Individual assignment

EE406

The Linkage of Bitcoin Price and Real-time data

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Introduction

In today's era of technology developing rapidly, the future technology will affect all sectors, and we cannot ignore it. BlockChain (Nakamoto, 2008) is a system that functions to record various data items like a continuous long chain that can identify throughout the day and time; since then, it has received a great deal of interest because of its decentralized nature the technology that underpins. The transactions are verified by the network nodes and recorded in the Blockchain is transparent, and banks, governments, or organizations do not issue them. As a result, no central body guarantees it or exercises control over this new technology. The emergence of a new currency known as a digital currency (Cryptocurrency) provides investors with security and anonymity. The first cryptocurrency to hold its origin, called Bitcoin, was invented by Satoshi Nakamoto in 2008. In the beginning, they had to dig (mining) like mining, similar to finding gold, but switch to a computer system instead, which is to save data through a computer system, helping to make the blockchain system more stable and it is irreversible and will receive Bitcoin as a reward. Since the beginning, Nakamoto has set that it will be only 21 million bitcoins, similar to the gold limited resources within the world. Its price will depend on people's demand, and the market will drift toward monopolistic competition (Bohme et al., 2015). The trading of Bitcoin, which resulted in an exponential growth in market volume, has enticed investors worldwide to see cryptocurrencies as a viable commodity to invest in and profit from (Philippas, D., Rjiba, H., Guesmi, K., & Goutte, S., 2019). As a result of much driving interest, significant price fluctuations and trading volume have been effective from media attention. In this letter, I empirically examine how Bitcoin prices influence or relate to media and people's attention in Thailand and worldwide. This study aims to explore the factors that correlate the price of Bitcoin and people's interests by using real-time data from google trends. Including the relationship latent between each other to bring the data to analyze or apply it as a strategy for various investments or related things and as information for further research in the future. Suppose it can detect a correlation between people's attention and the price of bitcoin. In that case, it might provide useful information and data to a wide range of individuals in a variety of fields.

Literature Reviews

This research focuses on the trend of people's attention in Thailand and worldwide, which has some linkage. There are many related kinds of research to Bitcoin market and people's attention, which can separate into main two categories

Literature related to Bitcoin price and Social network.

- Gibbs, T., & Yordchim, S. (2014) offer a dual process using a diffusion model to see if Bitcoin prices respond to use signals generated from Twitter and Google Trends with price surges. The empirical findings suggest that Bitcoin values are partly influenced by social media attention, implying an intense desire for information demand.
- Yelowitz, A., & Wilson, M. (2015) examine factors of Bitcoin interest using Google Trends data. Create proxies for four probable clienteles based on anecdotal data about Bitcoin users: computer programming enthusiasts, speculative investors, Libertarians, and criminals. Bitcoin interest is positively and significantly associated with computer programming and illegal search phrases, but not with libertarian or investment terms.
- Philippas, D., Rjiba, H., Guesmi, K., & Goutte, S. (2019) offer a dual process using a diffusion model to see whether Bitcoin prices respond to informative signals obtained from Twitter and Google Trends with price surges. The empirical findings suggest that Bitcoin values are partly influenced by a rise in media attention in social networks, indicating an emotional demand for information.
- Deebadi, A. (2020) comparing several machine learning algorithms and forecasting Bitcoin trading price based on the mood in Twitter feeds and additional Bitcoin metrics compared to the sophisticated BERT model. The statistical machine learning model was able better to predict the emotion of the Twitter tweet feed. It enhanced the bitcoin price forecast by integrating Twitter feed sentiment and various Bitcoin parameters instead of merely using bitcoin's previous day closing prices.

- Kristoufek, L. (2013) connects and investigates two phenomena: digital currencies, namely BitCoin, and search searches on Google Trends and Wikipedia. They demonstrate that not only are search queries and prices linked but there is also a significant asymmetry in the effect of increased interest in the currency while being above or below its trend value.

Literature related to Bitcoin price and others linkage

- Estrada, J. C. S. (2017) investigates Granger-causation correlations between the following pairings of time series: Bitcoin price and the S&P 500, Bitcoin price and the VIX, Bitcoin realized volatility and the S& 500, and Bitcoin realized volatility and the VIX. At the 5% significance level, it concludes that there is a bidirectional Granger-causality link between Bitcoin realized volatility and the VIX.
- IMKONG, P., & Nettayanun, S. (2019) the research aims to discover elements linked to gold and bitcoin. The OLS finds a favorable link between the DAX index and Bitcoin, and both gold and bitcoin are related to the DAX index. On the other way according to the study, the findings of a three-stage least square regression differ from those of the first technique, and there are no factors linked to Bitcoin.
- Gohwong, S. G. (2017) In Thailand, e-Money is the most common e-payment with 33.58 percent, followed by Inhouse Funds Transfer (ATM and Internet/Mobile/Telephone) with 28.98 percent, payment cards such as Debit card and Credit card (with 16.15 percent), and BAHTNET with 0.12 percent. Furthermore, according to a 2017 Siam Blockchain study, 7.1 percent of 2,055 respondents started using cryptocurrencies to buy everyday products.
- Cretarola, A., Figà-Talamanca, G., & Patacca, M. (2020) suggest a continuous-time model for Bitcoin price prompted by recent Bitcoin literature indicated. The price dynamics are impacted by investor mood and attention, and an exogenous element represents market attention in the Bitcoin system.

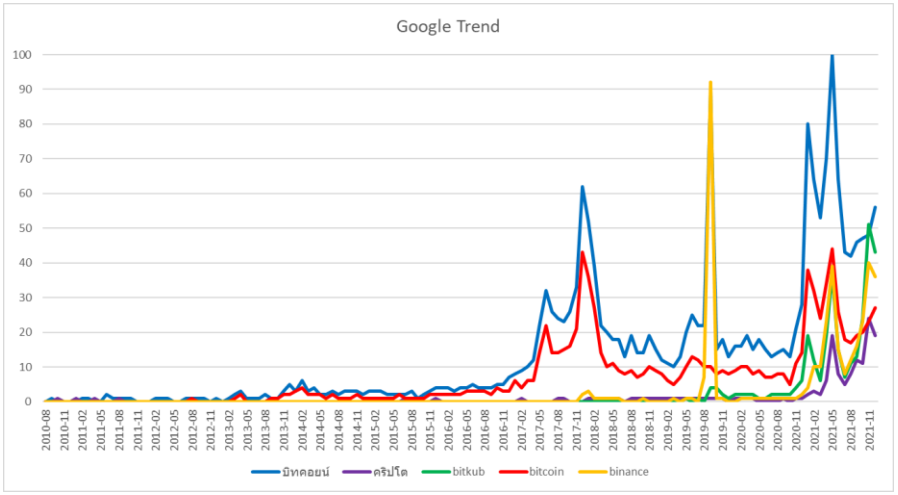
Research Gap

This study attempts to uncover patterns in time series data from the past that correlate with tweets about bitcoin from around the world and google trend searching in Thailand in rerated keywords to find linkages between the price and people's attention. The scope of this study got limited due to data limitations and the inability to obtain data on several characteristics that may be associated with people's attention. As a result, the indications projected to impact may not be accurate in all contexts.

Data and Methodology

- ***Data***

This study combines monthly time series from secondary sources, including data from Google Trends as a proxy for media attention, flows in social networks, from August 2010 to December 2021. Both are quantitative statistics gathered via the use of search terms and themes to gather interest inquiries. Consider that users can connect to the same public information network for free and have full access to it. To determine the relationship between Bitcoin price and Google Trends, use the keyword บิทคอยน์, คริปโต, bitkub, btc, and binance as the topic and search keyword respectively to find the linkage with Bitcoin price.



- ***Methodology***

To accomplish the objective of this study, the methodology that will be used to find the relationship of the Bitcoin price and google trend topic and keywords is the

ordinary least square regression model, to calculating a correlation, plotting a regression and a multiple regression, which the graph can help see the data more clearly.

Ordinary Least Square Regression (OLS)

By minimizing the sum of squares in the difference between observed and predicted values arranged as a straight line, the technique assesses the relationship between independent factors and a dependent variable. In this entry, we'll look at OLS regression in the context of a bivariate model, which is one in which just one independent variable (X) predicts a dependent variable (Y). On the other hand, the logic of OLS regression is extended to a multivariate model with two or more independent variables.

OLS regression function can write in from :

$$Yi = \alpha + \beta 1*X1 + \beta 2 *X2 +\ldots+ \beta n *Xn + Ui$$

Where Yi = Dependent variable

α = Intercept of the model

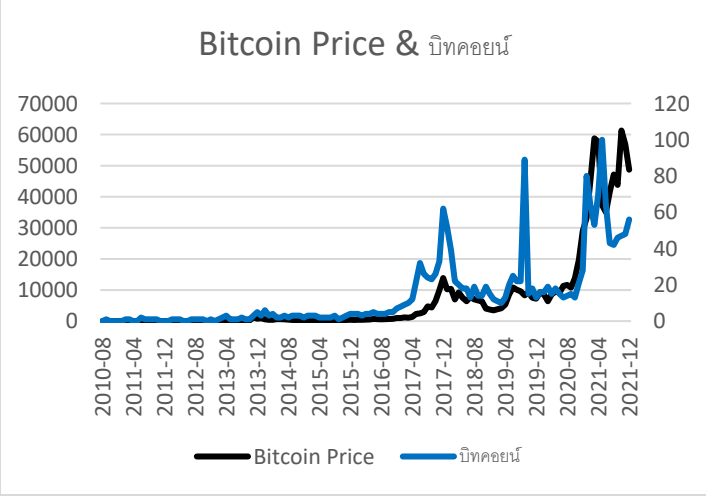
β = Coefficient

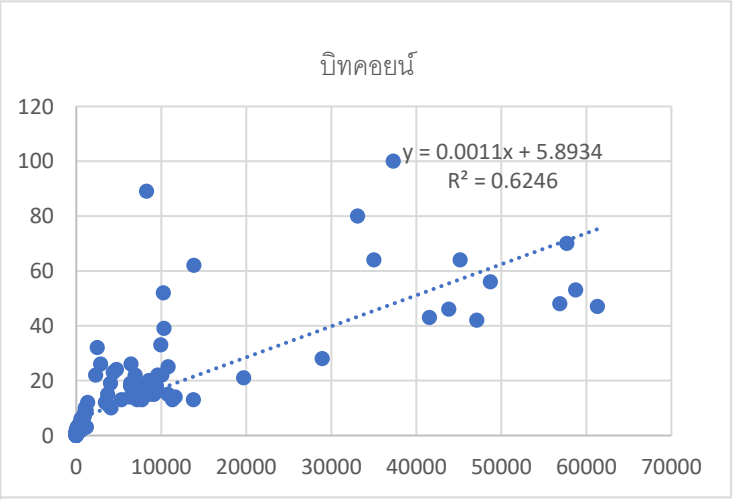
Xi = Corresponds to i explanatory variable of the model

Ui = the random error with the expectation 0 and variance $\sigma 2$

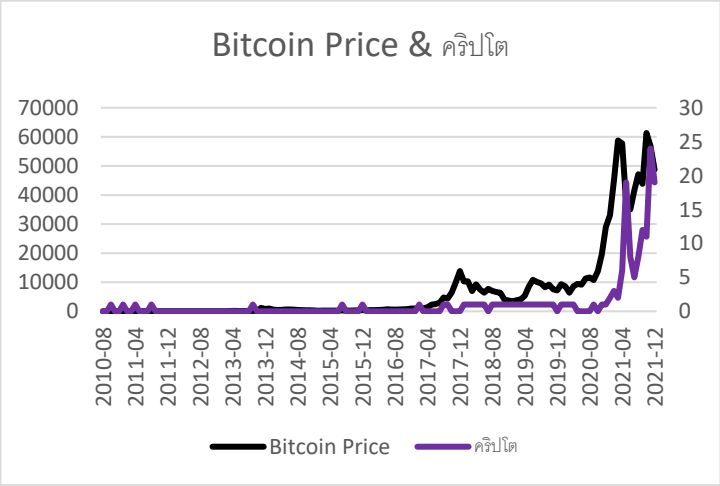
Result Analysis

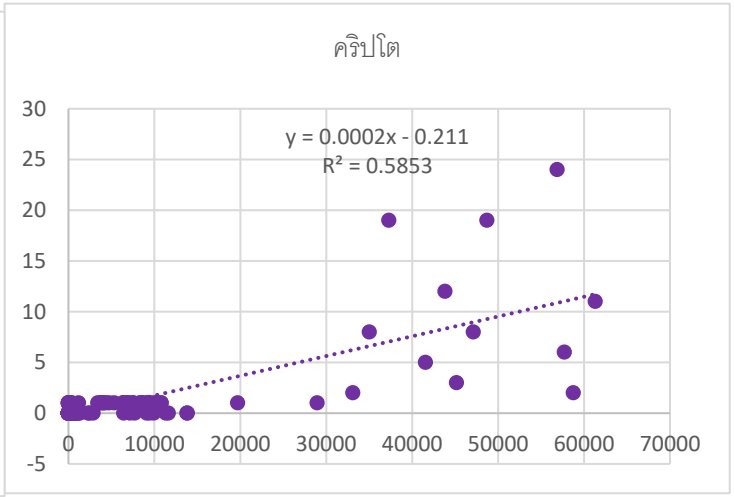
From the data of Bitcoin price from August 2010 to December 2021, the correlation between the price and google trend keywords บิทคอยน์, คริปโต, bitkub, BTC, Binance seem to be related to each other nonetheless. Beginning with the first one that is the search in the topic about บิทคอยน์, and the result shows that the correlation is approximately 78.3577%, the equation is y = 0.0011x+5.8934, and the R square equal to 0.6246



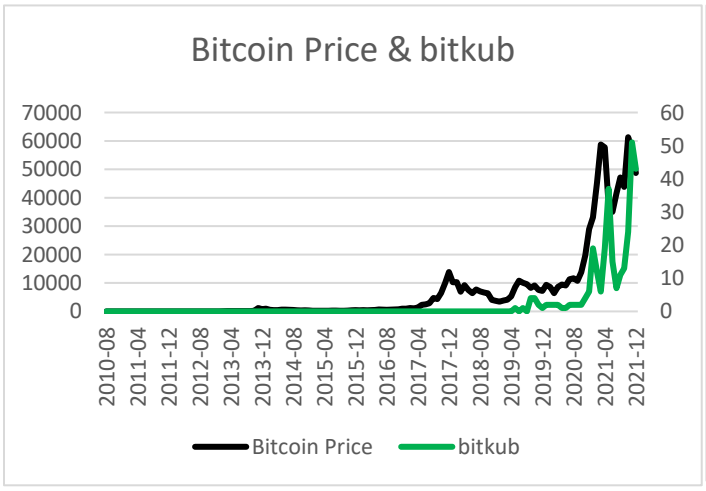


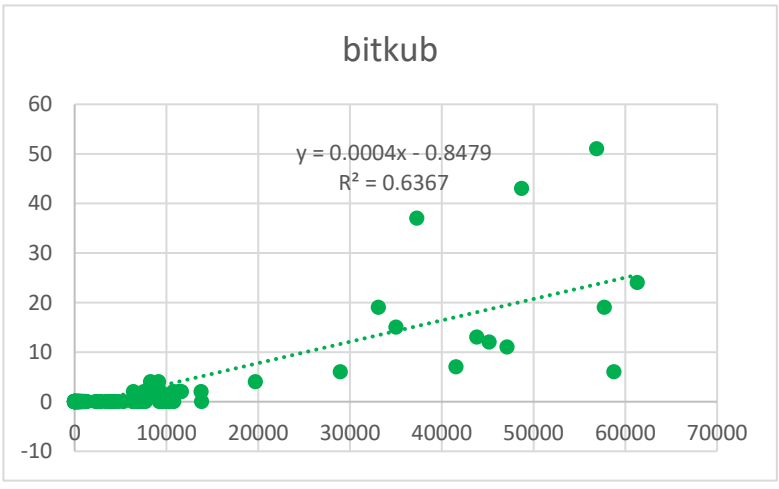
Secondly, we look on more specific at the keyword that is คริปโต, the result shows that the correlation is approximately 72.724 %, the equation is y = 0.0002x - 0.211, and the R square equal to 0.5853



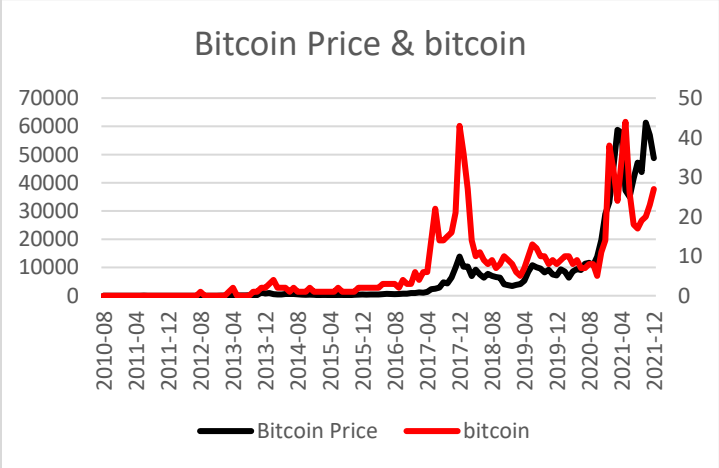


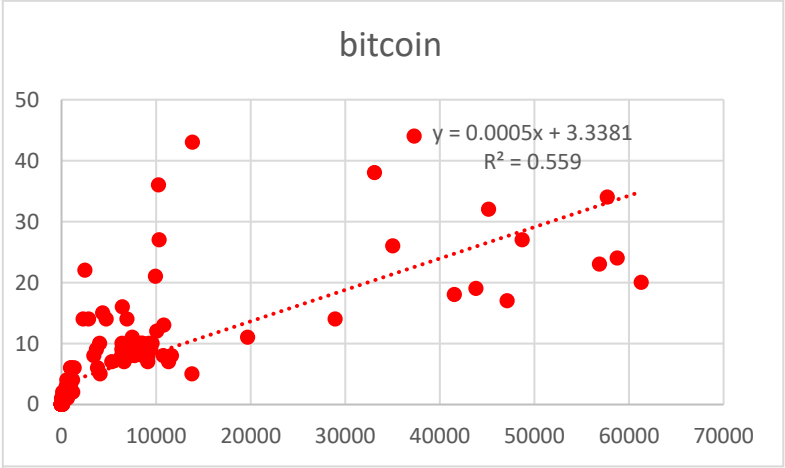
The third one is the bitkub keyword, which is the name of a new generation digital asset and cryptocurrency exchange platform that based in Thailand Thai person, the correlation is approximately 80.1004 %, the equation is y = 0.0004x - 0.8479, and the R square equal to 0.6367



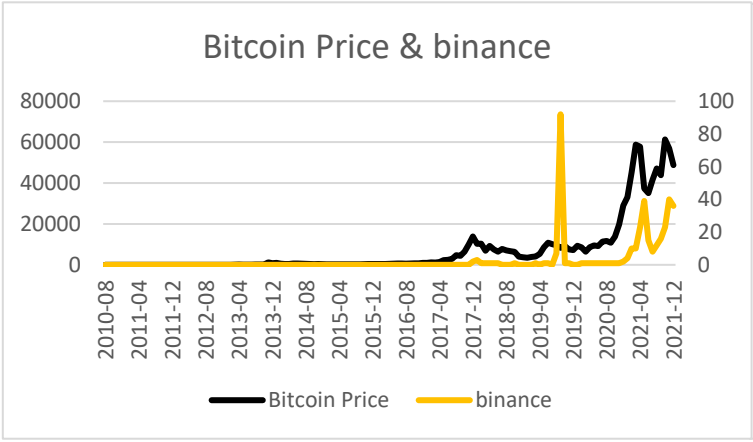


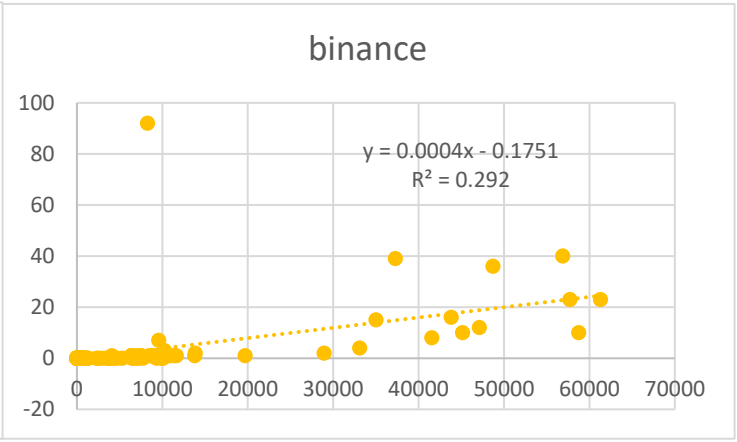
The Forth is the bitcoin keyword; the difference between this one and the first one is the language in Thai, and it is a topic search, but this one is in English and a specific keyword. The correlation is approximately 73.5401%, the equation is y = 0.0005x + 3.3381, and the R square equal to 0.559



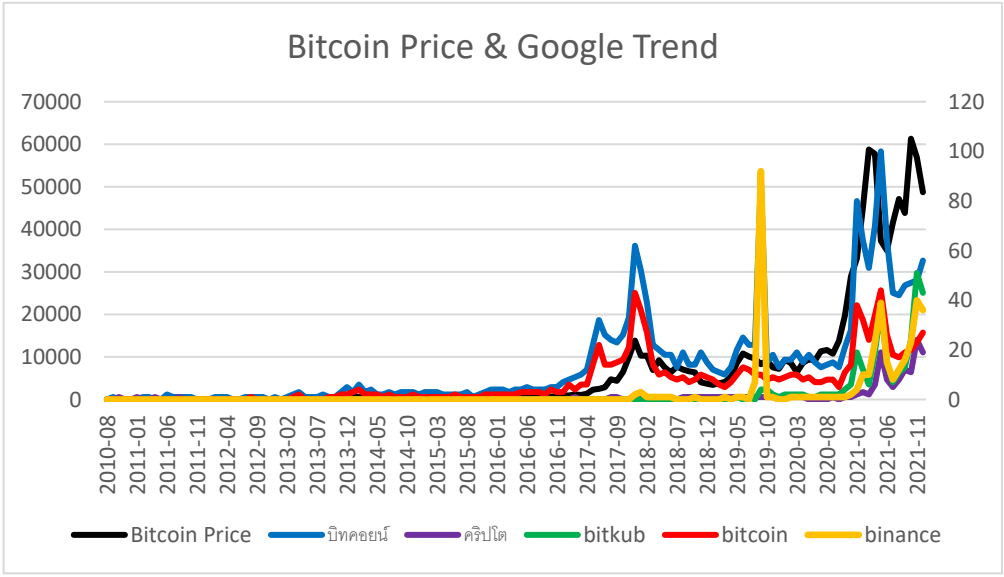


The last keyword is Binance, a cryptocurrency exchange that is now the largest globally in terms of daily cryptocurrency trading volume. The correlation is approximately 73.5401 %, the equation is y = 0.0005x + 3.3381, and the R square equal to 0.559





Finally, here is the graph that shows the overall look n big picture of the correlation between Bitcoin price and all of the keywords; also a topic search from google trend that contains บิทคอยน์, คริปโต, bitkub, bitcoin and binance



At last, there is the limitation in this data and analysis that is the keywords limitation some keywords might not correlate much with Bitcoin price in the long run or have some error in the information also it needs more conventional data because there are some actions or events that are not shown on google trend might also affect the data and analysis.

Conclusion

This research employs an ordinary least squares regression process as a tool for determining the relationship between the Bitcoin price and Google Trends topics and keywords by calculating a correlation, plotting a regression, and a multiple regression, which by using the graph can help to see the data more clearly, as in the example above, to expose the relationship between people and media attention, namely Google Trends and Bitcoin prices. It can demonstrate that their direction appears to be heading in the same direction and the severity of leaps generated from media reports on Bitcoin prices. I believe that media that attracts people's attention has a minor impact on Bitcoin values, which is stronger during moments of more uncertainty and can also serve as information demand sources in some situations.

On the other hand, price significantly impacts people's attention positively and negatively. I can only suggest that every investor should advise studying detailed information before making an investment decision.

Policy Recommendations

The data show that people now have a lot of attention and interest in this new technology. Government or rerated sectors can grab this opportunity to use this attention now like informing Thai people about this new technology correctly and promoting it to increase the investment. The government could collect the tax from this, Pushing and fostering investment in crypto with complete legitimacy, enacting relevant laws to be up-to-date and comprehensive with new technologies and the current world. It can also be used as information to decide the priority, like which one got the most attention now if there is any problem to fix in that area or need some development. It can use as a warning signal of the market in both positive and negative situations from looking at data, so the government and related sectors could prepare for any situation in advance. It can represent people's disbelief,

misunderstanding, perplexity, and panic towards the news or communication that may result in negative consequences and should be corrected to be accurate and precise. The government should have a way to directly communicate with people in this field that is new for most people.

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