

The Effect Of Perceived Value Towards Purchase Intention Using Information Overload As Moderating Variable In Electric Vehicle

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Abstract.

The world of transportation is an important part of this modern era, and technology and innovation in improving the performance of the vehicles we use every day can be useful for increasing the value of activities that depend on this aspect of transportation. Indonesia has started a transition in implementing electric vehicles, one of which is electric cars. Currently, Indonesia has 69,763 electric cars operating on Indonesian roads, but this figure is still very small compared to the Indonesian government's target of 2 million electric cars by 2030. The government has also made this implementation easier with the help of VAT discounts for cars. electricity, but it is still not enough to increase the development of electric cars in Indonesia to achieve the target in the next 6 years. This research aims to determine the influence of Perceived Value or can be interpreted as the value perceived by Indonesian consumers which influences the intensity of buying electric cars. The data collection technique is by distributing questionnaires online to as many respondents as 350 respondents across Indonesia, will be processed and analyzed using the (PLS-SEM) or Partial Least Square Structure Equation model. The finding reveal that perceived value has positive effect on purchase intention through consideration of value in benefits and also risk of EV. additionally, Information overload is negatively affecting the result of perceived value toward purchase intention.

Keywords: *Perceived Value, Perceived Benefits, Perceived Risk, Purchase Intention, Electric Vehicle, Information overload.*

I. INTRODUCTION

Electric vehicles (EVs) are regarded as an exciting development due to their potential to decrease emissions of carbon and promote environmentally transportation [1]. Over the past few decades, in the acceptance of electric vehicles on modern society has risen dramatically worldwide [2], including in Indonesia. The Ministry of Industry (Kemenperin) observed a surge in the quantity of electric vehicles in 2023, with a total of 12,248 units [3]. This represents a significant increase compared to the previous year's figure of 8,562 units, and an even more substantial rise from the 2021 count of 1,278 units. Adhi Prasetyo, School of Economy and Business Telkom University Bandung, Indonesia adhipras@telkomuniversity.ac.id [3]. In Indonesia, there are currently four distinct categories of electric cars based on their electrical systems: Hybrid Electric Vehicle (HEV), Battery Electric Vehicle (BEV), Plug-in Hybrid Electric Vehicle (PHEV), and Fuel Cell Electric Vehicle (FCEV) [4]. Among the all-electric vehicle models mentioned, battery electric vehicle (BEV) emits fewer emissions when powered solely by batteries, without any combination with a conventional engine [5]. BEV relies on electric engines and systems instead of internal combustion engines (ICEs) for propulsion [6]. They draw power from battery packs to drive the engine, which in turn drives the wheels [6]. BEVs are also one of the most widely used electric vehicles in Indonesia. As of January 2024, BEV sales in Indonesia reached 3,206 units, representing a 2,8% increase compared to the same period in the previous year [7].

Furthermore, In January 2024, the Wuling Binguo EV emerged as the best-selling electric vehicle in Indonesia, with a total of 1,876 units sold, followed by the Hyundai Ioniq 5 with 268 units and the MG 4EV with 39 units [7]. Electric cars provide several benefits, such as increased energy efficiency, reduced emissions, and enhanced performance [8]. Electric cars also help mitigate greenhouse gas emissions and pollution caused by conventional traffic [9]. By integrating electric cars, we can extend the availability of oil,

allowing other modes of transportation (such as air and water) to rely on it [9]. However, according to data released by the official association GAIKINDO, electric vehicle (EV) sales in Indonesia only make up about 1.35% of the total automotive market share in 2023 [5]. The Battery-based electric vehicle (BEV) has a total sales figure of only 10,171 units [5]. On the other hand, cars that are not battery friendly electric vehicles (BEVs) achieved sales of 744,502 units [5]. Despite its numerous advantages, electric car technology in Indonesia faces several weaknesses that contribute to its low adoption rate.

The first barrier to the electric car development in Indonesia is a lack of public awareness of the technology [10]. The second obstacle is the high cost associated with operating electric cars [11]. This cost is primarily driven by three factors: the price of the battery, the time it takes to charge the battery, and the expenses related to home electric power and vehicle taxes [11]. The third challenge pertains to the adequacy of the infrastructure, specifically the scarcity of public charging stations for electric cars [11]. Due to the substantial demand for electricity, it is only accessible in select regions, particularly in major cities with a more reliable power grid [11]. The fourth challenge pertains to the extended duration required for recharging. Typically, it takes around 4-5 hours to recharge an electric car [10]. However, there is now a faster charging option called SPKLU, which only takes 20-30 minutes, but this fast-charging system comes at a higher cost for users [10]. It can be inferred that the rate at which electric vehicles are being adopted in Indonesia is currently low.

As a result, researchers are interested in investigating the underlying factors contributing to this phenomenon. The research seeks to address the following inquiries:

1. How do psychological, environmental, and financial benefits, as well as physical safety risks, performance risks, and financial risks, impact the perceived value of electric cars?
2. Does Information overload moderate the relation of perceived value and purchase intention?
3. Does perceived value have an impact on purchase intention?

II. LITERATURE REVIEW

A. Perceived Value and purchase intention

Purchase intention is consumer behavior that appears in response to objects that indicate a customer's desire to make a purchase. Purchase intention is the decision-making process through which consumers decide to acquire a product or service based on their need for or preference toward its functionality [18]. Purchase intention can also be defined as a consumer's willingness to buy a product due to their awareness of its functionality [18]. Meanwhile, purchase intention or purchase interest is a pragmatic habitual form of a customer who is motivated and takes actions that are closely related to purchasing activities through various phases and levels of tendency to ability to buy a particular product, service or brand [20].

H1. Perceived value have positively related to the effect of purchase intention.

B. Perceived Risk

Perceived risk is a complex psychological concept that encompasses multiple dimensions, including performance risk, financial risk, and physical safety risk [17]. Financial risk refers to the potential economic losses associated with the adoption and maintenance of electric vehicles (EVs). Unlike conventional vehicles, EVs typically involve higher initial purchase costs and do not yet benefit from economies of scale. [20]. Performance risk refers to the likelihood that the driving performance and reliability of electric vehicles (EVs) may fail to meet consumer expectations. Compared to conventional cars, EVs typically have lower maximum speeds, shorter driving ranges, and longer battery charging times, which contribute to consumers' exposure to performance risks [20]. Physical safety risk refers to the potential hazards to personal safety associated with the purchase and use of electric vehicles (EVs). As novel technological products, EVs may elicit concerns among consumers due to perceived uncertainties regarding their safety standards and performance reliability.

H2. Financial risk is negatively affecting perceived value of EV.

H3. Physical safety risk is negatively affecting perceived value of EV.

H4. Performance risk is negatively affecting perceived value of EV.

C. Perceived Benefits

Consumers weigh the risks and benefits of a product when forming value perceptions [15]. Positive aspects of a product contribute to consumers' perceived benefits and increase perceived value. In the context of Electric Vehicles (EVs), adopting an EV provides financial, environmental, and psychological benefits [16]. Financial benefits refer to the lifecycle cost savings that consumers will enjoy by adopting an EV. To encourage the consumers to adopt and purchase EVs, governments have implemented various economic measures, including tax exemptions and direct price subsidies to help ease consumers' financial burdens for adopting EV's [16]. Environmental benefits stem from the use of EVs, contributing to environmental protection. A significant motivation for governments to strongly promote EVs is their potential to reduce dependence on oil, reduce exhaust emissions, and contribute to environmental conservation [23]. Psychological benefits refer to the emotional satisfaction derived from adopting EVs, providing convenience, enjoyment, and relaxation to meet consumers' psychological needs [24]. Therefore, consumers will experience psychological benefits when they adopting and using EVs. In addition, previous studies have shown that the greater the benefits consumers perceive from a product or service, the higher the value they assign [15]. Previous studies have also shown that perceived benefits have a positive impact on perceived value [16].

H5. Financial benefits is positively affecting perceived value of EV.

H6. Environmental benefits is positively affecting perceived value of EV.

H7. Psychological benefits is positively affecting perceived value of EV.

D. Information Overload

In general, Information overload can be categorized into subjective and objective dimensions. Subjective information overload refers to the negative psychological effects experienced when individuals are exposed to excessive information, leading to feelings such as regret, frustration, and fatigue. In contrast, objective information overload arises from the inherent attributes and characteristics of the information itself, such as the time required for processing and the complexity of the content [25]. Adequate information is essential for consumers to effectively evaluate products, form accurate perceptions, and make informed decisions. [26].

H8. Information overload will weaken the effect of perceived value on purchase intention

III. METHODS

This study employs quantitative methodologies to examine specific populations and samples, and to evaluate pre-established hypotheses. The target population for this study comprises individuals in Bandung who possess the capacity to purchase electric vehicles. The sample, chosen to represent the entire population, was selected using the PLS-SEM sampling technique with a minimum of 350 respondents. The criteria for respondents included prior or potential car buyers, Indonesian citizens, and individuals aged between 25 and 50 years. The data was gathered using an online questionnaire administered through Google Form to individuals who fulfilled the research criteria, along with supplementary data obtained from company reports and archives.

The measuring instrument's validity and reliability were assessed by employing the Average Variance Extraction (AVE) value and cross-loading for validity, along with an alpha value greater than 0.60 for reliability. Data analysis techniques encompass descriptive analysis, which aims to provide an objective account of the collected data without drawing overarching conclusions, as well as SEM (Structural Equation Modelling), which is employed to examine the relationships between variables using the PLS (Partial Least Squares) technique. PLS, or Partial Least Squares, is a statistical method used to analyse and compare the relationships between dependent and independent variables. It helps to identify and understand the theoretical connections between these variables. PLS analysis comprises two primary components: the inner model, also known as the structural model, and the outer model, also referred to as the measurement model. The model's validity is assessed through the examination of indicator loading and AVE values, while the predictive relevance of the model is evaluated by analyzing R squared.

IV. RESULT AND DISCUSSION

A. Test for Validity and reliability

To assess convergent validity, this study investigates cross-loading and Average Variance Extracted (AVE) values. All constructs, including Financial Benefits, Environmental Benefits, Psychological Benefits, Financial Risk, Performance Risk, Physical Safety Risk, Information Overload, Perceived Value, and Purchase Intention, meet the validity criteria, with cross-loading values exceeding 0.7 and AVE values exceeding 0.5 [12]. For the question item using the previous research question to ensure accuracy of this model by Xiangfeng Hu.

Table 1. Results of Validity and Reliability

Item	Loading
Financial Benefits ($\alpha = 0,931$; CR = 0,956; AVE = 0,878)	
Compared to conventional cars, I believe electric cars (EV) save more on fuel costs.	0,949
I believe the maintenance costs for electric cars are lower than conventional cars.	0,947
I believe electric cars have fewer mechanical problems and can save maintenance costs compared to conventional cars.	0,915
Environmental Benefits ($\alpha = 0,932$; CR = 0,956; AVE = 0,880)	
I believe that by driving an electric car, I contribute to environmental responsibility.	0,941
I believe electric cars can reduce carbon emissions.	0,938
I believe that driving an electric car reflects my concern for the environment	0,935
Psychological Benefits ($\alpha = 0,941$; CR = 0,962; AVE = 0,894)	
I believe Driving an electric car can provide pleasure and excitement.	0,938
I believe electric vehicle produce less noise when driving	0,946
The low vibration of an electric car when driving makes me feel comfortable.	0,953
Financial Risk ($\alpha = 0,918$; CR = 0,948; AVE = 0,859)	
I feel that EV prices are still quite expensive.	0,912
I believe Replacing EV batteries is expensive.	0,931
I believe the high initial acquisition cost and battery replacement costs make it less attractive to buy.	0,938
Performance Risk ($\alpha = 0,930$; CR = 0,955; AVE = 0,877)	
The maximum speed of an electric car (EV) did not meet my expectations.	0,944
The driving range of an electric car (EV) cannot meet my travel needs.	0,938
Electric vehicle (EV) charging times take a long time.	0,927
Physical Safety Risk ($\alpha = 0,911$; CR = 0,944; AVE = 0,849)	
I'm worried about the possibility of a fire while driving an EV.	0,923
EVs take a long time to charge and I'm worried about the risk of fire.	0,914
I'm worried about the safety of driving an EV.	0,927
Information Overload ($\alpha = 0,932$; CR = 0,948; AVE = 0,789)	
I feel overwhelmed by the amount of information about EVs	0,887
I'm having a hard time getting effective information because of the amount of information about EVs	0,896
It took me a long time to get information about EVs	0,896
I found there was little information I could find that met my needs.	0,896
I don't know where I can find the information about EVs that I need.	0,857
Perceived Value ($\alpha = 0,941$; CR = 0,954; AVE = 0,774)	
I believe EVs are cheaper to operate because electricity is cheaper than petrol.	0,919
Compared with traditional cars, EVs do not have engines, and their maintenance costs are lower.	0,904
If I buy and drive an EV, I can get environmental marks because it emits no exhaust gases.	0,860
Adopting and driving EV can boost my social status	0,889
EVs uses developing technology that interests me.	0,858
Adopting and driving an EV would make me proud and satisfied.	0,846

Purchase Intention ($\alpha = 0,956$; CR = 0,966; AVE = 0,849)	
I would consider buying an EV.	0.926
If the EV is good, I'm willing to recommend it to others.	0.922
I hope there will be more EV variations and models hitting the market as soon as possible.	0.917
I'm willing to buy an EV in the future.	0.929
I plan to buy an EV in the near future.	0.921
If I need to buy a new car in the future, I'm likely to buy an EV.	0.919

Moreover, discriminant validity assessment was conducted using the Fornell-Larcker value reported in Table 2 [13]. This involves comparing the square root of the Average Variance Extracted (AVE) with the correlations among latent variables. For each construct, the square root of the AVE should exceed its highest correlation with other constructs [14].

Table 2. Fornell-Larcker Criteria for Discriminant Validity

	EB	FB	FR	IO	ME 1	PV	PR	PSR	PB	PI
EB	0.938									
FB	0.699	0.937								
FR	0.672	0.632	0.927							
IO	0.693	0.74	0.666	0.887						
ME	-	-	-	-	1					
PV	0.639	0.615	0.655	0.686	-	0.705				
PR	0.758	0.698	0.793	0.773	-	0.88				
PSR	0.819	0.67	0.577	0.687	0.551	0.705	0.936			
PB	0.694	0.609	0.82	0.617	0.595	0.785	0.636	0.922		
PI	0.814	0.827	0.664	0.675	0.614	0.715	0.784	0.652	0.946	
	0.737	0.718	0.723	0.752	0.692	0.821	0.686	0.713	0.775	0.922

These findings suggest that the square root of the Average Variance Extracted (AVE) surpasses the correlations with other constructs. This affirms that each construct demonstrates sufficient discriminant validity, as higher AVE values imply that the construct more effectively explains the variance of its indicators compared to its correlations with other constructs

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	EB	FB	FR	IO	ME 1	PV	PR	PSR	PB	PI
EB										
FB	0.752									
FR	0.726	0.684								
IO	0.738	0.788	0.712							
ME	0.661	0.638	0.685	0.706						
PV	0.808	0.745	0.85	0.822	0.726					
PR	0.879	0.721	0.624	0.736	0.571	0.754				
PSR	0.752	0.662	0.897	0.663	0.622	0.845	0.69			
PB	0.869	0.886	0.714	0.714	0.633	0.759	0.838	0.703		
PI	0.779	0.763	0.772	0.79	0.709	0.865	0.726	0.763	0.816	

The HTMT test are measured by how the value are below 0,85 for the related construct. Since all of the variable are below the 0,85 can be confirm that discriminant validity has been established.

B. Hypothesis Testing

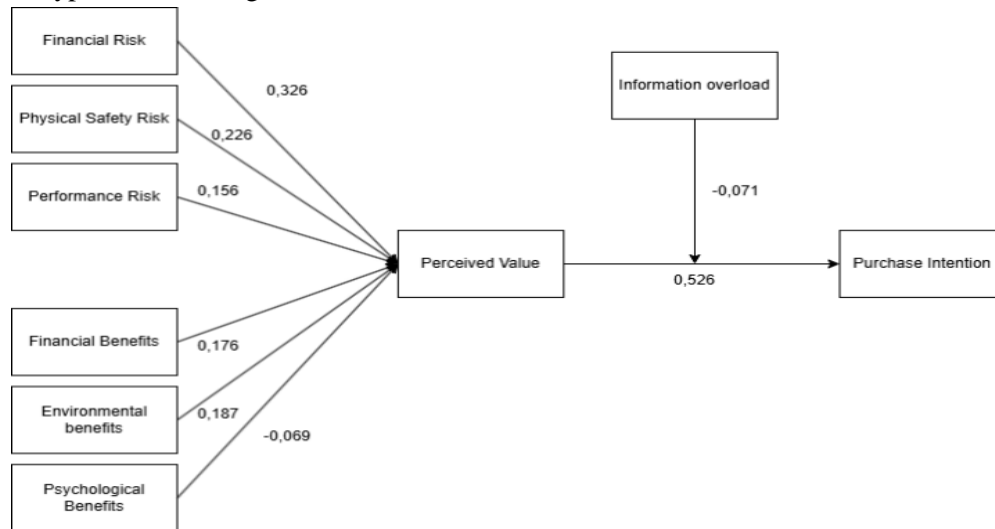


Fig 1. The findings from both direct and indirect hypothesis testing

1. Direct effect

- a. The effect of financial benefits on perceived value was confirmed by a path coefficient (β) of 0.176, a t-statistic of 2.618 which exceeds 1.65, and a p-value of 0.009 which is less than 0.05, thereby supporting the hypothesis.
- b. The effect of environmental benefits on perceived value was confirmed by a path coefficient (β) of 0.187, a t-statistic of 2.461 which exceeds 1.65, and a p-value of 0.016 which is less than 0.05, thereby supporting the hypothesis.
- c. The effect of psychological benefits on perceived value was confirmed by a path coefficient (β) of 0.069, a t-statistic of 0.927 which not exceeds 1.65, and a p-value of 0.354 which is more than 0.05, thereby not supporting the hypothesis.
- d. The effect of financial risk on perceived value was confirmed by a path coefficient (β) of 0.326, a t statistic of 3.195 which exceeds 1.65, and a p-value of 0.001 which is less than 0.05, thereby not supporting the hypothesis.
- e. The effect of performance risk on perceived value was confirmed by a path coefficient (β) of 0,156, a t-statistic of 2,955 which exceeds 1.65, and a p-value of 0.003 which is less than 0.05, thereby not supporting the hypothesis.
- f. The effect of physical safety risk on perceived value was confirmed by a path coefficient (β) of 0.226, a t-statistic of 2.119 which exceeds 1.65, and a p-value of 0.035 which is less than 0.05, thereby not supporting the hypothesis.
- g. The effect of perceived value on Purchase intention was confirmed by a path coefficient (β) of 0.526, a t-statistic of 6.497 which exceeds 1.65, and a p-value of 0.00 which is less than 0.05, thereby supporting the hypothesis.
- h. The influence of Information Overload on Perceived Value toward Purchase intention. The hypothesis is supported by the test outcomes: the β value is -0.071, the t-statistic is 3.089 which is greater than 1.65, and the p-value is 0.002 which is less than 0.05. therefore, it supports the hypothesis.

This finding shows that perceived value can influence the purchase intention of EV market through calculating the risk and benefits of EV. The results are aligned with previous research findings, indicating that the better perceived value that consumer has, EV has higher chance to be purchase and increasing the intention of buying. Perceived benefits such as Financial and environmental benefits have significantly positive effect on consumer value their item. The finding indicate that consumer is considering the effect that given by EV through its financial aspect and enviromental aspect of benefits. This aligns with the previous research of [16] and [27] related to positive effect of financial and environmental benefits. Psychological benefits having negative effect on perceived value are different from the previous research that mentioned

above. Psychological benefits in this research can be assumed from consumer that does not have align expectation of how they feel with the purchase of EV, either EV does not meet their expectation or they still prefer conventional vehicle. There is different finding on Perceived Risk in Indonesian market of EV compared to previous research from [27]. Based on previous research, Risk has negatively affected the perceived value such as innovative product, in [16]. Perceived risk as pointed can have a negative impact on perceived value of innovative product that led to risk of reducing value. In this research based on Indonesian market we can see that risk does not negatively affect the value of EV rather its positively effecting perceived value.

This is mentioned in [26] that perceived risk may affect consumer value judgment, not only in negative but also in positive way. also, can be interpreted as consumer are can consider feeling benefited knowing the risk of using or potentially buying product that they know has some risk related to that product such as being fine of using a product that has risk but more valueable to them like cheaper compared to other product. Consumer behaviour can be changed based on how they are willing to achieve certain target, in this case willing of accept the risk that they certainly known for EV's and choose to purchase it. This in line with the previous finding of individual having degree of willingness to incur cost (including time, money, effort, and other aspects of certain product) [28] As more consumers adopt EVs, they become aware of the drawbacks but are increasingly accepting the risks as the benefits outweigh them. Based on the finding and analysis it shows that indonesian market can also be overwhelm by information. This is aligned with the previous research from [26] that pointed out information overload have negative moderating impact on relation of functional value, social value, emotional value, and fashon value. In the context of EV sufficient information can help with understanding product better but if not keep in check information can be overloaded, creating negative effect on certain aspect. It can be seen from perceived value that can be affected by information overload. Information overload is shown to have negative impact on value. In Previous studies related to information overload, researcher identified some factor that are contributing with information overload based on their interpretation of how information may occure such as psychology, information system management, computer science, marketing, organisational studies, and accounting [29].

This corelate to the potential problem of EV being new adoption techology that is still foreign to majority of consumer that are not aware of advancement in vehicle industry. Based on previous discussion, perceived value of EV has relation with purchase intention. This relation is positively effecting purchase intention, the higher of EV perceived value so does higher intention of purchasing the EV. Information overload negatively effect the relation between Perceived value and purchase intention. With the benefits and risk also knowing information can be overloaded, brand and government can strategize approach to deal with negative effect of said variable. To counter the negative effect of perceived risk and benefits, brand and government can promote more campaign to help with controlling the negative effect. With risk of performance, safety brand can create test drive event of their EV model to promote and give consumer first hand experience and get to know better of the product. With financial benefits and risk can be strategize by doing discount or promoting program that support the weaknesses of EV like giving tax discount. And for the information overload can be taken cared by giving the consumer right amount of information and better understandment of EV product.

V. CONCLUSION

This study proves that perceived value influenced by perceived benefits and risks through perceived value. The result show that the benefits such as financial and environmental are positively correlated with the perceived value. While psychological benefits negatively correlated to the perceived value. Physical safety, performance and financial risk has positive impact on perceived value due to the right amount of exposure and undestandment of information that given to the consumer. Additionally, the moderating role of information overload are negatively moderate the relationship between perceived value and purchase intention. This shows the importance of information overload within the aspect of perceived value and purchase intention. Given the knowledge of this and previous research that are elaborated in previous chapter, some suggestion can be given to improve the current situation of EV market. In this research, out of 3

benefits that are listed, financial and environmental benefits are the one that align with previous research affecting value positively, while psychological benefits having negative effect on value of EV. This finding of psychological benefits affect value negatively due to the psychological of consumer that are not feeling any benefit psychologically to the EV value, seeing it as non other than conventional car. The risk has negative relation to the value on previous research and in this research the perceived risk having positive effect on perceived value. This can be caused by the undestandment of consumer tolerating the risk of EV and using it because of it has more benefits to them and willingly take its risks [26]. Both benefits and risk are contributing in the judgement perceived value of consumer. For Benefits and risk in [16] and [27], Benefits are positively affecting and Risk negatively effecting the value of EV in previous research. Knowing that perceived value is positively related to purchase intention.

Suggested that in order to improve consumer purchasing intention brand could increase their potential marketing through marketing program based on benefits of EV to public [27] this could help building more undestandment toward benefits of EV better and adjust consumer psychological aspect to know EV better. Example of this would be campaign marketing how EV can reduce carbon, preserve energy and having lower future cost of using electricity, while also supporting its infrastructure and giving program for supporting its lifecylce such as tax deduction and longer insurance. With the first hypothesis proven that perceived value of consumer positively effect their purchase intention, controlling said information to get optimal amount of information to balance out the undestandment of EV product. Based on [30] Information Overload negatively moderate perceived value and purchase intention, previous research suggested that in order to avoid the negative effects of information overload, managers in government and brand can manage both the quality and quantity of information that given to the consumer. There are limitations to this study, namely the period of data collection and processing from June 2024 to November 2024. Additionally, the research was confined to specifically Indonesian market, mainly major cities. This research could be expanded by increasing the sample to include more cities across Indonesia, adding more spesific typing for the EV that may have more insight or preference from the responden. For future studies, consider to approach data collection with more type of collection technique such as interview from enthusias and also regular consumer to get more insight as to compare the knowledge of broader samples of individuals.

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