snellen, D., & de Hollander, G. (2017). ICT'S change transport and mobility: mind the policy gap! *Transportation Research Procedia, 26*, 3-12. doi: https://doi.org/10.1016/j.trpro.2017.07.003

Souza, C. E. C., Leme, P. H. M. V., Guimarães, E. R., & Maciel, G. N. (2022). Market-Making Research: A Theoretical Systematization. *Revista Interdisciplinar de Marketing, 12*(1), 1-16. doi: https://doi.org/10.4025/rimar.v12i1.58651

Sparrow, R., & Howard, M. (2017). When human beings are like drunk robots: Driverless vehicles, ethics, and the future of transport. *Transportation Research Part C: Emerging Technologies, 80*, 206-215. doi: https://doi.org/10.1016/j.trc.2017.04.014

State of Automotive Software Development Report, (2024). What Are the Top Concerns Impacting Automotive Software Development? Perforce Software, Inc. Disponível em: https://www.automotive-iq.com/. Acesso em 29 abr. 2024.

Storbacka, K., & Nenonen, S. (2011). Markets as configurations. *European Journal of Marketing, 45*(1/2), 241-258. Doi: https://doi.org/10.1108/03090561111095685

Sze, N. N., & Christensen, K. M. (2017). Access to urban transportation system for individuals with disabilities. *IATSS Research, 41*(2), 66-73. doi: https://doi.org/ https://doi.org/10.1016/j.iatssr.2017.05.002

Tonelli, D. F. (2012) Origens e afiliações epistemológicas da teoria ator-rede: implicações para a análise organizacional. In: Encontro Da Associação Nacional De Pós-Graduação E Pesquisas Em Administração, 36., 2012, Rio de Janeiro. Anais... Rio de Janeiro: ANPAD, 2012.

Tureta, C.; Rosa, A. R.; Santos, L. L. da S. (2006) Estratégia como prática social e actor-network theory: uma possível conversação para o estudo da estratégia. In: Encontro Nacional Da Associação Nacional Dos Programas De Pós-Graduação Em Administração, 30., 2006, Salvador. Anais... Salvador: ANPAD, 2006. p. 1-16.

United Nations (2006) CRPD UN Convention on the rights of persons with disabilities. General Assembly A/61/611 – 6. December 2006.

Wamba, S. F., Bawack, R. E., Guthrie, C., Queiroz, M. M., & Carillo, K. D. A. (2021). Are we preparing for a good AI society? A bibliometric review and research agenda. Technological Forecasting and Social Change, 164, https://doi.org/10.1016/j.techfore.2020.120482

Wells, P. E. (2010). The Automotive Industry in An Era of Eco-Austerity: Creating an Industry as if the Planet Mattered. Edward Elgar,

Winkle, T. (2016). Safety benefits of automated vehicles: Extended findings from accident research for development, validation, and testing. In Autonomous driving (pp. 335-364). Springer, Berlin, Heidelberg.

Wolf, I. (2016). The interaction between humans and autonomous agents. In Autonomous driving (pp. 103-124). Springer, Berlin, Heidelberg.

Wolmar, C. (2018). Driverless cars: on a road to nowhere. London Publishing Partnership.

World Health Organization WHO (2011) World Report on Disability. Geneva. Switzerland 350p

World Health Organization WHO (2018). Disability. Retrieved from: https://www.who.int/health-topics/disability#tab=tab_1 . on April 24th, 2020.

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## Contribution of each author

| Contribution | Daniel Mesquita | Elisa Cozadi | Daniel Rezende |
|---|---|---|---|
| **1.** Definition of research problem | ✓ | ✓ | ✓ |
| **2.** Development of hypotheses or research question (in case of empirical studies) | | | |
| **3.** Development of theretical propositions (in case of theoretical work) | ✓ | ✓ | ✓ |
| **4.** Theoretical foundation / literature review | ✓ | ✓ | ✓ |
| **5.** Definition of methodologial procedures | | | |
| **6.** Data collection | | | |
| **7.** Analysis and interpretation of data (when applied) | | | |
| **8.** Revision of the manuscript | ✓ | ✓ | ✓ |
| **9.** Manuscript writing | ✓ | ✓ | ✓ |