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A Study of Marketing Strategies of Electric Vehicles (EV)

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ABSTRACT

The Electrical Vehicles (EV) industry is evolving in several ways. The technology behind EVs is improving, and so are the supporting facilities. At the same time, consumers have become more aware of electric vehicles as a viable option for their next vehicle purchase. In addition to these trends, fuel prices are ever-increasing while prices of EVs continue to fall. This means that more people can afford to drive an EV. The objective of this study is to know the marketing strategies of how electric vehicles can be used worldwide. This study applied descriptive quantitative method through survey which involved 100 Malaysian, Indonesian and Indian respondents. From the study, it can be found that satisfaction with electric vehicle's efficiency, satisfaction with environmental friendliness, and public perception towards electric vehicle usage were variables that influence consumers' behaviour towards electric vehicles. Furthermore, satisfaction with being environmentally friendly has a strongest impact on consumer behaviour above two other variables. It comes to conclusion that promoting electric vehicles as friendly environmental transportation to consumerscan be the focus of marketing strategy in EV market.

Keywords: Consumer Behaviour; Electric Vehicles; Environmentally Friendly; Public Perception; Public Satisfaction

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INTRODUCTION

The way we think about energy usage and transportation is being completely transformed by electric vehicles (EVs). With environmental issues and climate change at the front of everyone's mind, electric vehicles (EVs) provide a potential way to cut carbon emissions and encourage sustainability. EVs are cars that produce propulsion using one or more electric motors rather than conventional internal combustion engines that burn gasoline or diesel fuel. EVs are an energy-efficient and emission-free alternative to conventional automobiles since their electric motors are powered by rechargeable batteries rather than by burning fossil fuels (Xing et al., 2021). The electric vehicles are powered either by a collector system through electricity from charging station deployments or can be charged by self-charging devices such as regenerative braking systems, turbochargers, and others (Bhardwaj et al., 2020).

EVs were some of the first cars made, and in the early 1900s, before the dominance of light, powerful internal combustion engines (ICEs), they held a number of land speed and distance records for vehicles. They were manufactured by companies like Baker Electric, Columbia Electric, Detroit Electric, and others, and they once outsold cars that ran on gas. In the US, there were 28 percent of electric automobiles on the road in 1900. President Woodrow Wilson and his secret service agents drove about Washington, D.C. in their Milburn Electrics, which could go 60–70 miles (100–110 km) on a single charge, demonstrating how well-accepted EVs were at the time. But when gas-powered cars became more popular, electric cars started to lose ground. Electric cars were slower to refuel, had a shorter range, and were more powerful than gasoline-powered ones. Gas-powered cars had mostly taken the role of electric vehicles by the 1920s (Matulka, 2014).

There has been a renaissance of interest in electric cars in recent years. The development of more potent and effective electric motors as well as the expanding accessibility of charging infrastructure are some of the causes of this. Other contributing aspects include the growing worries about air pollution and climate change. Small city cars to huge SUVs may all be found on the market today in a wide range of electric vehicle configurations. The affordability of electric vehicles is also rising, with some models currently being less expensive than comparably equipped gasoline-powered cars.

Owning an electric car comes with a lot of benefits. In comparison to gasoline-powered cars, electric vehicles are more ecologically beneficial because they emit fewer emissions (Alanazi, 2023). Additionally, they require less maintenance and are quieter than cars that run on gasoline. Possessing an electric car does come with certain drawbacks, though. Compared to gasoline-powered cars, electric vehicles can travel farther but require more frequent refuel. Additionally, even though the price gap is getting less, they cost more to buy.

All the things are considered, electric vehicles provide a viable replacement for cars that run on petroleum. They cost less to maintain, are more ecologically friendly, and are quieter. Although they can refuel more slowly, they have a smaller range. Electric vehicles are expected to gain popularity in the coming years as technology advances and infrastructure for charging is more widely available.

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LITERATURE REVIEW

Public Awareness

Since local pollution, noise emissions, and dependence on oil are co-benefits of reducing carbon emissions transportation, public opinions are important. Supporting the growth of the early electric vehicle market demands taking initiatives to increase consumer awareness. The majority of consumers in many areas lack knowledge about electric car technology, are unaware of the incentives that are offered, and are unaware of the variety of advantages that electric vehicles offer. According to research by Buhmann and Criado (2023), people are more likely to consider buying an electric vehicle in the future if they have some knowledge about and experience with the technology. Assessing the possibility and effectiveness of a consumer awareness campaign for electric vehicles can benefit from taking local context and resources into account. There are several awareness-raising and outreach initiatives already in place, and because they are localised, they are well suited to managing local issues including obstacles and hurdles. Programmes that have particular focus can help boost sales and public awareness while giving drivers who might not otherwise have had introduction to or awareness of the technology actual application. Hence, we hypothesize:

H1: Public awareness is not associated with consumer behaviour towards electric vehicles.

Satisfaction with Electric Vehicle's Efficiency

EVs convert electricity straight into motion. As a result, they are significantly more efficient than standard cars, which must first burn fuel to produce heat before turning that heat into motion. Even the greatest diesel engines struggle to reach 40% efficiency once fully warmed up, but EVs can be more than 70% efficient right away (eDF, 2023). To put it another way, the typical vehicle wastes more than half of the energy contained in its fuel. In contrast to a conventional vehicle, an electric vehicle (EV) recovers and stores a large portion of its braking energy in the battery, making it available when it needs to regain momentum. In a conventional vehicle, the brakes simply turn the energy into heat and waste it. When braking, an EV may be two to three times more effective than a comparable conventional vehicle. Battery electric vehicles fall under the existing traffic roads, safety collisions, and other national rules and regulations. Car power provides all or part of the electricity for these vehicles: rechargeable energy storage batteries, such as lead-acid batteries, lithium-ion batteries, etc. It can use an external power source to charge the battery directly and then convert the battery power into mechanical energy to move. Comparing battery-electric vehicles to conventional cars, there are numerous benefits: 1) To achieve zero or almost zero emissions in the discharge; 2) To minimise the traditional car's handling of oil emissions caused by environmental pollution in a variety of ways, such as brake oil and other oil emissions; high energy conversion efficiencies can enhance the economy's use of energy, increase driving efficiency, and produce a smoother ride with linear acceleration and minimal noise when driving. Hence, we hypothesize:

H2: Satisfaction with electric vehicle's efficiency is positively associated with consumer behaviour towards electric vehicles.

Satisfaction of Electric Vehicle with Environmentally Friendly

Climate change and the decreasing amount of fossil fuels are two major concerns in the contemporary era. One-fifth of CO2 emissions in the EU are caused by automobiles. It is now critically important to implement renewable energy-based transport on a large scale if you want to reduce CO2 emissions. According to the current invention, an

electrically powered vehicle (EV) includes a battery, an electric power conversion device electric motor, a drive wheel, a control portion, an accelerator, a brake, and a rotation sensor. By the end of the 19th century, commercial electric vehicles were already on the market. One intriguing technical advancement that has the potential to drastically cut CO2 emissions from automobiles is the development of electric vehicles (EVs), which have an electric engine and solely depend on batteries. Due to decreased carbon emissions and the removal of reliance on foreign oil, EVs are becoming more and more popular. Due to the genuine interest in EVs that has been generated in the automotive industry, several top manufacturers have already manufactured their own EV models. The popularity of EVs is also demonstrated by impact studies that have been conducted globally. Hence, we hypothesize:

H3: Satisfaction of electric vehicle with environmentally friendly is positively associated with consumer behaviour towards electric vehicles.

Public Perception Towards Electric Vehicles Usage

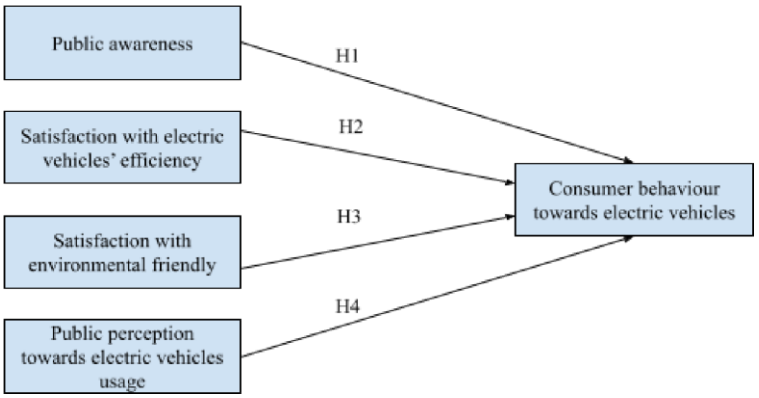
The researchers polled more than 2.000 people from all around the nation on their opinions of electric vehicles and other alternative fuel vehicles, including current EV owners and non-owners. They discovered that those who currently own an EV are more likely than those who don't to believe that it is cost-effective, environmentally friendly, and that it will become standard in the future. EVs are thought to be inferior to gas-powered vehicles, especially when traveling long distances and in mountainous terrain. Although this is frequently true, there are a lot of solutions that won't harm your experience in the end. The argument that EVs are unreliable stems from the fact that they need frequent maintenance and do not last as long as gas-powered vehicles (which, if you're not careful, can be true). It's reasonable for people to be concerned about the electric car range. According to estimates, the average American travels 11,500 miles a year, while the median range of today's batteries is little under 200 miles. For instance, a typical misunderstanding is that electric vehicles (EVs) are less powerful than gas-powered vehicles. While it is true that electric vehicles cannot go as quickly as gas-powered vehicles, it is questionable how detrimental this is in reality. Since they don't have the same energy overhead as gas-powered vehicles, EVs are more efficient when traveling at slower speeds. Hence, we hypothesize:

H4: Public perception towards electric vehicles usage is positively associated with consumer behaviour towards electric vehicles.

Consumer Behaviour Towards Electric Vehicles

EVs must overcome obstacles with customer behaviour as well as technological challenges, claim Egbue & Long (2012). The elements determining behaviour intentions motivated by knowledge and experience are explained by Ajzen's (1991) theory of planned behaviour (TPB). As a result, even once technical issues are resolved, the major issues with consumer behaviour towards EVs may still exist. According to Hale et al. (2002), the theory seems to be a good fit for illuminating environmentally conscious purchase choices. Although, according to Koenig-Lewis et al. (2014), it appears to be less useful in explaining behaviour with a significant unreasonable component. Berveling and Van de Riet (2012) believe that making an unreasonable decision can lead to the purchase of a car. The purchase could be motivated by reputation even if it might seem logical given that the car must meet both physical and financial requirements. Due to the topic global relevance, various authors have written literature reviews on EVs to organise their knowledge.

Figure 1. A Total of 4 Hypotheses Were Formulated Based on the Past LiteratureReview



RESEARCH METHOD

Sample and Procedure

In order to reach a conclusion, this study used both primary and secondary data. The primary source of information is an online survey that was administered via Google Form to 100 participants from Malaysia, India, and Indonesia. This questionnaire looks at public awareness, satisfaction with electric vehicle's efficiency, satisfaction of electric vehicles with friendly environmental, public perception towards electric vehicles usage and consumer behaviour towards electric vehicles. Using IBM SPSS Statistics, a demographic, descriptive, and multiple regression analysis were performed on the information that was collected. Appendix 1 is provided and contains the details of all measures. The term "secondary data" refers to the books, articles, journals, and websites that were employed to further this research purpose.

Measures

There are six sections in this questionnaire, the respondent's demography, public awareness, satisfaction with electric vehicle's efficiency, satisfaction with environmentally friendly, public perception towards electric vehicles usage and consumer behaviour towards electric vehicles. In respondent's demography, we employed single-statement items such as gender, age, nationality, education level and employment status.

Dependent variables discuss about consumer behaviour towards electric vehicles. This section has three questions on a five-point Likert scale to determine how strongly respondents agree or disagree with the statements. "I feel satisfied with electric vehicles performance" was one sample item.

Independent variables consist of items to assess responses towards public awareness, satisfaction with electric vehicle's efficiency, satisfaction with environmentally friendly and public perception towards electric vehicles usage. The items included: 1) I have knowledge about electric vehicles (public awareness); 2) Electric vehicles can save a lot of money for car buyer (satisfaction with electric vehicle's efficiency); 3) I feel that electric cars can improve the environment (satisfaction with environmentally friendly); and 4) Buying an electric vehicle will change my image positively (public perception towards electric vehicles usage).

RESULTS

100 respondents from Malaysia, Indonesia, and India were surveyed using a digital questionnaire that had six sections: respondent's demographic, public awareness, satisfaction with electric vehicle's efficiency, satisfaction with friendly environmental, public perception towards electric vehicles usage, and consumer behaviour towards electric vehicles. The poll used the internet to reach 100 respondents. Answers were provided for all 100 questions. Table 1 presents an overview of the respondents' demographic characteristics.

Table 1. Summary of Respondents' Demographic Characteristics (N=100)

	Frequency	Percentage (%)
Gender		
Male	55	55
Female	45	45
Age		
15-24	48	48
25-34	12	12
35-44	16	16
45-54	11	11
55 and above	13	13
Nationality		
Malaysia	63	63
India	18	18
Indonesia	19	19
Education Level		
High School	14	14
Diploma	15	15
Bachelor's Degree	57	57
Master's Degree	11	11
Doctor Philosophy	3	3
Employment Status		
Student	48	48
Employed	35	35
Unemployed	8	8
Retired	9	9

Table 1 summarizes the demographic information of the respondents. In accordance with Table 1, 55% of the respondents are men, and 45% are women. Adults between the ages of 35 and 44 account for 16% of respondents, adults between the ages of 55 and above account for 13%, adults between the ages of 25 and 34 account for 12% of respondents, and adults between the ages of 45 and 54 account for 11% of respondents.

Teenagers and adults between the ages of 15 and 24 make up the majority of respondents, accounting for 48% of all respondents. Of the 100 responders, 63% are Malaysian by nationality, followed by 19% from Indonesia and 18% from India. In terms of education, 57% of respondents—more than half of the sample—have bachelor's degrees. Another 15% have diplomas, 14% have only completed high school, 11% have master's degrees, and 3% have qualification in Doctor Philosophy. When it comes to employment status, the bulk of respondents—48%—are students, followed by 35% of those who are employed, 9% of whom are already retired, and 8 others who are unemployed.

Table 2. Descriptive Statistics, Cronbach's Coefficients Alpha, and Zero-Order Correlations of All Study Variables

Variable	1	2	3	4	5
Public Awareness	0.919				
Satisfaction with Electric VehiclesEfficiency	0.702**	0.891			
Satisfaction with Friendly Environmental	0.746**	0.662**	0.913		
Public Perception towards ElectricVehicles Usage	0.529**	0.507**	0.603**	0.793	
Dependant Variable: Consumer Behaviortowards Electronic Vehicles	0.706**	0.698**	0.856**	0.660**	0.912
Mean	3.82	3.75	3.29	2.55	3.92
Standard Deviation	0.89	0.88	0.71	0.52	1
N	5	4	4	3	3

Note: N = 100; *p < 0.01; Diagonal entries in bold indicate Cronbach's coefficient alpha.

Regarding the variables impacting consumer behaviour toward electric vehicles, the survey includes 100 members of the general public. The measure includes four factors: public awareness, satisfaction with electric vehicles efficiency, satisfaction with environmentally friendly, and public perception towards electric vehicles usage. The association between the variables is found using Pearson Correlation Analysis. Two continuous variables do not have a linear connection when the correlation coefficient is zero (Malawi Med J, 2012). All of the variables persist over 0.70, as seen in Table 2. The internal consistency of all variables according to Cronbach's Alpha test was 0.919, 0.891, 0.913, 0.793, and 0.912. The outcomes clearly show that the items for each variable are trustworthy and have a high level of internal consistency.

Table 3. Regression Analysis

Variables	Standardized Beta
1. Public Awareness	0.003
2. Satisfaction with Electric Vehicle's Efficiency	0.186**
3. Satisfaction with Friendly Environmental	0.594***
4. Public Perception towards Electric Vehicles Usage	0.192**
R Square	0.786
F Value	87.49
Durbin-Watson Statistic	1.655

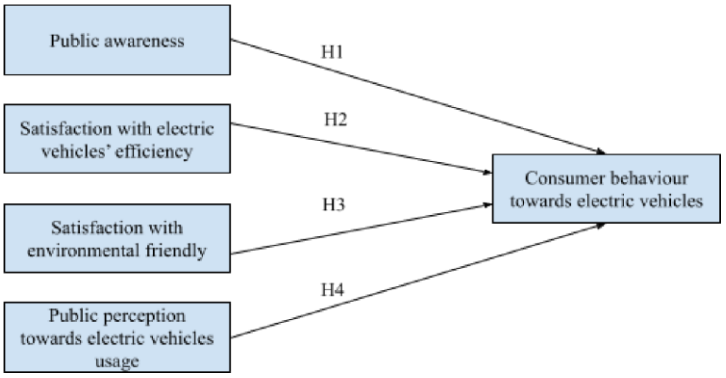
Note: N = 100; *p < 0.05, **p < 0.01, ***p < 0.001.

The regression analysis is shown in Table 3. Consumer behaviour towards electric vehicles was the dependent variable, while the independent variables were public awareness, satisfaction with electric vehicles efficiency, satisfaction with friendly environmental, and public perception towards electric vehicles usage. According to hypothesis 1, public awareness is positively associated with consumer behaviour toward electric vehicles. According to hypothesis 2, satisfaction with electric vehicles efficiency is substantially correlated with consumer behaviour toward electric vehicles. According to hypothesis 3, satisfaction with environmental friendliness is favourably correlated to consumer behaviour towards electric vehicles. According to hypothesis 4, public perception towards electric vehicles usage correlates positively with consumer behaviour toward electric vehicles.

According to the findings, H1, H2, H3, and H4 had corresponding beta () values of 0.003,

0.186, 0.594, and 0.192 and were all favourably correlated with customer behaviour toward electric vehicles. H1, H2, H3, and H4 were therefore supported. The R Square score was 0.786, meaning that 78.6% of the variables were related to public awareness, satisfaction with electric vehicles efficiency, satisfaction with friendly environmental, and public perception towards electric vehicles usage. We discovered that satisfaction with being environmentally friendly, with a value of 0.594, is the variable that most influences consumer behaviour towards electric vehicles. This is followed by public perception towards electric vehicles usage, with a value of 0.192, satisfaction with electric vehicle's efficiency, with a value of 0.186, and public awareness, with a value of 0.003. The summary of the output with the hypothesized model is shown below.

Figure 2. Hypothesized Model



DISCUSSION

Variables impacting consumer behaviour towards electric vehicles in order to study marketing strategies of electric vehicles were investigated in this study. As shown in table 2, the independent variables were public awareness, satisfaction with electric vehicle's efficiency, satisfaction with friendly environmental, and public perception towards electric vehicle usage, whereas consumer behaviour towards electronic vehicle as dependent variable. The research's outputs prove that satisfaction with electric vehicle's efficiency, satisfaction with environmental friendliness, and public perception towards electric vehicle usage were variables that directly affected consumer behaviour towards electric vehicles. Therefore, this study found that satisfaction with electric vehicle's efficiency, satisfaction with friendly environmental, and public perception towards electric vehicle usage influence consumers to act in certain behaviour towards electric vehicles. Three out of four independent variables (satisfaction with electric vehicle's efficiency, satisfaction with friendly environmental, and public perception towards electric vehicle usage) were recognized as significant in predicting consumer behaviour towards electric vehicles.

According to the findings above, it proves that public awareness has no significant impact on consumer behaviour towards electric vehicles. Such knowledge, aware of the existence of EVs, doesn't have a big impact on their behaviour. Even if they agreed with the government incentive on e-vehicles sales, still won't be a factor of how they act on such behaviour. The results of earlier studies also indicated that changing our ingrained responses requires awareness as a prerequisite. Although it may seem simple, altering our behaviour and decision-making processes may be challenging. It is challenging for an untrained mind to make conscious decisions and modify behaviour. However, "training" can change that (Baur, 2018). Thus, findings support H1 which states public awareness is not associated with consumer behaviour towards electric vehicles.

This paper also indicated that satisfaction with electric vehicles efficiency has a significant element to influence consumer behaviour on how they feel satisfied with electric vehicles. 38% of them were satisfied with electric vehicles performance until this day. Electric vehicles have an excellent acceleration which the technology has improved and have a much better range now. Users are drawn to EVs by their numerous benefits over conventional automobiles. Zero emissions, reliability, affordability, efficiency, simplicity, accessibility, and comfort are some of the benefits (Sanguesa et al., 2021). The cost of power required and the maintenance expenses of EVs are much lower than those of conventional combustion cars. Compared to conventional cars, EVs offer a significantly lower energy cost per mile (Yadlapalli et al., 2022). Thus, satisfaction of electric vehicles efficiency significantly predicts consumer behaviour towards electric vehicles. H2 was supported which states satisfaction with electric vehicles efficiency is positively associated with consumer behaviour.

Moreover, the result has proven that satisfaction with being environmentally friendly has a strongest impact on consumer behaviour. Most of them believed EVs can help reduce global warming. With the environment nowadays, electric cars can be one of the biggest factors on how to control the environment. According to research, electric vehicles are more environmentally friendly. Compared to petrol or diesel automobiles, they release fewer greenhouse gases and air pollutants. And this accounts for the creation of their goods and the power needed to keep them functioning. Furthermore, compared to ICEV, road transport greenhouse gas emissions may be significantly reduced by using electric mobility in conjunction with a gradual rise in low-carbon power generation (Ellingsen et al., 2017). Therefore, this satisfaction of electric vehicles with being environmentally friendly will predict the behaviour of consumers. Thus, H3 states a satisfaction of electric vehicles with environmental friendliness is positively associated with consumer behaviour towards electric vehicles.

Next, the result shows that public perception towards electric vehicles usage has a significant influence on consumer behaviour. Consumers said buying an electric vehicle will change their image positively. Other than that, 60% respondents strongly agree driving in an electric vehicle is more comfortable than in-fuel powered vehicles. Electric vehicles are now seen as a niche product in the United States. However, there has been a rise in favourable attitudes as a result of a study into the way that electric cars are now seen. According to a poll, 62% of Americans think EVs will gain in popularity. In contrast, only 27% of people believe they won't get greater popularity. According to Consumer Federation of America research, from 67% in 2020 to 75%, more consumers were aware of electric vehicles and their advantages (It's All Goods, 2022). Thus, H4 which states public perception towards electric vehicles usage is positively associated with consumer behaviour towards electric vehicles was supported.

CONCLUSION

Based on the findings of this study, it can be concluded that promoting electric vehicles as friendly environmental transportation to consumers can be the focus of marketing strategy in EV market. As complementary, building consumers believe that electric vehicles can change their image positively is also necessary to support marketing strategy of EVs.

Contrary to certain popular misgivings and ambiguities regarding the environmental advantages of electric vehicles, the research is becoming apparent that electric vehicles are definitely better to petrol or diesel vehicles when it comes to climate change and air quality. The Indian electric vehicle market was worth USD 1,434.04 million in 2021, and

it is predicted to grow to USD 15,397.19 million by 2027, at a CAGR of 47.09% during the forecast period (2022-2027). Experts predict that the switch from conventional to electric vehicles will have a significant effect on the automotive industry by 2025. It is anticipated that the market share of electric cars would increase from 3% in 2015 to 23% in 2025. The global electric vehicle market is segmented on the basis of type, vehicle type, vehicle class, top speed, vehicle drive type, and region. Battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell electric vehicles are the three categories by kind. All-electric autos require less maintenance than fossil fuel-powered ones (such as oil changes, smog checks, spark plug replacements, and replacing a catalytic converter or other elements that wear out and break down) (Veloz, 2022). The future of electric vehicles global market is expanding at a CAGR of 21.7%, which is expected to continue. Growth from 8.1 million units is anticipated to reach 39.21 million by 2030. Multiple factors, including worries about pollution, are driving this rapid expansion.

LIMITATION

Every study will have its problems and limitations at some point during the project. This study is not an exception. There was no way to ensure that the sample taken accurately reflected the whole population of EV users, making the use of a non-tribalistic sample in the research a significant restriction. The accuracy and precision that a probability sample may provide are absent from a non-probability sample. Even while these samples gave researchers a better understanding of the demographics of electric vehicle users, it's possible that a responder doesn't own an electric car. Some respondents were seen to have biases towards particular queries. The problem with time was yet another significant restriction experienced when working on the research task. The study's selection of previous studies is a limitation. Due to time constraints, only a select few journals were searched. This could exclude some other significant empirical investigations. Additionally, there were a lot of younger correspondents.

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DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest.

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