Manifestations of the Groundswell in the Online Environment and its Impact on the Electric Cars Sales

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Abstract: Electric vehicles are popular in many countries, and they have become a symbol of eco-innovations and saving nature. Governments are getting innovative with their incentive policies to encourage clean vehicle sales without too much cost and without benefiting high-income households. On the other hand, the development of information technologies, the increased availability of the Internet and the sharp increase in online media users have caused a significant change in several areas of consumer behaviour. The paper examines the possible impact of the groundswell phenomenon in the purchase of electric cars in 21 countries and analyzes the groundswell manifestations in the online environment and the sales of electric cars in recent years. It also examines the impact of the COVID-19 pandemic, the war in Ukraine and high electricity prices on the sales of electric cars, as well as on the interest in these products expressed by searching for related terms on the Internet. The author identifies trends in this area and provides an overview of current research and studies mapping the influence of the groundswell on the saleability and communication of eco-products.

Keywords: Groundswell. Online Media. Electric Cars. Consumer Behaviour

1. Introduction

With the gradual improvement, expansion of the portfolio and subsidization of electric cars by governments, sales of electric cars are increasing every year. Since 2011, when approximately 55,000 electric cars were sold, annual sales of electric cars in Western Europe, the USA, China, Canada and Japan have increased by 1,300%. According to The Economist Intelligence Unit (2022), new-vehicle sales will stall in 2023, especially in Europe and the US. Global new-car sales will rise by just 0.9% globally, held back by squeezed consumer spending, high commodity prices and production shutdowns caused by supply-chain disruptions. New-car sales in western Europe will decline by about 3%, while they will fall by 2.4% in North America. Meanwhile, new CV sales will fall by 1.3% globally, amid an expected recession in the Eurozone and slower GDP growth in the US and China.

The development of information technologies, the increased availability of the Internet and the sharp increase in online media users have caused a significant change in several areas of consumer behaviour. Currently, online media are becoming more and more popular, and users also use them as a source of information. As Voramontri and Klieb (2018) point out, the social media revolution has led to new ways of searching and obtaining information about several products and services on the market. Powers et al. (2012) emphasize that this allowed consumers to connect and discuss brands quickly and easily.

According to the Digital Report (Kemp, 2022), there were 4.95 billion internet users and 4.62 billion active social media users. The number of internet users in 2022 increased by 4.0% and active social media users increased by 10.1% compared to the previous year. Daily time spent using the internet reached in 2022 almost 7 hours and using social media reached 2 hours and 27 minutes.

Online media has empowered consumers because marketers have no power over the content, timing, or frequency of online conversations between consumers. Many studies (e. g. Ashman, Solomon, and Wolny, 2015; Bronner & Hoog, 2010; Grant, Clarke, and Kyriazis, 2007) focus on consumer behaviour in an online shopping environment, but without considering the effects of the Internet on the various stages of the consumer decision-making process. Investigating the impact of the Internet and social media platforms on consumer behaviour is also justified in the context of the groundswell phenomenon. Li and Bernoff (2011) define the groundswell as a societal trend where people use technology to achieve what they need from each other rather than from traditional institutions such as businesses. Through the mentioned technologies, we understand precisely social networks, blogs, applications and other tools that allow obtaining the necessary information or sharing it. This is also confirmed by the data from the Digital Report (Kemp, 2022) on the use of the Internet and social media, according to which the primary reason why internet users aged 16 to 64 use the Internet is finding information (61.0%) and the sixth most common reason is finding new ideas or inspiration. In the case of social media, the sixth and the seventh most common reason to use it is finding inspiration for things to do and buy 27.7%) and finding products to purchase (26.3%).

According to Sarkar (2013), ecology and the economy are at a crossroads in the modern world. With the increasing pace of globalization and economic liberalization, giving birth to the rapid growth of consumerism by modern civilization, there is growing consciousness to move gradually towards green growth with sustainability.

In connection with the growing interest in eco-innovations, like electric cars and an ecological way of life, we can also assume an increased influence of the groundswell phenomenon precisely in the field of eco-products. For this reason, this paper examines the possible impact of the groundswell manifestations in the purchase of electric cars in 21 countries and analyses the groundswell manifestations in the online environment and the sales of electric cars in recent years. We are trying to find out if there is a connection between the interest in searching for the term "electric vehicle" on the Internet and the sale of battery electric vehicles (BEVs).

2. Aims and methodology

The paper aims to analyze the manifestations of the groundswell in the online environment and its possible impact on the sale of electric cars. The manifestations of the groundswell are analyzed with the help of search results on the Internet based on the so-called of interest in searching for selected keywords. The impact of the groundswell on the sale of electric cars was searched based on a comparison of data and sales of battery electric vehicles in 21 countries of the world and average values expressing the degree of interest in the search term "electric car" via the Internet search engine Google. The data was obtained using Google Trends and from the International Energy Agency. To prove the possible influence of these two variables, we used a correlation analysis, with the help of which we evaluated the dependence of two quantities (BEVs sales and interest in searching the term "electric car" on the Internet).

3. Assumptions

A1: There is a correlation between the interest in searching for the term "electric car" on the Internet and the sales of BEVs.

A2: Interest in searching for the term "electric car" on the Internet and the sales of BEVs have an increasing tendency between 2019 and 2021.

A3: Interest in searching for the term "electric car" will be highest in the countries with the highest sales of BEVs.

4. Discussion

According to the Global EV Policy (2022), in 2021, more than 4,700,000 battery electric vehicles (BEVs) were sold worldwide, which is more than double compared to 2020 (in 2020, more than 2,000,000 BEVs) and more than triple compared to 2019 (more than 1,500,000 BEVs were sold worldwide in 2019).

China has the largest share of BEVs sales, where more than 57% of global BEVs consumption was sold in 2020. We can observe an increase in BEVs sales in all analyzed countries except for the Netherlands. Figure 1 shows more detailed results.

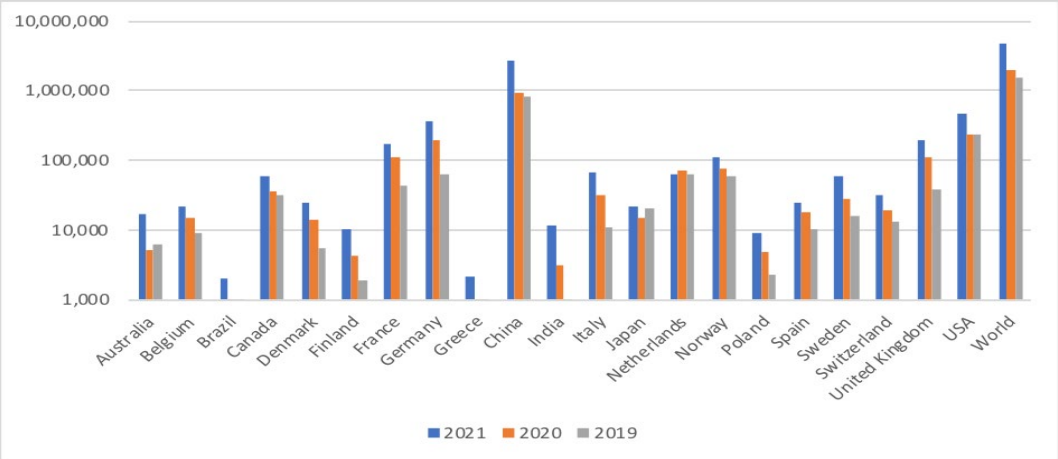

Figure 1 Comparison of BEVs sales in selected countries in 2019-2021.

Source: personal collection, 2022 (data: IEA©)

The sales of electric cars are influenced by several factors, from the price of the cars themselves, policies and support from the state to the economic level and situation in the given country. Marketing communication and varying degrees of sales support or direct discounts from manufacturers or sellers of electric cars have an impact on sales. However, based on the theory of the manifestations of the lower wave, we can assume that the behaviour of individuals in the Internet environment will reflect certain manifestations or indicate certain tendencies reflected in real shopping behaviour. We, therefore, focused on the analysis of search results for the term "electric car" in the Internet environment.

The results of the analysis show that in 2021 we can see the highest interest in searching for the term "electric car" in Norway, on the contrary, the lowest in Norway. When comparing individual years, we can see relatively significant differences in the level of interest of individual countries between 2019 and 2021, while the lowest interest can be observed in 2020. Figure 2 shows more detailed results.

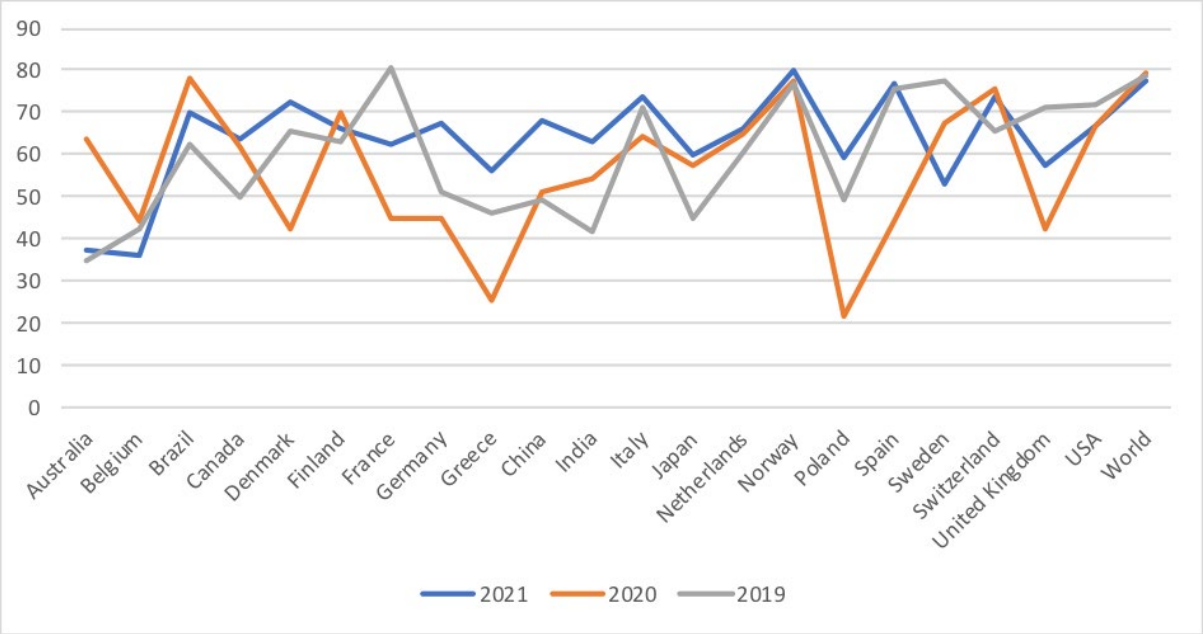

Figure 2 Comparison of the interest in searching for the term "electric car" in selected countries in 2019-2021.

Source: personal collection, 2022 (data: Google Trends©)

An interesting finding is that the average value expressing interest in searching for this term in China ranks seventh among all analyzed countries, while sales in this country reached the highest value in 2021. We, therefore, investigated the possible impact of interest in searching for the term "electric car" on BEVs sales through a correlation analysis for the years 2019-2021. Tables 1-3 show the results of the correlation matrix.

Table 1 Correlation matrix (BEVs sales and interest in searching for the term "electric car" in 2019)

	Google Trends	*BEVs Sales*
Google Trends	1	
BEVs Sales	0.214029394	1

Source: personal collection, 2022

Table 2 Correlation matrix (BEVs sales and interest in searching for the term "electric car" in 2020)

	Google Trends	*BEVs Sales*
Google Trends	1	
BEVs Sales	0.260407894	1

Source: personal collection, 2022

Table 3 Correlation matrix (BEVs sales and interest in searching for the term "electric car" in 2021)

	Google Trends	*BEVs Sales*
Google Trends	1	
BEVs Sales	0.291586741	1

Source: personal collection, 2022

The results of the correlation analysis revealed a weak positive correlation in all three analyzed years, while we can observe a slight increase in 2021 compared to the previous two years. We can thus conclude that there is very little connection between the interest in searching the term "electric car" on the Internet and the sale of BEVs. We can partially confirm assumption 1.

The level of interest in searching for the term "electric vehicle" on the Internet was not the same in individual years. The level of interest also differed in individual countries. However, the results of the analysis showed that the interest in searching for the term "electric car" between 2019 and 2021 did not have a growing tendency. In 2020, we can observe a more significant decrease compared to 2019. Therefore, we cannot confirm assumption 2.

Search interest for the term "electric vehicle" in 2019-2021 was highest in countries where BEVs sales were significantly lower than in countries with the highest sales. Therefore, we cannot confirm assumption 3. Figure 3 shows more detailed results.

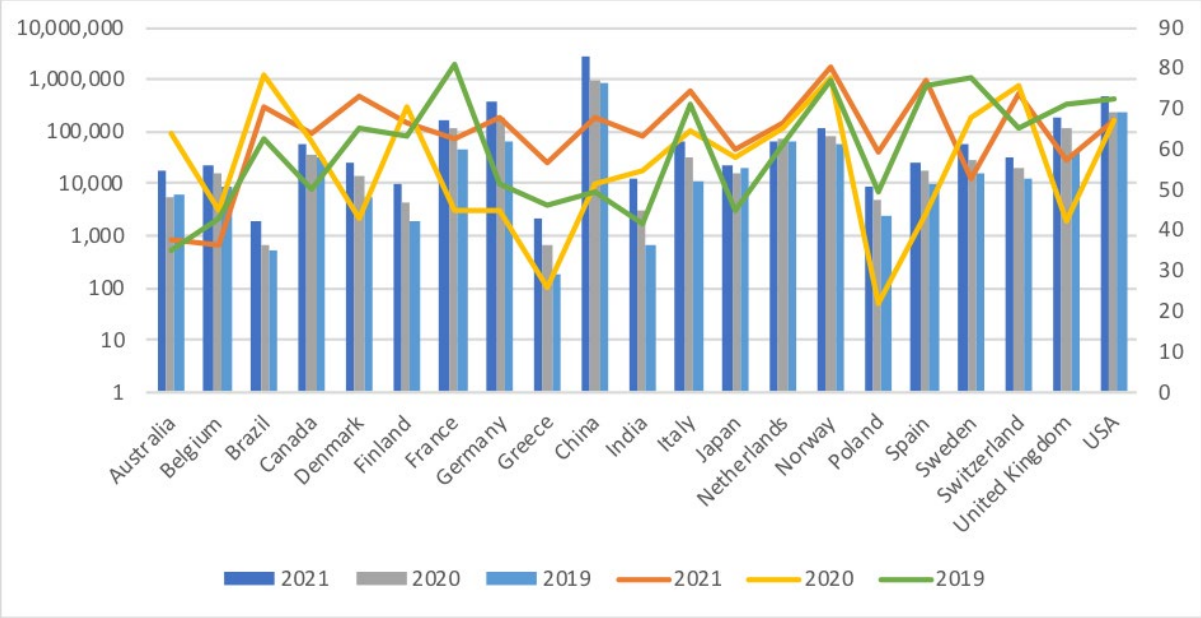

Figure 3 Comparison of the interest in searching for the term "electric car" and the number of BEVs sold in selected countries in 2019-2021.

Source: personal collection, 2022 (data: Google Trends©, IEA©)

5. Conclusion

Using various unofficial sources, such as social or online media, instead of official sources, such as official websites, stores, etc. to obtain the required information, the professional literature describes it as a groundswell phenomenon. Several studies (e.g. Peiró-Signes, A., Segarra-Oña, M., 2018; Li, 2010; Jansson, 2011) point to a change in the consumer and media behaviour of not only current but also older generations, while we can observe manifestations of the mentioned lower wave. This is also confirmed by data on the use of social networks or data from Internet searches (Kemp, 2022). As Krajčovič (2022) points out, given the importance of innovations and ecological solutions, social media and social networks can even be considered necessary, especially in raising awareness and eco-products, ecological services, as well as other ecological options available to customers.

From the point of view of researching the influence of the groundswell on consumer behaviour, it is interesting to analyze data from the online environment that talks about the way of using social or online media, and data about the consumption or sales of specific products. These data, in turn, indicate a certain trend in consumer behaviour.

For this reason, we investigated the possible connection between Internet searches and sales of electric cars. We analyzed the search for the keyword "electric car" through the Internet search engine Google, expressed by the so-called search interest and the number of BEVs sold in 21 countries around the world. We hypothesized that due to the phenomenon of the groundswell mentioned above and described in the literature, there would be a mutual connection between Internet searches and BEVs sales, which would confirm the existence of the groundswell and its direct impact on consumer behavior.

The results of the analysis confirmed the mutual connection and positive correlation between these variables, but it should be emphasized that this is a weak correlation. The results thus confirm the existence of the groundswell but do not prove its significant influence on the investigated phenomenon. However, the reason may be the fact that consumer behaviour, especially in the case of electric cars, is influenced by several factors that were not included in this analysis.

However, an interesting finding is that interest in searching for the term "electric car" on the Internet between 2019 and 2021 did not have an increasing tendency. In 2020, we can observe a significant decrease in interest in searching for this term, especially in some countries, such as Denmark, Greece or Poland. One of the reasons may be the COVID-19 pandemic, which affected almost all industries and affected the sales of many products.

Another interesting finding is that in the countries where the largest number of BEVs were sold, there was also the highest interest in searching for the term "electric car" on the Internet. We found much higher interest in countries where BEVS sales were lower. We found the highest search interest in France in 2019, on the contrary, we found the lowest interest in Poland in 2020.

According to Jansson (2009), in terms of the above-mentioned factors that influence consumer behaviour when buying electric cars, the following can be classified: (1) high-involvement green purchase decisions, such as eco-innovation adoption, can be viewed as morally based; (2) green purchase decisions and curtailment behaviours within a specific context are determined by partly different factors but the personal norm is a strong predictor of both types of behaviours; (3) green consumers are a heterogeneous group that can be separated based on green curtailment behaviours and proenvironmental purchase decisions, and (4) personal and social norms, consumer novelty seeking, and four perceived innovation characteristics influence the adoption decision.

The willingness to accept ecological innovations is also influenced by other determinants, which are the result of a combination of attitudinal factors and habits. According to Jansson et al. (2010) values, beliefs, norms, and habit strength determine the willingness to curtail and the willingness for eco-innovation adoption. Personal norms have a strong positive influence on willingness for the behaviours and habit strength has a negative influence. The other determinants have varying influences depending on the type of behaviour.

Social media can provide us with a lot of interesting information and data that can point to a certain trend, either in consumer or purchasing behaviour. By comparing these data over time, we can observe development tendencies and determine their probable development.

6. Limitations and scope for future research

The contributions focused exclusively on the number of BEVs sold (while we did not analyze other categories of electric cars such as Plug-in Hybrid Vehicles - PHEVs or Hybrid Electric Vehicles - HEVs) and interest in searching for the term "electric car" on the Internet. We did not analyze specific conditions, restrictions and other factories in individual countries that affect the sale of electric cars (such as government incentives, etc.). Data on the number of BEVs sold were compared with data on interest in searching for a specific term on the Internet. We compared the interest in the Internet term "electric car", while they did not try and compare the interest in searching for other related terms. The paper aimed to find out whether there is a possible connection between the search for and the sale of electric cars. Further studies from a more detailed possible connection using a wider range of search keywords.

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