The Impact of Product Picture Advertisements and Product Video Advertisements on Chinese Consumer Purchase Intentions

Yongda Chen[1(✉)], Yiyang Han[2], Yuan He[3], and Jiaqi Xu[4]

[1] Department of Politics and International Studies, University of Leeds, Leeds LS2 9JT, UK
pt21yc@leeds.ac.uk, 296341154@qq.com
[2] School of Journalism and Communication, Hebei Institute of Communications, Shijiazhuang 050000, China
[3] School of Humanities and Art, Nanchang Institute of Technology, Nanchang 330099, China
[4] School of Media, Sichuan Conservatory of Music, Sichuan 610500, China

Abstract. Over the past few decades, there have been more and more forms of product advertising, and the use of product advertising has also increased. Among this, picture advertising and video advertising have become the most common ways for marketers to promote. Consumers also tend to learn and buy products by watching picture advertisements and video advertisements. In this study, Ajzen's Theory of Planned Behavior is used as a theoretical framework with the aim of exploring the degree of influence of product picture advertisement and product video advertisement on consumers' purchase intention. In order to reach reliable and valid conclusions, the researchers collected about 100 questionnaires filled out by people of different ages and consumption levels, and then conducted data analysis. The final results show that product video ads have a greater impact on consumers' willingness to spend than product image ads.

Keywords: Picture advertisements · Video advertisements · Purchase intentions

1   Introduction

In the past few decades, China's economic development is obvious to all. In the 27 years from 1978 to 2005, China's GDP grew by an average of 9.6 percent per year [1]. Based on a stage and period of continuous rapid and stable development of China's economy, more and more people's living standards and purchasing power have been directly and significantly improved. People's consumption needs are gradually transitioning from basic living security to higher-quality pursuits such as health food, leisure and entertainment [2]. According to a research paper published in 2015, relevant advertising of products is one of the important factors affecting consumers' purchase intention [3]. In such an environment and scope, sellers hope to increase the sales of their products in the form of advertisements, so as to achieve the purpose of making profits. The meaning

and function of advertising is undoubtedly to further help merchants to make profits by directly or indirectly influencing customers' purchase intentions [4]. But there are many forms of advertising, and there are differences in the value expression of different types of advertisements and their appeal to shoppers. In daily life, the two most common forms of advertisements are product picture advertisements and product video advertisements. And the type of comparative advertising has become an important means to fully display product information to buyers, and thus influence the wishes of customers [5]. To sum up, as the title of this research shows, the purpose and significance of this study is to analyze and explore the influence of the two most classic forms of advertising, product picture advertising and product video advertising, on consumers' purchase intentions.

Consumers, the research object of this paper, have a very important position. For example, the United States believes that consumers are the main body of economic growth [6]. Consumers often consider a variety of factors before choosing the products they want. In previous studies, An article looks at service quality and customer satisfaction are widely recognized as key influences in the formation of consumers' purchase intentions in service environments [7]. The study reported here was designed to aid in the understanding of these relationships by empirically assessing the nature of the relationship between service quality and consumer satisfaction in the formation of consumers' purchase intentions across four unique service industries. There is also an article that looks at the relationship between a company's environmental performance and consumers' willingness to buy [8]. Surveys were posted to a random sample of residents in Hobart, the capital of Tasmania, Australia. Responses (n = 698) show that participants report higher purchase intention for products from high versus low PEP companies, and that participants' EI and product price moderate this relationship. However, there are few researches on the influence of product advertising pictures and product advertising videos on consumers' purchase intention.

2 Literature Review

An increasing number of professors focus on the correlation of human behavior and their cognitive process and various theoretical frameworks indicates that cognitive self-regulation plays a critical role in human behavior. Within those frameworks, the theory of planned behavior (TPB) is extensively investigated. In TPB, Intention is essential for people to regulate their behavior and this key factor influenced by attitude toward the behavior, subjective norm and perceived behavior control [9].

Perceived behavior control is a critical issue in TPB. There are great difference between perceived behavior control and Rotter's theory of perceived locus of control [10]. Former concept indicates that people perception of the ease of difficulty of performing the behavior of interest. While perceived locus of control is a broad concept that remains stable. In addition to that, Atkinson also stated that perceived control can be detected in the theory of achievement [11]. And author also confirmed that perceived control is a specific behavioural context rather than a generalized predisposition. In general, TBP enables to comprehensively explained human behavior among numerous areas such as leisure behavior. One of the tenets of TPB is that behavioural intentions virtually determine human social behavior. Intention, perception of behavioural control, attitude

toward the behavior, and subjective norm each reveals a different aspect of the behavior, and each can serve as a point of attack in attempts to change it [12].

TPB has gone through three stages of development. The 1980s is the formation and revision period of the theory, which is mainly the proposal and preliminary test of the basic theory module. The 1990s was the perfect period of the theory, which mainly focused on the further definition of basic variables, the exploration of new mediating variables and moderating variables, and the revision of measurement methods. The first decade of this century was a stage of comprehensive development of the theory. The applicability of TPB in different fields, different countries and different contexts was confirmed, and the interdisciplinary expansion of the theory was completed [13]. TPB applications can be summarized into the following three categories: first, to predict individual behavior. Although TPB was originally intended to explain how individuals plan their behavior to achieve specific goals, most research has focused on how to influence TPB elements to predict individual behavior to achieve specific goals. This kind of research is widely seen in health communication, marketing, management, clinical medicine and other fields. The subjects included healthy sexual behavior [14]. Second, TPB's expansion into new media. As new media become part of everyday life, researchers are examining the predictive and explanatory power of TPB on online behavior. This type of research focused on the first decade of this century and included online shopping [15]. Third, the cross-cultural application of TPB. TPB is proposed and tested in the context of north culture, therefore, many researchers are committed to testing its adaptability in the context of heterogeneous culture.

The theory of planned behavior is a new theory further expanded and evolved by Icek Ajzen in 1985 based on the theory of rational behavior [16]. The important achievement of the theory of planned behavior is that the theory of planned behavior overcomes the limitation that the theory of rational behavior cannot reasonably explain the behavior that is not completely controlled by the will. When analysing behavior intention and actual behavior, planned behavior theory is not only affected by "attitude" and "subjective norm", but also affected by "Perceived Behavioural Control". The application of the theory of planned behavior starts from attitudes, subjective norms and perceived behavior control, and accurately predicts the intention of various behaviors through the effective support of past experience and relevant evidence [12]. Because the predictive ability and generation ability of the theory of planned behavior are very significant and outstanding, for many scholars and researchers, the theory is a classic theory with universal practicability in different fields. Over the past few decades, the theory of planned behavior has produced thousands of written studies. And the theory of planned behavior has also been applied to multiple modules such as online shopping, political economy, and safe sex [16].

According to the above research, it is not difficult to see that the types of advertisements in today's era are affecting consumers' purchase intentions all the time. At the same time, the type of advertisement also plays a role in helping the merchant to achieve the purpose of profit. So far, there are many studies on which medium is more attractive to consumers, video advertising or picture advertising, however, with the development of communication technology, the coverage of 5G networks has increased and people's

use of fragmented time has gradually improved, so this research still has value. According to a 2018 research paper on the impact of advertising on consumption, businesses are shifting their marketing strategies towards social media for promoting their products and services predicting [17]. Therefore, the popularity of picture advertising and video advertising has also made companies change new means and methods to attract consumers. Today, the emergence of different advertising types has led to a new wave of media economy, the advertising economy, led by picture advertising and video advertising, has entered the authors daily life in an all-around way. A series of advertising applications such as blogger recommendations and Tik Tok advertisements have gradually entered the public's field of vision. And the marketing methods that rely on picture ads and video ads are worthy of the researchers in-depth discussion. This discussion also makes the related research on consumers' purchase intention a new entry point with the help of pictures and videos. Therefore, this article will compare the information, content classification, and audience acceptance, of video advertisements and picture advertisements to compare which type is more attractive to consumers. This article can deeply explore the specific ways that video and picture advertisements promote consumer consumption, to allow merchants to adjust their marketing methods more suitable for them. For example, merchant can design the art elements in the picture according to the product characteristics, including colour matching, screen layout, etc., merchant can also design the creative ideas presented in advertising videos, merchant can also choose the advertising platform, find partners, etc.. Drive the development of the electronic economy industry through a certain publicity method of video or pictures and promote consumers' desire for consumption. Therefore, this paper will take consumers as the research object, and use video advertisements and picture advertisements as the main media to deeply explore the influence of video advertisements and picture advertisements on consumers' purchase intention. And the researchers will apply TPB theory to deeply explore the influence of product advertising pictures and product advertising videos on consumers' purchase intention and compare the communication effects of the two forms of communication to make an in-depth analysis. Therefore, no matter which type of problem TPB is applied to, it needs to predict and investigate the driving force behind the relevant behavior according to its own characteristics.

The importance of this research is that it will compare the relationship between picture ads and video ads. This will provide new ideas on how to advertise and promote their products more efficiently for sellers. At the same time, it will also help to gain a more comprehensive understanding of targeted consumers. It is also possible to identify some of the factors that influence their willingness to consume. This will give the advertisers more effective ways to increase the consumers' willingness to spend on. The aim of current study is to investigate the product advertising in the picture and video of the two modes of publicity, which is more popular in contemporary society? This research will provide more effective publicity basis for shops and individual sellers, and it is also expected to let more people know what factors affect consumer behavior. Questionnaire was applied to comprehend consumers' attitudes, and also the theory of Planned Behavior (TPB) was employed to design corresponding questions. Because TPB can be applied to predict individual behavior, can also be extended to new media, and can be applied across cultures. To a certain extent, it overcomes the limitation of TRA's inability to rationally

explain behavior that is not completely controlled by will. Ideally, this is expected to give an overall picture of the public's attitude towards both forms of publicity. SPSS will be used to conduct statistical analysis for significance. Of the two proposed methods, advertising videos generally take longer to view than advertising pictures alone. As the length of the AD increases, so does the waiting time. Therefore, perceived interference and irritability during viewing should also be increased. As advertising becomes more stimulating, people may be less inclined to watch it [18]. Therefore, it is more challenging for a video advertisement to maintain the attention of the audience when the duration is longer. Previous studies have focused more on traditional media channels, such as television and computers. With the broad use of 5g, mobile phones have become the most convenient channel for advertising information. The current study will also focus on the latest media channel such as TikTok. Based on these characteristics, it can be assumed that picture advertising works better than video advertising. The results are expected to be consist with previous similar studies.

3   Method

3.1   Research Design

The method used in this research report is a survey method, more specifically, a online survey. Obviously, by reading the title of this research report "The Influence of Product picture Advertising and Product Video Advertising on Consumers' Purchase Intention", readers can associate and speculate that this survey must require a large number of samples. In order to collect a large number of samples in a short period of time for this task, the online survey method is undoubtedly an effective and reliable choice. Online surveys have very prominent advantages. First, it is an interesting means of collecting sample data, which has a certain degree of appeal to people. Secondly, this method is very simple, the cost is very low, a large number of people can be surveyed at the same time, and the speed of collecting information is very efficient [19]. Data collection and sample analysis for a study are very important. Since the 1930s, the survey method has become a standard tool for research in many fields such as social sciences and market consumption [20]. In addition, samples and data were collected in the form of online questionnaires, omitting the process of data collation and analysis in traditional research methods.

3.2   Data Collection

The guiding theory reported in this study was identified as the theory of planned behavior. By browsing and adapting the previous relevant questionnaires, the researchers made a one-to-one correspondence between the dependent variables and independent variables in this research report and the dependent variables and independent variables in the theory of planned behavior, and finally obtained a new questionnaire consistent with this research report. The questionnaire is divided into two parts: basic information and information that this research wants to get. Basic information is presented in the form of multiple-choice questions, while the information the researcher wants to obtain in

this study uses a scoring method to show the degree. Since this is an online survey, the researchers put the designed questionnaire on software called "Questionnaire Net". In addition to the "Questionnaire Net", the researchers also distributed the questionnaire on local Chinese social platforms such as Micro-blog and WeChat. Those who answer the questionnaire need to answer for at least three minutes, and then they can get a certain amount of reward. Based on this situation, the researchers received nearly 100 questionnaires in less than a day. Because it is in the form of an online survey, the people participating in the survey are all people who can use the Internet or have frequent access to the Internet of Things [19]. Therefore, the respondents have a distinctive feature, that is, most of them are over 18 years old.

3.3 Data Analysis

After receiving all questionnaires, the researchers performed a basic filtering of the data and information, retaining those completed by respondents who viewed both video and picture ads. After that, the researchers used spss data analysis tools to perform reliability analysis, validity analysis, correlation analysis and regression analysis on the filtered information. Combining the above steps with the frequency distribution of relevant information in this study, it can be found that women account for 62.7% of the respondents. Respondents over the age of 18 accounted for 86.3% and those with a college degree or above accounted for 80%. Therefore, overall, women over the age of 18 with a college education or above accounted for the majority of the respondents.

4 Results

4.1 Reliability Analysis

Reliability analysis generally refers to the degree of consistency or reliability of research results. Reliability analysis is used to measure whether the response results of the samples in the questionnaire are reliable, and whether the test subjects answer seriously. According to the reliability analysis results, the higher the test reliability, the more reliable the result. From Table 1, it clearly shows that the reliability coefficient of the picture in the following table is 0.977, and the reliability coefficient of the video is 0.983, Both reliability coefficients are greater than 0.8. This indicates that the data in this study is highly reliable and can be used for further analysis. However, the reliability coefficient of the video is greater than that of the picture, so the reliability quality of the video is better than that of the picture.

Table 1. Reliability statistics

	Picture	Video
Cronbach's alpha	0.977	0.983
Number of terms	19	19

Table 2. Analysis of Variance

	Picture	Video
KMO Quantity of sampling suitability	0.880	0.895
Bartlett's ball checkout the approximate method of card	1270.167	1447.202
Bartlett's ball checkout degree of freedom	171	171
Bartlett's ball checkout significance	<0.01	0.000

4.2 Validity Analysis

Validity analysis is used to chat the validity and accuracy of questionnaire design, and to measure whether the item design is reasonable. When the KMO is greater than 0.7, there is a certain relationship between the independent variables designed in the questionnaire, and the questionnaire is valid. According to Table 2, the KMO of the picture is 0.88, and the KMO of the video is 0.89, all of which are greater than 0.7. Both questionnaires are valid. But the KMO of the video is larger than the KMO of the picture, the statistic of the Bartlett's ball checkout the approximate method of card for the video is larger than that of picture and the Bartlett's ball checkout significance for the video is less than that of picture. So the questionnaire of the video is relatively more effective.

4.3 Correlation Analysis

Correlation analysis is the analysis of the relationship between the independent variable and the dependent variable, so as to measure the degree of correlation between the two variables. The results of the correlation analysis between pictures and videos in this study are shown in Table 3.

4.4 Regression Analysis

Regression analysis is an analytical method to study the influence of X on Y. The first step of this research is to analyze the model fitting of pictures and videos through R-square, the closer the R-square and the adjusted R-square are, the more stable the data is. It can be seen from Table 4 that the R-squares of pictures and videos are relatively close, which shows that the data in this study are relatively stable. But relatively speaking, the R-square of the video and its adjusted R-square are smaller, so the video data is more stable.

The next step uses the analysis of variance table ANVOA to test the hypothesis. If the significance is less than 0.05, it proves that the regression equation is meaningful. According to Table 5, the significance of pictures and videos are both less than 0.05, indicating that both regression equations are meaningful. But the saliency of the video is obviously lower than that of the picture, so the data of the video is more stable.

The third step is from the coefficient table. The pictures and videos should be compared vertically, and after the comparison, the useful parameters should be compared horizontally. Look at the academic. The significance value of Attitude in the picture is

Table 3. Pertinence

		Picture				Video			
		Attitude AVG	SN AVG	PCB AVG	PI AVG	Attitude AVG	SN AVG	PCB AVG	PI AVG
Attitude AVG	Pearson's correlation coefficient	1	0.872	0.758	0.809	1	0.890	0.823	0.878
	Significance		<0.001	<0.001	<0.001		0.000	0.000	0.000
	Number of cases	51	51	51	51	51	51	51	51
SN AVG	Pearson's correlation coefficient	0.872	1	0.788	0.908	0.890	1	0.809	0.903
	Significance	<0.001		<0.001	<0.001	0.000	0.000	0.000	0.000
	Number of cases	51	51	51	51	51	51	51	51
PCB AVG	Pearson's correlation coefficient	0.758	0.788	1	0.824	0.823	0.809	1	0.892
	Significance	<0.001	<0.001		<0.001	0.000	0.000	0.000	0.000
	Number of cases	51	51	51	51	51	51	51	51
PI AVG	Pearson's correlation coefficient	0.809	0.908	0.824	1	0.878	0.903	0.892	1
	Significance	<0.001	<0.001	<0.001	<0.001	0.000	0.000	0.000	0.000
	Number of cases	51	51	51	51	51	51	51	51

Table 4. Model Summary

	Picture	Video
R	0.925	0.946
R2	0.856	0.895
The R2 after adjustment	0.846	0.888
Errors in standard estimates	0.4270	0.3451

Table 5. The ANOVA of purchase intention

Model	Picture			Video		
	Regression	Residual error	Aggregate	Regression	Residual error	Aggregate
Quadratic sum	50.777	8.570	59.347	47.633	5.597	53.230
Degree of freedom	3	47	50	3	47	50
Mean square	16.926	0.182		15.878	0.119	
F	92.823			133.331		
Significance	<0.001b			0.000b		

Table 6. The coefficient of purchase intention

	Picture				Video			
Model	Constant	Attitude AVG	SN AVG	PBC AVG	Constant	Attitude AVG	SN AVG	PBC AVG
B	−0.132	−0.016	0.693	0.339	−0.302	0.158	0.477	0.454
Standard error	0.260	0.132	0.124	0.108	0.210	0.124	0.120	0.093
Beta		−0.014	0.692	0.290		0.144	0.431	0.425
t	−0.509	−0.124	5.605	3.128	−1.439	1.280	3.967	4.872
Significance	0.613	0.902	<0.001	0.003	0.157	0.207	0.000	0.000

0.902, which is greater than 0.05, which proves that the dimension of attitude is not related to the dependent variable the authors study. The significance of SN is <0.01, and the significance of PBC is 0.003, so it is obvious that the significance of SN is less than that of PBC, so the significance of SN is selected as the horizontal comparison. In the video, attitude is still not significantly correlated, and the SN PBC significance data in the video are the same, so the researchers also choose SN as the researchers horizontal comparison in the video. In the last step, the authors perform a longitudinal comparison of the SN saliency of pictures and videos. The significance value of pictures is less than 0.001, the significance of videos is approximately equal to 0.000, and the significance of videos is less than that of pictures. As shown in Table 6.

In summary, compared to picture ads, video ads are more attractive to consumers.

5   Discussion

In both analyses of the data above, it was found that Subjective Norm had an impact on consumer intent, as did Perceived Behavior Control. However, the influence of Subjective

Norm is slightly stronger in both picture and video ads. Thus, the strongest correlation with the dependent variable Purchase Intention is the independent variable Subjective Norm. Obviously, it is clear that respondents or consumers are willing to act in a way that is consistent with their picture in the minds of others. At the same time, this shows that they are very willing to listen to the recommendations from family members and friends and is clearly related to their willingness to purchase. According to previous study, attitudes were recognized as one of the strongest predictors of behavioural intentions [12]. However, the analysis of the data from this research revealed that attitudes did not significantly predict people's intention to buy a product in either picture or video ads. Therefore, the authors suspect that consumers are not too critical of product advertising. They do not perceive the quality of product advertising as having a direct impact on the quality of the product.

A comparison of the data already shows that product video ads are more likely to influence consumers' purchase intentions and thus indirectly influence their purchasing behavior. This conclusion also disproves initial assumption above that picture ads are more appealing to consumers and drive them to purchase products. In the previous assumption, the authors tried to demonstrate that video ads for products would make consumers impatient due to their longer duration. However, it is clear that the length of time spent viewing a video ad does not determine its appeal to consumers. Among the conclusions drawn from this study, the researchers reckon that being more entertaining is one of the factors in favor of video advertising. And with this feature, having a longer time is an advantage for video advertising to incentive purchase. In the same way that it is an advertisement, a more entertaining advertisement may make the viewer more relaxed. At the same time, the entertainment allows the viewer to better understand the content of the ad [18]. This deepens the viewer's impact on the product advert and stimulates their desire to consume it. Based on current study, while drawing conclusions through a series of comparative analyses, still has limitations. However, there are still certain limitations. Firstly, as it was an online questionnaire, the research can only survey people who are proficient in using the internet. For example, teenagers or office workers. The majority of respondents to the questionnaire were university students. With this, the scope of application of the findings was greatly reduced. Secondly, of the 135 questionnaires collected in this study, 74 people viewed the picture ads. The number of people who viewed the video advertisements was 61. However, the researchers chose to select a sample of respondents who viewed both the picture and the video advertisements. In the end 51 people were retained for each of the two questionnaires. The sample of respondents were relatively small, so it may not be generalizable to the large population. In addition, the TPB was used to study consumers' purchase intentions and only questions related to the three independent variables of the theory were set. The influence of other factors on purchase intentions may be ignored. For example, this research ignore whether the choice of advertising platform also affects consumers' purchase intention.

6   Conclusion

Based on the background of the era that the rapid and stable development of China's economy has led to the improvement of people's consumption level and purchasing

power, the researcher in this paper conducts research on consumers' purchase intention. Propose and explore which of the two different types of advertising, product picture advertising and product video advertising, has a greater impact on consumers' purchase intentions. Guided by the theory of planned behavior, through online surveys and the use of SPSS data analysis software, the results show that product video advertising has a greater impact on consumers' purchase intention than product picture advertising. Obviously, this is not consistent with the report's assumptions, which shows that people's speculation sometimes runs counter to the real research results. Therefore, after the analysis and discussion in this study, the researchers of this study suggest that businesses use more video advertisements to attract customers. By reviewing and sorting out relevant literature, this study strongly demonstrates the practicability and reliability of planned behavior theory in analysing behavioural intentions. When it comes to the contribution and significance of this research, the first thing that bears the brunt is that this paper summarizes the views and theories put forward by predecessors and extends and deepens on this basis. In addition, the report enriches the literature and data in related fields, and provides a relatively novel perspective, providing a reliable and convincing reference for scholars who want to study this field in the future.

References

1. C. A. Holz, China's economic growth 1978–2025: what we know today about China's economic growth tomorrow, World Development, 2008.
2. K. Hubacek, D. Guan, A. Barua, Changing lifestyles and consumption patterns in developing countries: A scenario analysis for China and India, Futures, 2007.
3. V. Mirabi, H. Akbariyeh, H. Tahmasebifard, A study of factors affecting on customers purchase intention, Journal of Multidisciplinary Engineering Science and Technology, 2015.
4. D. Braithwaite, The Economic Effects of Advertisement, The Economic Journal, 1928.
5. M. G. Collins, L. K. Waters, Effects of type of comparative advertisement on responses to the advertisement and the advertised product, Psychological reports, 1986.
6. S. H. Barello, Consumer spending and U.S. employment from the 2007–2009 recession through 2022, Monthly Labor Review, 2014.
7. S. A. Taylor, T. L. Baker, An assessment of the relationship between service quality and customer satisfaction in the formation of consumers' purchase intentions, Journal of retailing, 1994.
8. M. Grimmer, T. Bingham, Company environmental performance and consumer purchase intentions. Journal of business research, 2013.
9. I. Ajzen, From intentions to actions: A theory of planned behavior. In Action control. Springer, Berlin, Heidelberg, 1985.
10. J. B. Rotter, Generalized expectancies for internal versus external control of reinforcement. Psychological monographs: General and applied, 1966.
11. J. W. Atkinson, An introduction to motivation, 1964.
12. I. Ajzen, The theory of planned behavior, Organizational behavior and human decision processes, 1991.
13. J. Zhang, Q. Zheng, The development, completion, and application of the theory of planned behavior, Chinese Journal of Ergonomics, 2012.
14. K. Basen-Engquist, G. S. Parcel, Attitudes, norms, and self-efficacy: A model of adolescents' HIV-related sexual risk behavior, Health education quarterly, 1992.

15. H. Lim, A. J. Dubinsky, The theory of planned behavior in e-commerce: Making a case for interdependencies between salient beliefs, Psychology & Marketing, 2005.
16. J. N. Cappella, Planned Behavior, Theory of The International Encyclopedia of Communication, 2008.
17. G. Jain, S. Rakesh, K. R. Chaturvedi, Online video advertisements' effect on purchase intention: an exploratory study on youth, International journal of e-business research, 2018.
18. D. Raditya, W. Gunadi, D. Setiono, J. Rawung, The Effect of Ad Content and Ad Length on Consumer Response towards Online Video Advertisement. The Winners, 2020.
19. J. Bethlehem, Selection Bias in Web Surveys, International Statistical Review/Revue Internationale de Statistique, 2010.
20. M. S. D. P. Nayak, K. A. Narayan, Strengths and weaknesses of online surveys, technology, 2019.