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The Lure and Limits of Smart Cars: Visual Analysis of Gender and Diversity in Car Branding

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Abstract: Introduction: Currently Europe regards itself as a leader in the global race towards smart automated transport. According to ERTRAC, European Road Transport Research Advisory Council, automated driving innovation is motivated by technological advancements as well as "social goals of equality". This article analyzes to what extent such dimensions of gender and diversity have become visible in smart car advertisements and how they correspond with the notion of Gender-Smart Mobility, which signifies equal and accessible transport solutions. Methods: Guided by theoretical notions of gender scripts and discourse analysis, this article addresses how perspectives of smart technology, gender, and class are carved out and handled in YouTube videos applied as marketing tools. Using visual analysis as a method, videos from well-known car producers such as BMW and Volvo are scrutinized. The visual analysis includes a presentation of the car company, descriptions of the most relevant YouTube videos, and discussion of the findings. Results: The visual analysis of the Volvo and BMW YouTube videos points to the lack of inclusiveness. There continues to be a prevalent reproduction of gendered stereotypes in the videos, not least in the notion of 'hyper masculinity' storytelling by BMW and how leaders (be they women or men) look, i.e., middle-class people. Volvo, on the other hand, has maintained its focus on female professionals in parallel with the introduction of new and energy-saving cars. Yet, a rather one-sided presentation of a professional business-woman is depicted as a replication of the businessman. Conclusion: In the final section, it is assessed how the visual branding complies with the notion of Gender-Smart Mobility, a concept that was developed in the EU Horizon 2020 project TInnGO. The two brands meet the Gender-Smart Mobility indicator, but only to some degree. None of the companies are fully inclusive, and it is difficult to label them as gender-smart and sustainable despite their ambitions of feeding into the green transition.

Keywords: smart cars; visual analysis; gender; diversity; middle class; gender scripts; YouTube videos; BMW; Volvo

1. Introduction

Visions of smart mobility are presently led by producers and manufacturers who promote an optimistic image of a society in which technological advances have delivered "a benign mobility system that all users can access seamlessly and on-demand" [1] (p. 116). Such claims are endorsed by the European Union and its aligned agencies who promote themselves as a leading party in the development of what is now called CAD, or Connected and Automated Driving [2]. Smart mobility and autonomous vehicles will, according to optimists, bring massive gains in safety, cost reduction, and infrastructure, and vehicles will be used more efficiently and extend accessibility for all [3–5]. Most of these optimistic predictions are made by people with financial interests in the industry, based on experience with new technologies such as cameras, smart phones, and personal computers [6,7]. According to the sceptics, including scholars, some politicians, and NGOs, such predictions tend to ignore significant obstacles to smart cars and their benefits. Several studies have

forecasted the risk of reinforcing the prevailing 'system of automobility', including all its evils of waste, pollution, and environmental degradation, as well as the social impacts of widening gaps between social groups with the coming of electric and automated cars [3,4].

In this article, we analyze how such contrasting perspectives in the cross-cutting field of smart technology, sustainability, and social inclusiveness are handled by two well-known and high-end car producers. In 2019, private cars constituted 60.7% of the total transport CO_2 emissions in Europe [8]. This stresses the need to investigate how the car models today respond to requests regarding sustainability, diversity, and inclusiveness [9] (p. 46). Diversity points to the inclusion of more social categories, such as age, ethnicity, class, sexuality, and disabilities. Working with diversity in research, planning, and policy-making means to be aware of how the category of women, for example, does not represent a single group, but contains large differences due to variables of age, class, and other categories.

This study is based on a visual analysis of advertisements from Volvo and BMW published on YouTube, a channel that has become pivotal for car companies. This echoes the fact that images and visuals in various forms have taken the lead in online representations of smart mobility. Scholars currently talk about a visual turn in smart mobility and the smart city discourse, where images form a vital form of existence and what has been labelled smart mentality [10,11], whereby a constant flow of images of smart cars and cities has become vital for urban existence and smart mobility [12]. Eventually, visual car-branding and the use of social media has become both an agent and an imperative for car producers who are in constant interaction and aim to reach out to new customers. The future of autonomous travel is often depicted in romanticized and harmonious localities, as a contrast to current urban realities as shown in Figure 1, which illustrates the the future vision of self-driving cars in the European Union [13].

Figure 1. An illustration of the future vision of self-driving cars in the European Union.

To use visual analysis and images in qualitative cultural analysis of car culture implies an interest in what the images tells us about society. Images are never innocent, and they do not show or mirror the world "as it is"—rather, they interpret the world and represent it in specific ways, depending on who is the sender, who is the receiver, and who sees the picture. Images can both function as disciplining in the ways in which they form our ideas about ourselves and the others; yet images can also create a sense of imagined community and imagined identity, which is central to the field of e-marketing [14–16]. In this study, we see images and other visuals as vital data and as a new entrance to a broader cultural analysis of smart cars and of future urban mobility [17] (p. 64).

Our specific aim is to analyze visual signs of break-ups from social and gendered stereotypes in the visualizations and promotion of future mobility. Until now, car promotion has routinely addressed men as the primary target groups and aligned masculinity with speed and mobility, while women have been an add-on and referred to in a feminized sphere of the home, domesticity, and care work. Or, they have been referred to in a highly sexualized atmosphere of the car shows, where women have been exhibited and used as a sales gimmicks [18]. As for class, it is evident that leading car brands such as Volvo and BMW have aimed at visualizing and attracting the new and emerging middle class, notably young and fit white people. Notwithstanding similarities among today's (European) and globalized car producers, we will show how these car companies at the same time seek to

maintain their own unique profile and brand including a blend of social, gendered, and national and local characteristics.

Social media platforms are not neutral instruments for communication, but have different qualities and affect what material is produced and how it is communicated [19] (p. 717). YouTube is chosen as the platform from where we analyze the car companies' commercials and videos. This platform has been selected due to its easy reach in many parts of the world, e.g., one does not need to pay to enter the website or to create an account to watch videos. This makes the social media platform accessible to many people. We have made selected videos from the car companies the focus of the analysis and used them as a departure for the conduct of specific case studies of Volvo and BMW. The material that is studied is, therefore, a defined content that reflects how the car companies represent themselves and how they address potential consumers.

Icons are of vital importance for car brands and a lot of their identity is connected to the particular characteristics and logos of the brands. The car brands included in this study have a long history in Europe and are, in their visual representations, connected to national histories and developments. A subtext is the development from poor to wealthy and modern European nation states. This goes, in particular, for Volvo, while BMW connects its history to the success of the post-1989 period, including the unification of Germany and the "victory" of the "free and democratic world". As for the aesthetics of their logos, Volvo and BMW have changed their iconic logos to conform better to the flat google world of the screen. The current two-dimensional form fits the digital age better and is central for the branding on the various digital platforms of the companies, including the YouTube videos.

At the end of this article, we will evaluate how the visual branding complies with the notion of Gender-Smart Mobility, a concept that was developed in the EU Horizon 2020 project TInnGO [9,20,21]. Gender-Smart Mobility implies an equally accessible transport solution for all spelled-ou in a new indicator consisting of five dimensions. In general, indicators have been vital for political and strategic goals of gender equality as well as for sustainability. The *Global Gender Gap Index*, for example, measures progress and backlash on an annual basis related to four vital areas: politics, education, economy, and health (https://www.weforum.org/reports/global-gender-gap-report-2021 (accessed on 14 January 2022)). The TInnGO indicator of Gender-Smart Mobility is intended to fill in the gap in the field of gender equality in transport and mobility, where recognized indicators are still lacking. Moreover, the ambition of launching the concept of Gender-Smart Mobility is to move away from static tick box evaluations. For instead, to present a reflective indicator, which do not have a final answer, but introduce new ways of thinking and raise consciousness in the field of transport. As such, the five dimensions form a composite indicator, used as a guide for assessments of particular transport modalities or devising in asking to which extent and for whom these smart cars are inclusive, affordable, attractive, effective, and sustainable.

In the following, we outline the conceptual framework and the methodology of the visual and cultural analysis of videos of the two car firms, BMW and Volvo. We demonstrate how the companies use e-marketing, in particular YouTube videos, to present the prospects and proliferation of smart mobility. Particularly, we ask: How is new technology and designs represented? How are categories such as gender and class, along with ethnicity and locality used and visualized? How does it all connect to the promise of sustainability and social equality?

2. Key Concepts and Methods

We have made use of an explorative and open methodology in the visual analysis of YouTube videos. We have connected digital data collection and analytical tools in the representation of smart cars and conducted an interlocking analysis of gender, diversity, and smart car technology. Diversity points to the inclusion of more social categories, such as age, ethnicity, class, sexuality, disabilities, and potential other dimensions. Working with diversity in research, planning, and policy-making means to be aware of how the

category of women, for example, does not represent a single group, but may contain large differences due to variables of age, class, etc.

2.1. Gender Scripts and Feminist Discourse Analysis

The Swedish scholar Catarina Landström connects scripts and discourse analysis in the notion of gendered interpellations as a way of understanding the gendered character of car culture. She argues that certain processes of interpellation invite men into an imagined homo-social community and into a shared culture of cars and transport artifacts. Car culture consequently becomes implied in the construction of stereotypical gender thinking and in the practice of heterosexual masculinity and pleasure, while women in such a stereotyped framework are often constructed as practicing a rational femininity as opposed to this type of masculinity and pleasure [22]. All in all, it is important to note that design and technical devices are not always the result of conscious attempts to exclude certain users. Rather, it can be the result of unconscious repetitions and reiterations of the hegemonic masculine norm.

The notion of gender scripts as an analytical tool can assist in the interpretation of gendered meanings of cars and visual representations, and also help to specify ideas about what is seen as masculine or feminine. Historical accounts have demonstrated that certain artifacts such as the car, have galvanized stereotypical representations of femininity and masculinity, which, in turn, have legitimized, reproduced, and reinforced asymmetrical relations between genders. A gender script analysis can be specified as a study of who has to "adjust more, who has to pay the price for not fitting the norm that is produced in the artefact." [17] (p. 44), [23] (p. 413). This leads us to feminist critical discourse analysis, which allows us to show the complex, subtle, and often invisible ways in which gendered norms and hegemonic power relations are handled. Feminist discourse analysis operates with the insight that a wide range of expressions, from text and talk to sight and sound, have material and phenomenological effects, not only for groups of men and women, but also for ethnic and sexual minorities in specific contexts [24,25]. Used in the framework of car producers, we will look at such expressions in the YouTube videos and examine how gender and potentially other categories are discursively produced, sustained, and challenged in the two companies [24–28].

Gender scripts and critical discourse analysis provide an explorative conceptual framework that can assist the visual and cultural analysis. This approach contrasts the narrow focus on the mainstream behavioral studies in transport research. Behavior is a notion that often implies a hierarchical model of technology and humans, the assumption that technology comes first, and an assumption that humans only enter this interplay as reactive users. The suggested theoretical framework is fruitful for an analysis of the social and visual shaping of technologies and the recognition that it includes more than the material object. It means, for instance, that the practice and potential take-up of the technology and the identity of the (supposed) car user is vital in both innovation, production and consumption of cars.

2.2. YouTube Videos as Data Material

YouTube as a media platform has been an important channel for marketing smart cars for both companies analyzed in this study. Comparing BMW with Volvo from 2006 till 2021 in the YouTube landscape highlights BMW as the leading company in terms of smart visuals and viewers as shown in Figure 2 [29,30].
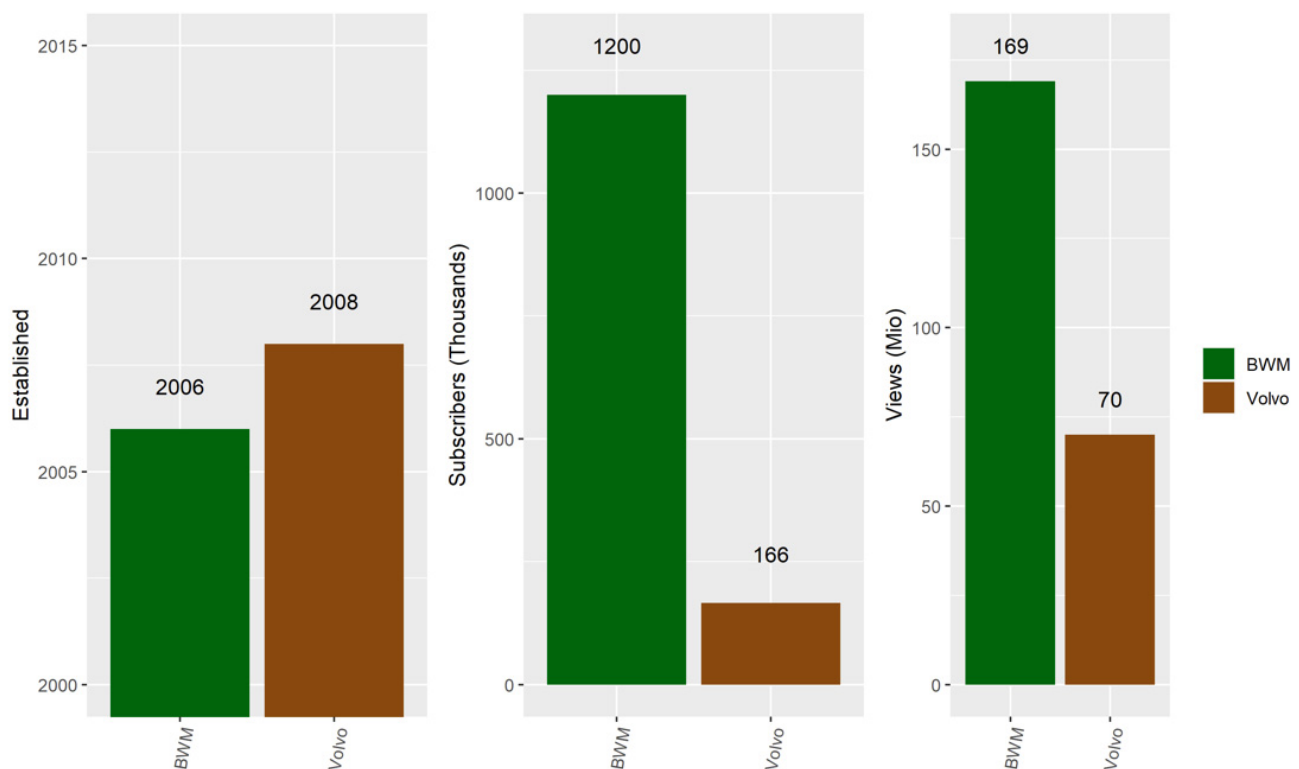
Figure 2. Numbers of subscribers and of viewers of BMW and VOLVO you tube channels (2008–2021).

We have identified the international channels of both companies as well as related channels that targeted specific geographical areas and countries. As for the data collection, it is possible to detect numbers of subscribers and views related to each channel and in specific geographical contexts as seen in Figure 3 [29,30]. From here, we have mapped and selected material uploaded on the car companies' international channels. We have done this in two ways: (a) identified which playlists and themes that the car companies make use of, and (b) identified which videos were most popular. C. We located the promotion of videos with smart cars. These mappings may contain the number of views, likes, the length of the videos, and the date of upload, which have been visualized in tables and figures.
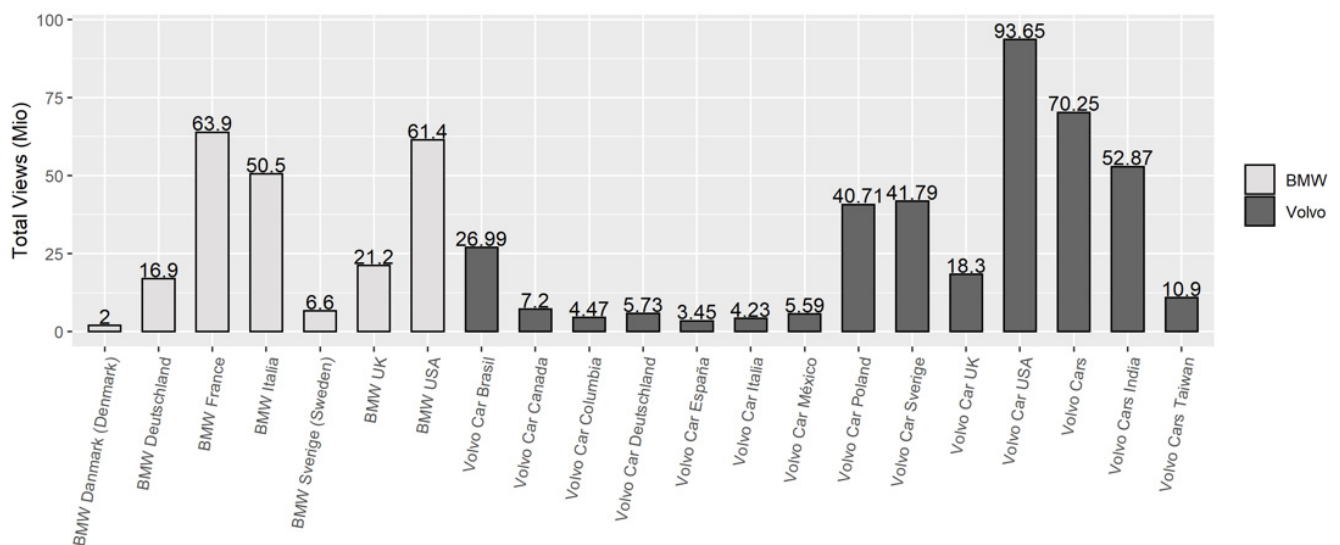

Figure 3. BMW and Volvo. You Tube Viewers in specific geographical areas 2021.

The variations in numbers of "smart" subscribers and views might also indicate the particular profile of the car brand and its customers and their level of perceived smartness. From a conceptual angle, one can argue that social media platforms such as YouTube form part of new communicative infrastructures, which also enable new forms of social connectivity and social being [11]. This includes the smart visuals can be seen as a peculiar digital form of urban being, and as connected to nearly all forms of being in advanced capitalist societies. As such, YouTube videos form part of the new social media landscape, which also co-constitute human beings in human material—intra actions. Yet, the analysis also shows that not all beings and affective fields are formed in the same way, and that they may vary according to nationality, age, gender, ethnicity, and so forth Post-humans are understood here as human subjectivity that is co-constituted with technologies, and as such, the term post-human also directs attention to subjectivities that are not the white, straight masculinity with which the "human" is so often conflated [11].

2.3. The Role of Pictures and How to Approach Them

In the YouTube analysis of smart car images, we have been inspired by an approach developed in social sciences [31,32]. The explorative research design was spelled out in a quantitative mapping of videos from 2018–2020, when smart cars and climate change came of age. A selection of a total of 60 videos was mapped according to gendered representations and profiles. The mappings quantified the proportion of videos with visual gender representation and other aspects, including the gendered voiceover, which in many videos plays an emotional and seductive key role. The outcome of this quantitative mapping is shown in Table 1 [29,30]. It reveals that Volvo depicts more women than BMW in its videos—and more women hold a proliferated role than in the BMW films. The auditive dominance of women is also noted in the Volvo voiceover in 90% of the videos, whereas in the BMW videos, male voices dominate. These quantitative outcomes are by and large echoed in the qualitative analysis, which points to the masculine dominance of the BMW visuals and the promotion of gender equality in the Volvo videos.

Table 1. Mapping of visual and auditive gender representations in BMW and Volvo videos.

	BMW		Volvo	
	Women	**Men**	**Women**	**Men**
Appearance in video	50% (29) *	50% (29)	63% (56)	37% (33)
Domination in video	30% (9)	37% (11)	50% (15)	23% (7)
Voice over	0% (30)	100% (30)	90% (27)	10% (3)

* Numbers are written in percentages, frequency in brackets ().

The use of mixed methods and the combination of quantitative mapping with deeper qualitative analysis turned out to be fruitful and showed that quantitative mapping cannot stand alone. Hence, the mapping of 60 videos showed that gender analysis cannot be conducted by body counting alone; gendered practices in car culture must be contextualized and localized in order to yield full meanings. While the quantitative mapping offers a ground for generalization, the qualitative analysis offered more complexity and depth where the car narratives become contextualized and inserted in a larger framework of traditional car culture and gendered interpellations (The TInnGo project experimented with more advanced digital methods in the mapping and location of gender and diversity in smart mobility. Yet, it turned out that digital tools such as image scraping are particularly problematic due to frequent misreadings of gender and race. See https://www.tinngo.eu/wp-content/uploads/2020/11/TInnGO_D4.6_Media-Analysis-Report.pdf (accessed 14 June 2021)).

The qualitative analysis consisted in the following steps, shown in Figure 4.
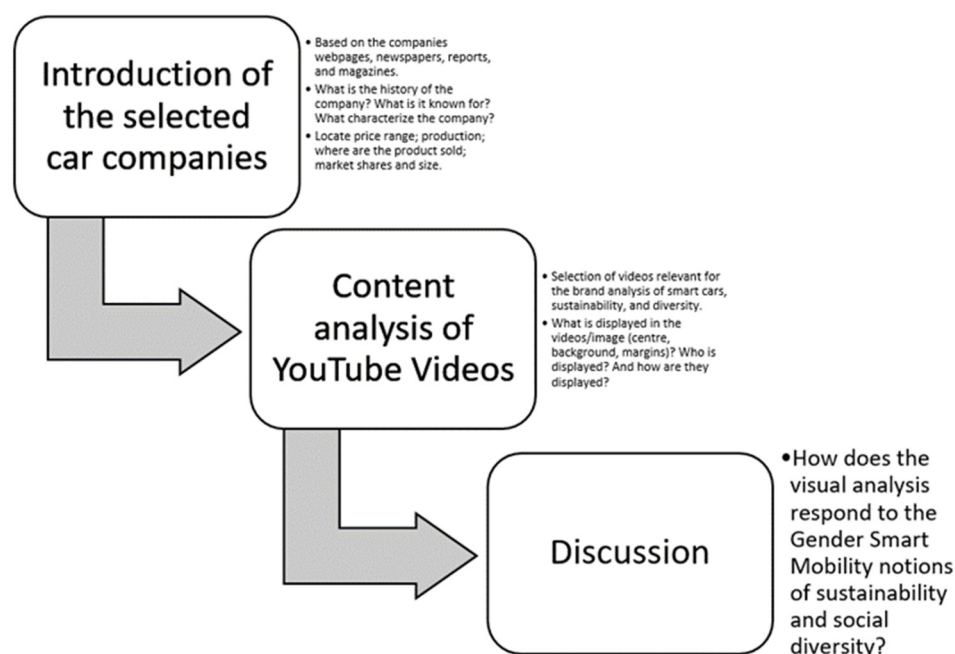
Figure 4. Model of qualitative visual analysis consisting of 3 steps, introduction, content analysis and discussion.

Step 1: *Introduction of the selected car companies.* This first step is based on the companies' own webpages, but also newspapers, reports, and magazines. In this part of the analysis, it is vital to ask what the history of the car company is. What is it known for? What characteristics does it have? Moreover, it is relevant to locate the price range of the company's cars and where they are sold and produced, as well as market shares and size.

Step 2: *Content analysis of the YouTube videos.* We selected a few videos relevant for the brand analysis of smart cars, sustainability and diversity, guided by questions such as: What is displayed in the image? Center, background, margins? Who is displayed? When and where (which here refers to gender, ethnicity, and locality)? What colors and styles are used and how are they "coded" in gender and ethnic and class terms? Which elements are the most central: Visuals, sound, talk, text? Also, we focus on the social categories that are represented and how they are addressed. Are the videos echoing stereotypes or challenging them? Which social characters are associated with the narratives expressed in the videos?

Step 3: *Discussion: How does the visual analysis respond to the notions of sustainability and social diversity?* This concluding section discusses how the video narratives respond to the notion of Gender-Smart Mobility, spelled out in five dimensioins developed by the TInnGO project. This step addresses the car companies' self-representation, but may also widen the complexity of the indicators of Gender-Smart Mobility in order to capture and challenge and change the future motorized mobility. We have chosen this approach of visual and qualitative analysis in order to advance new insights and to further reliability.

This analysis uses the notion of smart cars as a backdrop, which refers to various models of existing electric cars and autonomous cars. The Table 2 below depicts the codified terminology and how the step-wise process of innovation includes the fully automated car as the end goal [32]. Most advanced car producers, notably BMW and Volvo, are located in step 3, yet they are striving towards step 4 and 5 in tough competition with other leading brands, including newcomers such as Tesla.

Table 2. Depicts the terms and the step-wise process of innovation which includes the fully automated car as the end goal.

Stages of Autonomous Driving	Description	Elaboration
1	Driver Assistance	Driver Assistant System supports the driver but does not take control. Examples: Active Cruise Control with Stop-and-Go function, which independently adjusts the distance to the car in front of you.
2	Partly Automated Driving	System can take control, but the driver remains responsible for operating the car. Examples: Steering and Lane Control Assistant.
3	Highly Automated Driving	Personal CoPilot System allows the driver more freedom to completely turn their attention away from the road. Examples: The car will be able to drive autonomously over long distances in certain traffic situations, such as on motorways. However, the driver must be able to take over control within a few seconds, such as at road construction sites.
4	Fully Automated Driving	On this level, the car can handle the majority of driving situations independently. The technology in level 4 is developed to the point that a car can handle highly complex urban driving situations, such as the sudden appearance of construction sites without any driver intervention.
5	Full Automation	Here, the car performs any and all driving tasks—there isn't even a driver cockpit. Therefore, every person in the car becomes a passenger, opening up new mobility possibilities for people with disabilities, for example.

3. BMW Analysis: Driving towards Success, Innovation, and Leadership

BMW is a German multinational corporation which produces luxury cars and motorcycles. The company was founded in 1916 and has since grown into one of the world's leading car brands, in terms of luxury, innovation, and sustainability. BMW strives to be a fully sustainable company by cutting CO_2 emissions, recycling, expanding hydrogen technologies, and even planting peanuts [32].

3.1. BMW's YouTube Channel

The official YouTube channel of BMW, 'BMW', has existed since January 2006. By April 2021, it counts more than 1.2 million subscribers and has had over 169 million views.

The following visual analysis is divided into two main sections of analytical focus. The first section focuses on how BMW uses various visual effects and tools to construct and present a specific brand identity on masculinity and leadership. This analysis is completed through a close examination of the top three most popular YouTube videos.

The second section focuses on the development on electric and autonomous cars and examines how these cars are promoted and connected to the brand identity of BMW.

The Small Escape is the most popular BMW YouTube video with more than 23 million views and 88,000 likes [33]. The video depicts a historic landmark of Berlin in 1964 where East Berliners desperately tried to cross the border to West Berlin. The Berlin Wall divided families and friends, and the time of 1964 was characterized by fear and uncertainty [34], yet allows the audience to perceive glimpses of technical drawings of a BMW vehicle. The scene then slightly changes, and we can see in the background the appearance of a BMW Isetta. White letters appear at the in front with the words: "Based on a true story".

The video then illustrates scenes from the Berlin Wall and its checkpoints where West Berliners could cross the borders to East Berlin to commute to work. The lighting is still dark due to the evening atmosphere. The only lighting in the scene is from the projectors surrounding the checkpoint, which leaves the audience with a feeling of coldness. The scene then changes from a bird's-eye view perspective to the ground perspective, where we

witness how a car is closely examined by the checkpoint guards. Suddenly, the owner of the car starts running and the guards try to stop him. The scene ends with the main character, a middle-aged white man, who wakes up. He gets out of bed and sits at his desk—the same desk we, as an audience, saw at the beginning of the video, with technical drawings of a BMW vehicle laying around. The choice of selecting such a historical moment for Berlin suggests an embracing of German history and Western values. It illustrates a story of the innovative, intelligent, and brave man, who stands up against the oppressive system. It emphasizes freedom, independence, and leadership, and underscores the identity of BMW as a strong car brand we can count on. It paves the way and drives us into the future. Source: [34].

In the second most popular BMW YouTube video, 'The Epic Driftmob', we are watching five BMW 235i cars performing a drift-choreography in about 90 s. The setting is a modern urban area with admiring pedestrians on the sidewalks as the audience [34]. All five drivers are men, and the video shows remarkable drifting skills, speed, and playfulness. The sound is heavily dominated by the noise of the vehicles when drifting, which accentuates the wow feeling when watching the video.

Obviously, drifting is not to be confused with usual and responsible driving. On the contrary, drifting is a high-risk activity that requires an extensive amount of training and the acquisition of professional driving skills. Only few people will have the proper skillset and knowledge to perform and control a car in such a situation. To some extent, drifting can be understood as what Lyng describes as edgework, i.e., a dangerous, yet controlled activity for the skilled ones [35]. Both edgework and drifting involve risk-taking, and controlling a dangerous situation (through acquired skillsets) is a key factor.

Taken together, these compositions of the video portray an image of the BMW driver as a person (read: male) who leads with power and risk-taking, whilst having the professional skillset to control what others consider to be a dangerous or risky situation. He stands out from the mainstream and is not afraid to do so. Such a portrayal resembles a hegemonic masculinity, where certain traits and characteristics become idealized and receive social recognition [36,37]. By employing an idealized form of masculinity, which only few men are able to live up to, BMW becomes an identity marker and an efficient way of positioning oneself socially away from the crowd.

In the third video, '*The all-new BMW 7 Series. All you need to know*', we meet a male presenter, who is introducing the new BMW 7 Series [38]. The video contains beautiful landscapes, mountains, and a very modern house, which sets the scene for the presentation whilst underscoring the luxury, comfort, and exclusiveness of this BMW model.

Throughout the video, the presenter demonstrates and explains many of the innovative features of this model and illustrates how it fits perfectly into the modern lifestyle of the businessman. This includes, for example, its work-lounge on the backseat and its built-in massage device. The camera is frequently zooming in on each of the features, which allows the audience to absorb the visual expressions and luxury details of the interior of the car.

The video resonates with the former videos in its presentation and reproduction of BMW values and identity traits. Once again, the video speaks into the *business* and leadership narrative, including using idealized forms of masculinity within its presentation. This is, for example, illustrated through the use of associations, such as activating associations with Hollywood agent movies when presenting the parking features: "You might be thinking of some kind of special agent Hollywood movie, but this is the BMW technology available today" [39].

3.2. BMW: Pioneering Electric and Smart Mobility

The storytelling and identity of BMW as a leading, innovative, and business-oriented car brand is furthermore extended through its development of electronic cars and focus on smart mobility in general. When examining a selected amount of YouTube videos from the YouTube Channel BMWi, which has existed since September 2006 and currently has more than 47,800 subscribers, it becomes evident that BMW considers itself as a pioneer when it

comes to electronic mobility, from its evolution of straight-up electronic cars to mild hybrid technology. Some examples of electronic BMW cars are the BMW i3 and BMW i3X. Both car models are fully electronic and integrate the innovative technology of BMW. They are powered with BMW eDrive technology, which features BMW's high voltage lithium-ion battery, as well as the potential of recycling all materials [39,40].

The focus on environmental issues and sustainability are emphasized in several YouTube videos—both in videos on BMWi and the main channel BMW. On the BMWi YouTube channel, one of the latest YouTube videos, 'Remembering the future. The BMW i3 Moments.' (2021), dedicates its attention to the responsibility of humans in protecting our environment [41]. The setting of the video is characterized by nature: Landscapes, sunlight, trees, flowers, and the ocean. We see two young people travelling around in their BMW i3. They are enjoying the silence of the car, the sunlight, sitting in the standing car, and viewing the waves and ocean.

This particular video distinguishes itself from some of the prior YouTube videos of BMW, and the female character is much more in focus than previously. Secondly, even though many of the prior videos contain beautiful landscapes and people enjoying the nature (e.g., by swimming), there seems to be a greater focus on the presence and being-with-the-nature within this video compared to a more consuming-the-nature within some of the prior ones.

The choice of extending the brand of BMW by including the development of electronic cars and the use of marketing strategies such as 'Remembering the future' seems to prolong the identity of BMW as the brand for leaders—for people who dare to try something new and to lead the future. However, research on electric car brands and the role of brand personality, experiential brand associations, and emotional design suggests what appears to be a discrepancy between the identity of BMW and the extension of electric cars [42]. Based on surveys and interviews, Moons and De Pelsmacker find that people commonly associate the brand personality of BMW with being an active, sporty, and even an aggressive brand. It was described as sharp, strong, and masculine, and with a focus on technology and luxury. This stands somewhat in contrast to electric cars, which were commonly associated with being softer, feminine, and more responsible and reflective.

Many of the non-fully electric cars in the BMW context presented within a 'hyper-masculine' framework were luxury, had innovative technology, and storytelling focused on leadership. The leadership storytelling continues to be in focus in the electric car videos, but these are more concerned with emphasizing sustainability and female characters (either as voiceovers or in person), and have less of a business narrative.

At an overall level, there seems to be a subtle shift within the framework of BMW, wherein the narrative of leadership is extended yet supplemented with feminine and softer traits. This shift suggests a greater focus on driver diversity and the everyday life of families. Where some of the earlier videos focus mainly on comfort for a stereotypical businessman, such as working lounges, these videos focus much more on efficient and mobile transportation, fast charging systems, and making sustainable choices for future generations.

3.3. Driving towards Success, Innovation, and Leadership

The visual representations of cars from the BMW Group appeal to white businessmen who identify themselves with leadership. The visual analysis illustrates a solid business and leadership narrative and identity framework, where values like independence, freedom, intelligence, risk-taking, and control are strongly connected. Besides this, the analysis suggests a marketing strategy, where BMW becomes more than just a brand—it is a symbolic identification, whereby customers can position themselves and display their exclusive group membership. In contrast to the visual Volvo presentations, BMW promotion focuses more on the storytelling than on the actual car. The car becomes an icon or status symbol that reflects the specific personal identity of the consumer. In the recent promotion of electric cars, there seems to be a shift in the branding of BMW models, and more attention is

given to feminine qualities and values in the electric car videos than the white businessman-oriented campaigns. These videos feature more female characters and contain a focus on sustainability and responsibility for future generations to come. Taken together, these associations constitute an aggregated narrative, where independence, leadership, and comfort are central to the representation of the BMW identity. Such associative features can be illustrated in the following Figure 5.
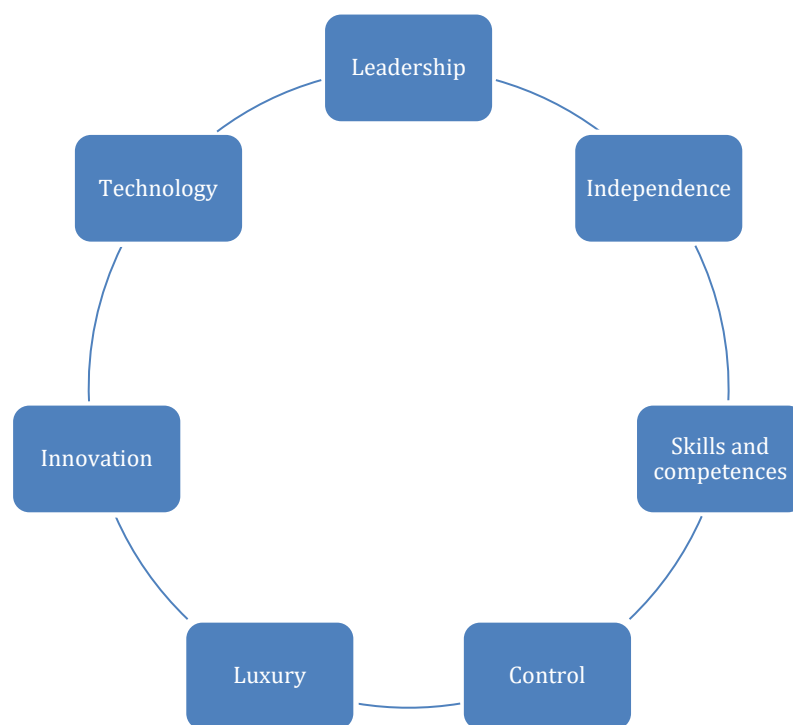
Figure 5. Association map of features based on visual analysis of BMW showing that independence, leadership, and comfort are central to the representation of the BMW identity.

Each of these features contributes to the overall narrative of the BMW identity as a company, which develops and designs vehicles for the future. The features reflect a narrative of BMW as an innovative, serious, and high-quality brand only few people can afford, and reflects an identity of BMW consumers as successful, leading, and independent people who value quality and innovative design. Such values and characters are commonly associated with the business world, where people are expected to perform innovative thinking, leadership, and independence in order to stay in the game.

4. Volvo Analysis: Promoting New Visions of Gender Equality?

Volvo was founded in Sweden in 1927 and is well-known today as an international car brand with Nordic and Scandinavian historical roots and qualities. Volvo was promoted from the outset as a strong and safe car, which echoed the characteristics of "The people's Home", the Swedish term for a well-ordered democracy and elaborate welfare state that protected its citizens. These ideas were carried on in the 21st century where "Volvo for Life" was used as a bold campaign slogan that pretended to address all walks of life. Volvo catered for safety and security in individual car mobility, as did the welfare state in social affairs, which also included gender equality as a core value [43–45].

Volvo's main YouTube channel, "Volvo Cars", has existed since 11 August 2008, and as of 4 January 2021, it counts more than 166,000 regular subscribers, i.e., users who have an account on the site and have opted to receive notifications when videos are uploaded to the Volvo Cars channel. Volvo Cars videos have achieved over 70 million views since 2008. Furthermore, Volvo has a diverse portfolio of channels that cater for customers in various countries.

The Figure 3 showed the various channels and their individual numbers of subscribers and views. The mapping of the various national channels also indicates the main Volvo markets. The US appears as one of the main Volvo markets, along with Sweden as the homeland of the brand. The upcoming markets are some of the BRIC countries—Brazil and India—and then China, which is not included in this count. Poland also stands out as a post-socialist country.

The presentation of Volvo YouTube platforms is based on mapping of the main Volvo Cars YouTube channel. The selection is guided by the aim of presenting the main characteristics of the Volvo brand and with an emphasis on how the visualizations connect past and future brand identities. What happens when a car brand like Volvo, known for its robust and advanced engineering, transforms from combustion to electric cars and, potentially from there, to autonomous mobility? What is the open and underlying composition of gender, age, and class in the presentations of the new mobility ages, and the new range of cars?

In the following section, we have selected and analyzed a couple of significant videos from these campaigns with a focus on the gendered character of the imagined future of the electric car and the future of autonomous driving. A visual representation which connects to both the past and present in Volvo's history.

4.1. The Volvo XC 40 Recharge: Walkaround

This 14-min-long video, with its detailed presentation of the first all-electric Volvo XC 40 recharge, connects to the historical presentation of the Volvo YCC concept car in 2004, developed by an all-women Volvo staff [46]. It also follows the lessons learned from addressing women and gender equality in car production, e.g., in the depiction of a robust car, the rational presentation, and the focus on practical details such as easy accessibility and driving abilities.

At the beginning of this video, we see a picture of the new off-white car against a background of bright walls. The music soundtrack is interrupted after a few seconds by the sound of high heels, which indicates the arrival of a woman. It is a younger woman, walking energetically and with loud steps towards the viewer. "*Hi, I am Beatrice Simonsen, I am the product manager.*" She is dressed in black trousers and a sand-colored jacket, with her hair tightly put up. In front of the robust car, she looks like Alice in Wonderland, a little girl in front of an oversized car (The misfit between bodies and the new robust cars was also noticed by potential Chinese women customers, who preferred a smaller and more handsome car compared to the "big and bulky" SUVs [18]). The car is, she argues, designed for an active, urban lifestyle. Everything to make life less complicated: "You can activate your preheated seats over the Volvo app on the phone, and all you have to do to drive is to carry your key". She enters the car and looks directly at the viewer: "*Do not look for the pedal; there isn't any*" and with a certain thrill, "*in fact, it is integrated in the seat as a sensor, so once seated just push the brake pedal, choose your gear and off you go; it cannot be easier*".

4.2. The Volvo XC 40 Recharge: Walkaround, Power and Acceleration

"Our new, purely electric xc 40 recharge really takes driving to a new level (. . .)" is the first sentence from Karolin Krellin, the Volvo Solution manager of electric propulsion [46]. She enters the screen in a casual style and presents the advanced technical details standing in front of a naked car, turque. Her presentation, held in a rational and serious tune, is accompanied by several depictions of technical details of speed and reach of the battery, charging times, etc. She assures that the cx 40 recharge is made with no compromises. It offers a truly inspiring drive, she says, to address assumptions about battery problems and seamless driving modes.

The electric power train is said to be at the heart of the driving experience, and she addresses the driver directly: "One pedal driving means that you only press for acceleration and release for braking; it offers a more relaxed drive in the city. And more intuitive control". As for the battery, which has been one of the main concerns of potential car consumers, she

also assures that the 78 KW battery gives a driving range of over 400 km, which makes it the perfect car in the city as well as over long distances. The battery also lowers centers of gravity, and stiffens the body and even weight distribution. All this makes the car even more fun and comfortable to drive, she assures.

All in all, this video connects to the style of Volvo presentations as being down to earth and rational, but not emotional or entertaining in a traditional sense. It links to the assumptions of women as rational car consumers, as claimed by Landström, yet it also connects the Volvo equality brand to present women role models in STEM vocations and as a vital part of the company and its recent innovation. It has to be noted as well that these images are all avoiding the pitfalls of making female-specific products small and pink [18,47], a feature that has characterized other products aiming at attracting female customers.

4.3. Volvo 360c: The Future of Autonomous Travel

The Future of Autonomous Travel is a significant Volvo promotion video presenting the future concept car of autonomous driving [48]. This video, launched in 2018, took a leap into the future and asserted the Volvo vision of developing advanced and safe technology for a new era. At the same time, the film promoted the businesswoman as a central car user and, as such, galvanized Volvo's enduring commitment to gender equality.

The 360C concept video depicted four different vehicle design details and scenarios where the businessman—routinely to take center stage and to be visual addressed—was replaced by one or more businesswomen. The scenarios clearly addressed and predicted the car as a new comfort zone and a location for so-called daily life for professional women in the business class segment. They were depicted in various work-related situations as both users and professionals. The video started with visualizations of the streamlined design and where the car is showcased from the outside, including the iconic new lights depicted together with the modernized and more elegant and dynamic Volvo logo.

The male voiceover addresses the businesswoman directly and shows how the car can bring "you" to work. The first scene portrays a professional woman sitting in her car with her breakfast while she enjoys reading a book. The online technology takes care of the outside world with stress-less driving. The scene is reminiscent of a business class airline experience, serving a close-up picture of breakfast neatly served as it would be in a café or hotel; the breakfast is enjoyed while the woman is on the go.

Another scene depicts smart travelling as an alternative to an office meeting. Here, two well-dressed women sit in front of each other in the car in comfortable chairs and with a table between them. The voice presents the situation as follows: "*You actually pick up a client, you present your work, you have a side screen, and fresh coffee.*" Nothing is left beyond the gaze of the designer; the coffee is served in a model cup shown earlier by the design director.

The last scenario, which from the design vice president's view is the most interesting: The car that can substitute air travel is the ultimate dream of the Volvo car producers: "*Imagine a car which picks you up from work and takes you directly to your destination in another city for a meeting the next day*". Here, we see the businesswoman on the move. Again, the cabin and bed look comfortable, safe and sound, and also come close to a business-class airplane design.

Volvo in this film maintains and proliferates the brand as having a strong commitment to gender equality, in particular when it comes to marketing the most advanced future models. This differs from findings in recent studies, where it is argued that smart cars inherently address the needs and affordances of the male business elite [49–51]. The visual representation of the imagined future of the Volvo car relocates the dominant and exclusive male and masculine focus and widens the circle of business people to also include women and, hence, Volvo in these videos maintains its brand's commitment to addressing women both as experts and as consumers. The company has, more than other car producers in this segment, recognized the importance of women consumers as a driver of its business potential and market share. The challenge remains, however, whether the inclusion of the

emerging female business elite car-owner and co-producer of high-end, middle-class cars will change the bigger picture of (un)sustainable mobility in society?

4.4. Volvo: Promoting New Visions of Gender Equality?

Volvo is still presented in the videos as a brand with specific Scandinavian traits. This goes for both the quality, safety, and sturdiness, as well as for the attention to family and gender equality. While Volvo has been known for paying attention to family life, there seems in the YouTube videos of autonomous and electric cars to be a narrower emphasis on urban middle-class and corporate gender equality. This complies with new norms in the Western world and in the global business community, where gender equality is promoted as a potential driver of growth as shown in Figure 6 [52].

Volvo cars, notwithstanding various steps towards climate-friendly qualities and sustainability in the electric car fleet, are not inclusive in the sense that they clearly belong to the higher end of the middle-class market. The price of electric cars in Denmark ranges between €55,818 and €166,969, which is why Volvo has not become a "people's car". The size and sturdy design also threaten its prospects of offering seamless transport in big cities in the future where these cars will add to and not solve the pressing problem of congestion. The videos transpose a predominantly white middle-class culture that is not challenged or changed by users from non-white ethnic groups. Yet, it is important to note that that the broader outreach of the Volvo brand seems to be underway. Sustained by YouTube marketing, Volvo has achieved a growing market share in India and China, for example. This might also pose a challenge to the Scandinavian and a global trend towards more gender-inclusive marketing and underplayed car consumer strategies, in contrast to the current Chinese owners who acquired Volvo in 2009 and who want more flashy and aspirational sedan cars that appeal to traditional businessmen [53].

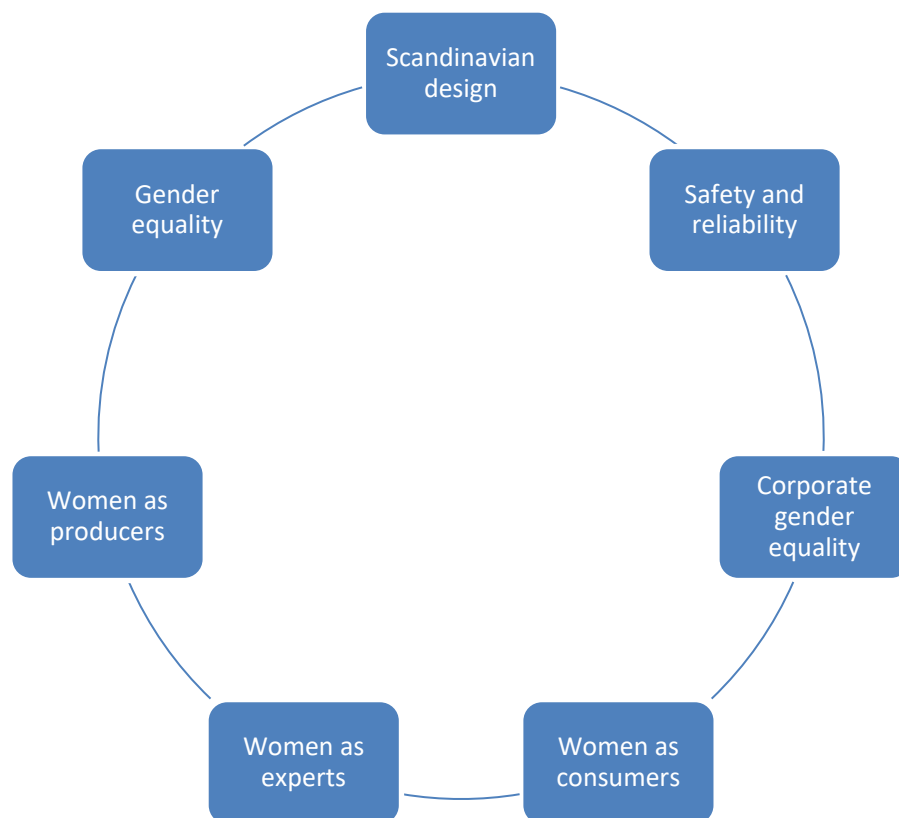The dominant associative features of Volvo can be illustrated in the following model:

Figure 6. Association map of features based on visual analysis of Volvo showing that Scandinavian design, reliability, gender equality including women as producers and consumers are central to the representation of the Volvo identity.

5. Discussion: Comparing and Contrasting Volvo and BMW You Tube Films with Gender-Smart Mobility

In continuation of the above analysis and overview of the BMW and Volvo videos and their visualizations of products, we now turn to comparing and contrasting the smart car analysis with the notion of Gender-Smart Mobility [9]. The notion of Gender-Smart Mobility has been developed by the Horizon 2020 TInnGO project and can be defined as a composite indictor consisting of five dimensions of being inclusive, affordable, attractive, effective, and sustainable transport. Together, it is used to assess for whom transport solutions are made and, especially, who they do not target. Indicators can assume different forms and serve various functions. In general, indicators are divided into A: descriptive indicators relevant for systems that disseminate knowledge or create attention about a problem or a gap; B: Normative indicators, which include a strategic goal or a critical limit value. The Gender-Smart Mobility indicator is an explorative indicator which cuts across existing categorizations of types and roles of indicators (A composite indicator should be based on a theoretical framework and definition, which allows individual indicators/variables to be selected, combined, and weighted in a manner which reflects the dimensions or structure of the phenomena being measured. Cf https://eige.europa.eu/gender-equality-index/2021 (accessed on 22 January 2022)). As such, the five dimensions are presented as a guide to assessments of particular transport modalities or devices in asking to which extent and for whom these modalities are inclusive, affordable, attractive, effective, and sustainable One can see examples of the implementation of Gender-Smart Indicators in the TInnGO HUBS and Gadap plans. https://transportgenderobservatory.eu/resources/gender-diversity-action-plans/ (accessed on 1 February 2022).

5.1. Inclusive Transportation

Following the concept of Gender-Smart Mobility developed by the TInnGO project, the inclusive smart transport solution is defined as a system that addresses various groups of citizens in non-stereotypical ways, expressed in the transport systems of design, accessibility, safety, public campaigns, market promotions, living labs, etc. [9] (p. 46). The visual analysis of the Volvo and BMW YouTube videos points to lack of inclusiveness in various ways. Although the analysis occasionally identifies both female and non-white characters, there continues to be a strong reproduction of gendered stereotypes in the videos, not least in BMW's 'hyper masculinity' storytelling and how leaders (be they women or men) look like middle-class people. Such an 'inclusion gap' and strong identification with professional leadership and masculinity reproduces gender stereotypical images and primarily appeals to men [37,38]. Volvo on the other hand depicts a rather one-dimensional image of the professional businesswoman. Notwithstanding Volvo's more female-inclusive branding, studies that goes back in time have shown that the effects might be limited. When Volvo presented the "female" concept car in 2007, its promotion emphasized "all decisions made by women" and aimed at addressing "the most demanding premium customer: The independent woman professional". As for the lasting effect the 2007 all-woman concept car has been deemed as a good business case in terms of attention. Yet, it has also been interpreted as a "carnival" that captures the double nature of such an "affirmative" action. On the one hand, the car as an innovation project gave space to women as a marginal group in car innovation and technology. On the other hand, such an activity runs the risk of becoming marginal with a limited sustaining impact [44,54]. We did identify examples of new scripts of diversity and inclusiveness, although in a much smaller scale compared with the representations of white male drivers and experts.

5.2. Affordable Transportation

The affordable transportation dimension refers to the ambition that current investments should address robust and stable public transit provisions. This also means that both public and private investments should support the innovation of smart small cars for all rather than luxury cars for the few, keeping in mind the gender pay gap, and that women

in general are less economically resourceful than men [9]. The price of a new BMWi3 starts from €37,600, which suggests that only middle-class families and above will be able to afford to buy it. The price of a XC40 Recharge Volvo begins at €65,895, making it difficult even for the average middle-class family to purchase it.

5.3. Effective Transportation

According to the Gender-Smart Mobility indicator, effective transportation can be seen as when transport planning and policies provide seamless transport for all, including walking and biking in relation to smart mobility provisions, and that market stakeholders are directed to produce smart and efficient public transport rather than smart luxury cars [9] (p. 46). The car companies here display a high degree of effective transportation and individual affordances, as private cars offer a high degree of flexibility. Yet again, the key question is 'for whom?' The electric vehicles the two car companies offer are private solutions with a high level of comfort. However, the size and bulkiness of the recent Volvo cars, in particular, may impede seamless mobility and parking in urban areas.

5.4. Attractive Transportation

Whether the transport modality or artifact is attractive can be defined as if the planning provides safe, accessible, and livable spaces in all parts of the city, and if it provides smart solutions for (. . .) broader and diverse groups of people [9] (p. 46). The rather stereotypical presentations of high-income or middle-class business users of the Volvo and BMW smart cars presented on the YouTube channels and videos is not a realistic perspective for the broader population. Again, this connects to the question of affordability and who the target group is.

5.5. Sustainable Transportation

When speaking of sustainable transportation, it is usually not private cars that come into mind. On the roadmap developed by the TInnGO project, the inclusion of non-motorized transport as well as mixed and connected modalities were regarded as being at the core of ensuring sustainable transport [9] (p. 46). However, non-motorized vehicles may not be an opportunity for everyone on all journeys, and despite that, it is fundamental to incorporate non-motorized transport as part of the transport system. Yet, it remains relevant to ask how motorized transport, too, can be reflected in a sustainable framework. Sustainability was, in this analysis, indicated as cars that were small and electric, and built from recycled materials. However, a sustainable solution requires more than the assessment of the isolated vehicle and a consideration of the broader context and criteria.

6. Conclusions

In this article, we have scrutinized visual representations of smart cars in terms of gender, class, and other social categories as presented on the YouTube channels of Volvo and BMW. We found that the two brands only to some degree meet the Gender-Smart Mobility indicators set out by the TInnGO project. Neither of the companies are fully inclusive, and it is difficult to label them as sustainable despite having ambitions for green transition.

Returning to the issues that were raised at the beginning of this article regarding the potential and limitations of the emergence of smart cars, this analysis sheds light on the complexity and scale of these issues. It has been argued that the making of 21st century modernity and consumer communities corresponds with the formation of nation-states as imagined communities in the 19th century [18]. Today, it is claimed that cars and other consumer goods have replaced media and political arenas as the channel for the imagination, and that the imagination is now situated in transnational connections and regional consciousness rather than within national boundaries. Notwithstanding similarities among today's (European) and globalized car producers, the visual representations in YouTube videos show that the car companies try to maintain their own unique profiles and brand, including a blend of social, gendered, national, and local characteristics in the intensi-

fied competition at the global car market. They use e-marketing in a broader effort of mobilization of memories and feelings in favor of energy saving, whilst galvanizing a car-centric mobility as a signpost for modern society and smart middle-class mobility. The interest of the car producers is not to destabilize or decode the car discourse and practice, meaning that the broader issue of climate-friendly solutions is reduced to providing a better and safer car for individuals and their families. Car producers apply sophisticated marketing tools and methods, which not only promote the cars as isolated devices, but show them in certain and specific contexts. Both of their e-marketing takes issue of the new communication technologies in the YouTube videos, where they try to maintain and build alliances with new consumer values and preferences. Moreover, the car companies in their e-marketing distinctively read and reflect current buzzwords and political trends related to climate and CO_2 reduction and various urban challenges. Traditional car companies like Volvo and BMW are up against threats from many sites—technologically, politically, and in terms of global competition. As reflected by the current CEO of Volvo in the introduction to their vison of the autonomous cars: "The business will change in the coming years, and it is important that Volvo should be the leader, we should contribute to transforming the business . . . it is really about going from selling cars to delivering mobility services to our customers." [44]. The staging of the mature CEO as a relaxed, white, senior male on a sofa, talking slowly and in a low and crispy voice seems nearly a counter-statement to this prediction of a glorious and changing future for the traditional car companies. Time will tell how and whether car producers are willing to provide and connect a new range of mobility services that are able to meet the call for a broader variety of customer interests and desires for climate- and human-friendly solutions.

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