



Paper 25

The effect of short-form videos in social media among Generation Z in their consumption towards live sports TV broadcasting

Muhammad Fathin Al Ghazali

ICMEM

The 7th International Conference on Management in Emerging Markets

Abstract – Short-form videos has already become mostly been applied in various social media platforms. Such form also has attracted the Generation Z the most. Some kinds of product marketing use this interesting phenomenon, including the sport field, particularly live sports TV broadcasting. This paper explores how the effect of short-form videos towards the interest of Generation Z to purchase live sports TV broadcasting. The data collection technique was conducted using online questionnaires among 219 respondents where 179 respondents are the Generation Z and the rest of it is millennials and X generation. Afterwards, the data were analyzed by conducting quantitative approach, through correlation coefficient and regression analysis. The result shows that, to some extent, there is a positive correlation between the effect of short-video form among Generation Z towards live sports broadcast consumption.

Keywords – short-form videos, generation Z, marketing

I. INTRODUCTION

Short-form videos in social media have seen a rise in popularity for the last couple of years with platforms like TikTok gaining a huge user base since their launch and with other platforms like Instagram and YouTube following suit. A short-form video is a format that can be up to 3 minutes and 20 seconds in length, and it is an effective and engaging way for businesses to reach audiences. It allows marketers to form connections and build consumer advocacy for a growing audience in a brand-safe environment. The top app that utilizes short-form videos, TikTok, has more than 1 billion monthly active users worldwide [1]. TikTok's distinct selling point is its mass approach over the content, which brings it closer to being a TV replacement than any other social platform [2].

With the ever-changing nature of the current digital world, the sports industry must adapt to how to make sure their business models adhere towards the newer generation otherwise they will lose a significant portion of the audience; thus, they must market correctly. This short-form video-based content allows for an instant and snackable user-generated content that can be consumed anywhere and anytime. It is the perfect kind of content for the younger generation, specifically Generation Z. Generation Z is defined as the generation of people born between 1997 and 2012 [3].

Generation Z typically has an attention span of 8 seconds [4]. Attention span is how long you can focus on something or spend on a task before you need a break or get distracted [5]. These changes in consumption habits have huge implications for how companies must approach a different way of marketing where traditional marketing might not catch the eye anymore of the Generation Z audience who are all over the social media platforms. This is quite evident in the live sports broadcasting industry, where they are seeing several interests decreasing from the young generation. Studies have shown that less people are watching live sports broadcasting in the younger generation with most preferring to consume their sports-related content through social media videos and highlights than watching a full live game of sports. This affects the broadcasting revenues of the industry as less people are paying for subscription television rights with the younger generation opting to go for a less expensive alternative in the form of social media sports consumption.

The role of social media in the distribution and consumption of sports content is a topic of constant debate [6]. This can be seen in how much of a challenge it is to get young people to watch sport on television with their consumer base being the children of the "pay-per-view" generation, it's hard to get them to pay an expense to watch sports on the television [7].

If the sports industry wants to attract and retain young viewers, especially Generation Z, it will have to make and work around some changes to suit them. According to [8], generation Z is a hard to please customers, tech savvy, and on-demand lifestyle, but dynamic and perceived as the loyal customers [9]. The young generation, while still watching television, are not as strictly restricted towards it as they utilize a wider selection of devices and platforms while watching. When compared to other generations, just 35% of Generation Z commonly watch live sports broadcast with Generation X and Baby boomers having 57% and 77% respectively. Generation Z mostly prefers using their mobile phones, with 65% of them using it for sports media consumption [10]. Social media has brought upon new methods of seeking and obtaining information on the market's plethora of products and services [11]. Industries now place a high value on how social media can be used to shape consumers' perceptions of brands and products and influence their purchasing decisions. Consumers are thought to be effectively adding to the promoting content with user-generated content (UGC) on

social media. They are now encouraged to interact with brands, share data with other buyers, and create content that reflects their identity [12].

It is tougher for brands and industries to market themselves in the current world with the competition of the consumer's attention getting denser to reach as the general audience is more overstimulated than ever with the abundance of information around them [4]. There is a lot of distraction for consumers from diverting their attention from what they are doing, especially for Generation Z. Generation Z averaged more than 4 hours a day on their mobile phone apps, so to retain their favour, brands must prioritize authentic, high-quality, and innovative content strategies. Generation Z's expectations, combined with their aversion to disruptive traditional advertising, will fundamentally alter the marketing landscape [13]. Because of this consumer expectation, it is critical for businesses to reconsider how they develop marketing plans and strategies. Platforms such as TikTok, Instagram and YouTube dominate the screens of the younger generation by implementing strategies that have adhered to Generation Z's needs such as short-form videos and easy-access UI which gives instant gratification that is demanded by the younger generation. Since the advent of the Internet and the exponential growth of social media, instant gratification has become the norm for consumers [14].

This research attempts to give a solution for stakeholders in the sports industry into how to appeal more towards Generation Z. For now, and in the next few years, Generation Z is going to be the dominant consumers on this planet [10]. Moreover, Araujo et al. [15] find that generation Z's consumer behavior significantly impacts their purchase intention. The objective is to investigate how the social media trends that we see in the young generation today affect the older form of entertainment i.e. live broadcast. Three research questions that to be explored are: 1) How does short-form videos factor in the Generation Z's consumption towards live sports broadcasting; 2) How can the sports industry adapt and change their business to Generation Z's consumption characteristics; and 3) What will the future of live sports broadcast be like in the digital landscape?

II. METHODOLOGY

This quantitative study focused on respondents with the following criteria: Indonesian, range from Generation X to Generation Z, and whether like to watch live sports broadcast. Moreover, the survey questions are based on the three research questions to collect the information in terms of consumer behaviour on the highlight of the match and subscription, consumer subscription with additional features, and consumer subscription within

the next five years. The survey utilized measurement through observational variables, using a 5-point Likert scale. The 5-point Likert scale starts from the lowest Strongly Disagree (1) Disagree (2), Neutral (3), Agree (4) to the highest Strongly Agree (5). A sum of 12 statements regarding consumer behaviour, features of the live sports package, and what live sports would be in the future were included in the questionnaire. A pilot study with 5 respondents has also been conducted to measure Cronbach's alpha and justify its reliability and consistency.

The research was conducted through a deductive approach in the quantitative method of Likert Scale questionnaires as primary research directed to a sample of Generation Z questions relating to their usage of social media and consumption of sports media. Table I shows the list of questions and its variable codes. The relative importance of short form video social media in relation to live TV sports broadcast is assessed.

The sample is taken from 178 participants of Generation Z, age group 15 - 24 and all genders. The participant of the questionnaire is targeted to those who have an interest in watching sports content as live broadcast through the television or any media platform. The questionnaire is conducted online in the form of short-ended questions.

Here, data are collected by survey using questions on Google Form and sending out questionnaires through some groups on instant messaging platforms. Data were collected by distributing questionnaires mostly to Gen Z in Indonesia (Gen X and Gen Y could also be the respondent to be compared). Participants will then point how much they "agree" or "disagree" with the statement based on the 5-point Likert Scale.

Analysis of the data collected is conducted through Pearson correlation (to measures the strength of the relationship between two variables) and multivariate regression (to have a different view of the relationship between various variables). The aim of the analysis is to find out whether any of the variables influenced consumption and if any influence was positive or negative. Despite some debate about which method should be applied to Likert scale data, this study uses Pearson correlation and regression because there is an adequate sample size (more than 10 observations) [16]. The Pearson correlation formula [17] is as follows.

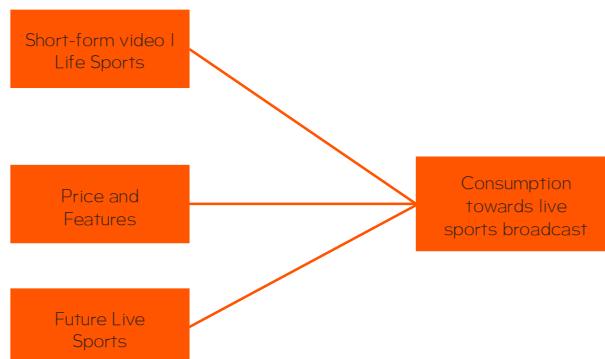
$$r = (\sum(x - \bar{x})(y - \bar{y})) / (\sqrt{(\sum(x - \bar{x})^2)(\sum(y - \bar{y})^2)}) \quad (1)$$

where x and y are vectors with length n ; \bar{x} and \bar{y} corresponds to the mean of x and y , respectively. Meanwhile, the multivariate regression formula is as follows.

$$y = mx_1 + mx_2 + mx_3 + b \quad (2)$$

where y is the dependent variable of the regression; x_i for $i = 1, 2, 3...$ denotes the i -th independent variable of the regression; b denotes constant.

Figure 1 shows the proposed model for this study and relate with the Table I. The short-form video | Live sports factor includes HL, Live, HLBetter, LiveBetter, HLNSubLive. The price and features of live sport broadcast package include SubDiscount, Free, LiveNFeatures, and NotInterestFeatures. The future of live sports includes Live5Yrs and InteractiveLive5Yrs.



No	Code	Question
1	HL	I like to watch the highlight of the match through social media platforms (e.g., Twitter, TikTok, YouTube etc.)
2	Live	It's fun to watch live sport broadcast either through the television or live streaming
3	HLBetter	It's more interesting to watch highlights of the match instead of live sports broadcast.
4	LiveBetter	I prefer to watch live sport broadcast from the start until the end of the match.
5	HLNSubLive	I interested to watch highlight score of the match through any media as well as subscribe the live broadcast package of my favorite sports.
6	Free	I really like the free live streaming of sport events.
7	LiveNFeatures	It's interesting if a live sport broadcast subscription package accompanied by highlight score, special merchandise, and favourite player accessibility features.
8	SubDiscount	I interested to subscribe a live sport broadcast package with price discount for a particular category (student/ employee etc.)

9	NotInterestFeatures	I'm not interested at discount price, special merchandise, and favourite player accessibility features of live sport broadcast package.
10	Live5Yrs	Within the next 5 years, live sport broadcast through television media is still interesting.
11	InteractiveLive5Yrs	Within the next 5 years, live sports broadcast that involves the audience interactively through television media is still interesting.
12	HLOnly	I only need to watch the highlight of the match through YouTube, TikTok etc. and not interested to watch live sports broadcast.

III. RESULTS

A. Result of Generation Z's Consumer Behaviour

Descriptive statistical analysis: From 219 respondents, there are 178 respondents of Generation Z. The minimum and maximum values of the scales between 1 and 5 indicate no limitation in terms of variation for the scales used. The mean values of the observed variables are different (2.80 – 4.31) The mean value of the observed variables in the consumption behaviour scale ranges from 3.53 to 4.10.

Table II shows the correlation coefficient between the variables, and its range from -0.16 to 1. Table III, IV, and V shows the coefficient of the influence variables as the result of multivariate regression.

Table 2 - CORRELATION COEFFICIENT BASED ON GEN Z DATA

Var	1	2	3	4	5	6	7	8	9	10	11	12
1	1	0.53	0.32	0.2	0.32	0.41	0.4	0.3	0.19	0.23	0.39	-0.02
2	0.53	1	0.08	0.38	0.33	0.5	0.44	0.37	0.12	0.41	0.4	-0.13
3	0.32	0.08	1	-0.08	0.24	0.22	0.15	0.1	0.18	0.05	0.27	0.19
4	0.2	0.38	-0.08	1	0.31	0.2	0.23	0.08	0.13	0.4	0.27	-0.15
5	0.32	0.33	0.24	0.31	1	0.4	0.32	0.35	0.25	0.33	0.29	0.02
6	0.41	0.5	0.22	0.2	0.4	1	0.41	0.47	-0.1	0.28	0.41	-0.16
7	0.4	0.44	0.15	0.23	0.32	0.41	1	0.64	0.03	0.29	0.41	-0.11
8	0.3	0.37	0.1	0.08	0.35	0.47	0.64	1	0.07	0.28	0.33	-0.09
9	0.19	0.12	0.18	0.13	0.25	-0.1	0.03	0.07	1	0.17	0.16	0.24
10	0.23	0.41	0.05	0.4	0.33	0.28	0.29	0.28	0.17	1	0.53	-0.08
11	0.39	0.4	0.27	0.27	0.29	0.41	0.41	0.33	0.16	0.53	1	-0.02
12	-0.02	-0.1	0.19	-0.15	0.02	-0.2	-0.1	-0.1	0.24	-0.1	-0	1

Table 3 - MODEL 1 OF REGRESSION

HLNSubLive	Estimate	Std. Error	Pr(> t)
SubDiscount	0.18457	0.07766	0.01882 *
HLBetter	0.13703	0.06702	0.04278 *
LiveBetter	0.25676	0.08223	0.00218 **
Free	3.00E-01	0.10434	0.00471 **
NotInterestFeatures	0.15059	0.05835	0.01089 *

Table 4 - MODEL 2 OF REGRESSION

LiveNFeatures	Estimate	Std. Error	Pr(> t)
SubDiscount	0.47979	0.05907	2e-13 ***
HL	0.20955	0.08012	0.00987 **
InteractiveLive5Yrs	0.19203	0.07937	0.01681 *

Table 5 - MODEL 3 OF REGRESSION

Live5Yrs	Estimate	Std. Error	Pr(> t)
Live	0.18915	0.08579	0.02908 *
LiveBetter	0.22084	0.07273	0.00285 **
InteractiveLive5Yrs	0.44506	0.08266	2.94e-07 ***

Therefore, we can obtain following linear regression equations for each model:

$$\text{HLNSubLive} = 0.18457 * \text{SubDiscount} + 0.13703 * \text{HLBetter} \\ + 0.25676 * \text{LiveBetter} + 0.29967 * \text{Free} + \\ 0.15059 * \text{NotInterestFeatures} \quad (3)$$

$$\text{LiveNFeatures} = 0.47979 * \text{SubDiscount} + 0.20955 * \text{HL} + 0.19203 * \text{InteractiveLive5Yrs} \quad (4)$$

$$\text{Live5Yrs} = 0.18915 * \text{Live} + 0.22084 * \text{LiveBetter} + 0.44506 * \text{InteractiveLive5Yrs} \quad (5)$$

There is a profiling question in the questionnaire whether the respondent likes to watch live sport broadcast (through the television or any other media)? If the answer is "No", then we still explore how their attitude towards live sports broadcast in the form of three statements and using the 5-point Likert scale as well. There are 32 respondents from 179 generation Z's respondents (18%) have answered "No". The first statement (TQ1) is "I will interest to watch the live sport broadcast through any media platforms (television, etc.) if it's an international competition". The result is 50% of them "Neutral" (undecided). The second statement is "I will interest to watch live sport broadcast through any media platforms if it's the match of my favourite club". The result is a tie between "Agree" and "Neutral" (25% each). The third statement is "I'm not interested at all on live sports broadcast". The result is 37.5 % of them "Disagree".

B. Words frequency



Fig. 2. Wordcloud of "live sport broadcast" definition from Generation Z's respondents

There is also one short question in the questionnaire which asks the respondents to define the "live sports broadcast" in three words. Based on their words, we can have the frequency of the words to identify what the things in their mind about live sports. The visualization is shown in Fig. 2, and the list of the word frequency is in the Table VI.

Table 6 - WORD FREQUENCY OF LIVE SPORT BROADCAST DEFINITION

word	frequency
fun	44
live	37
broadcast	20
interesting	14
cool	11
exciting	10
entertaining	6
entertainment	6
thrilling	6
tense	5

C. Comparison of Generation Z, Y, and X

There is some generation X and Y's respondent as well, so we can have a comparison, particularly of the model. Table VII shows the comparison of the model 1, model 2, and model 3 based on the p-value, adjusted R-square, F-statistics, and degree of freedom (DF). The comparison of independent variables is shown in Table VIII.

Table 7 - MODEL COMPARISON OF GENERATION Z, Y, AND X

Gen Z	p-value	Adjusted R-squared	F-stat	DF
Model1	2.42E-10	0.2914	F(5)=12.93	140
Model2	< 2.2e-16	0.4666	F(3) = 43.29	142
Model3	5.32E-14	0.3524	F(3) = 27.3	142
Gen Y	p-value	Adjusted R-squared	F-stat	DF
Model1	7.00E-08	0.8791	F(7) = 25.92	17
Model2	0.000381	0.5521	F(4) = 8.397	20
Model3	1.35E-08	0.8194	F(3) = 37.31	21
Gen X	p-value	Adjusted R-squared	F-stat	DF
Model1	3.85E-04	0.8093	F(3) = 17.97	9
Model2	0.0003714	0.6714	F(9) = 25.51	11
Model3	2.16E-04	0.9129	F(95) = 26.16	7

Table 8 - VARIABLES COMPARISON OF GENERATION Z, Y, AND X

	HL	Live	HLBetter	LiveBetter	Free	Sub Dis- Count	NotInterest Features	Interactive LiveSrys	HLOnly
Gen X	✓	✓	✓	✓	✓	✓			
Gen Y	✓	✓		✓	✓	✓		✓	
Gen Z	✓	✓	✓	✓	✓	✓	✓	✓	

IV. DISCUSSION

Based on the results of statistic analysis, some interesting findings are as follows.

A. Correlation coefficient and regression analysis

As we can see from the Table II, the number of columns/rows corresponding to the code in Table I, (e.g. 1 for HL, 2 for Live, and so on). Moreover, there was a significant positive correlation between the dependent variable and independent variable. For example, there was a significant positive correlation between the dependent variable LiveNFeatures and the independent variable SubDiscount $r(144) = 0.64$.

Furthermore, Table III, IV, and V shows that we have some significant variables for each model, as indicated by the $p\text{-value} < 0.05$. The obtained model corresponds to the three research questions that want to be answered. Equation (3) indicates that the short-form videos are one of the factors that affect the generation Z's consumer behavior, in terms of watching the highlight and subscribe the live sports broadcast package. The coefficient of HLBetter shows that to some extent (0.13703)

the short-form videos affecting the generation Z's consumption towards live sports broadcast. The highest coefficient is Free variable, which means that in general the cost to watch the live sports is the main consideration for generation Z.

Meanwhile, from (4) we can see that for generation Z, to subscribe the live sports broadcast package, the factors that affecting the decision are discounted by category, the short-form videos (HL) and live sports package that involves the audience interactively. Here, the coefficient of the SubDiscount as the highest means that the cost to watch the live sports is still the main consideration for generation Z. However, by providing some features of the packages such as price discounts, the highlight of the match, and interactive feature with the audience could make them want to pay for that. Therefore, the sports industry can adapt and change their business, according to this Generation Z's consumption characteristics.

The third research question might be answered by (5) where the independent variable InteractiveLive5Yrs has the highest coefficient. This means that the sports industry needs to retain the interactive feature of their product, particularly the live sports broadcast package. The future of live sports broadcast is determined by its live broadcast and interactive nature.

For the result of the generation Z's respondent who does not like to watch the live sports broadcast, we still can see the opportunity for the sports industry to also fill the gap. Although the answer of the first two questionnaire statements tends to be undecided, but the answer of the third questionnaire statement makes it clear that it depends on who's involved in the match. For example, the sports industry can offer the special package for the special occasion/ national events.

B. Words for marketing strategy

It is obvious from Fig. 2 that the generation Z's respondents perceived the live sports broadcast as a fun, live, and interesting thing to watch. Most of the top 10 words as in the Table VI are also found in the description from generation X and Y. However, there are two words on the list that only come from the generation Z, namely thrilling and tense. The sports industry may take a note of this as one of the marketing strategies of their product to attract the generation Z for purchasing the package.

C. What's characterized the generation Z?

Based on the Table VII we can see that the model 1, model 2, and model 3 of generation Z's respondent is more likely to be significantly fit compared to others. It is indicated by its smallest p-value.

Meanwhile, from Table VIII we know that the short-form videos are one of the factors that affecting the consumption of generation Z towards the live sports broadcast. The interesting finding is that although the attention span of generation Z is notoriously quite short,

but from the result we know that they still can tolerate with the longer-form video such as live sports. This is indicated by the result of HLOnly where 35.62% of them Disagree with the statement.

Another interesting finding is that only generation Z's respondent who does not care about features when cost is the priority (either free or discounted price) This should be the consideration of the sports industry as well when offering the live sports broadcast package.

The above findings, which answer the research question partly emphasize the findings by Araujo et al. [15], who investigate the influence of TikTok towards Generation Z's purchase intention, regarding the three dimensions: emotional, entertaining, and informative TikTok advertisements. They find that the three dimensions positively affect consumer behavior, and only emotional dimension positively affects the purchase intention. They also find that the Generation Z's consumer behavior significantly affects their purchase intention. Here, the result shows that the short-form videos are one of the factors that affect the generation Z's consumer behavior to watch the highlight and subscribe the live sports broadcast package. However, the most significant factor is regarding the package price instead of other various features that might involve the emotional dimension (e.g., favorite sport club or favorite players) Therefore, as the managerial implications of this are as follows. Firstly, the live sports broadcaster should think carefully about the package price more significant rather than the various features of the live sport package offered. Secondly, the next priority of live sports broadcaster should be the thought of creativity to attract Generation Z towards subscription by considering the top 10 words as presented in Table VI. Particularly the thrilling and tense, aspect that are not in the word's description of live sports broadcast from generation X and Y.

V. CONCLUSION

The generation Z is the one who has a special characteristic and the future consumer, like for the sports industry. This study has investigated the effect of short-form videos into generation Z's consumption towards live sports broadcasting. The result shows that to some extent, the short-form videos affecting the consumption of generation Z, although the price still their main concern. The result also finds that the generation Z may want to pay for watching the live sports if they can get the feature that they want, such as discounted price and other interesting features. This finding should be considered by the sports industry or live sports broadcaster when they want to design or offer their product/package to the generation Z as the target market. The generation Z also sees there is still a future for live sports broadcast if

the sports industry retains the interactive nature of their product. As for the future works, we can elaborate the investigation of what kind of the interactive nature of the sports industry product that acceptable within the next few years.

REFERENCES

1. Statista, TikTok MAU 2021 | "Number of monthly active users (MAU) of TikTok worldwide from January 2018 to September 2021," 2021. [online] Available at: <<https://www.statista.com/statistics/1267892/tiktok-global-mau/>> [Accessed 22 November 2021].
2. Fcbusiness.co.uk, "Why TikTok will revolutionise the sports industry," FC Business. 2021. [online] Available at: <<https://fcbusiness.co.uk/news/why-tiktok-will-revolutionise-the-sports-industry/>> [Accessed 24 November 2021].
3. Beresford Research, "Generations defined by name, birth year, and ages in 2022," 2021. [online] Available at: <https://www.beresfordresearch.com/age-range-by-generation/> [Accessed 26 December 2021].
4. K. Boger, "The rise of short-form video & the gen Z social revolution," IAB UK. The Internet Advertising Bureau. 2020.
5. D. Brennan, "What to know about short attention spans," 2021. [online] Available at: <https://www.webmd.com/add-adhd/short-attention-spans#:~:text=Your%20attention%20span%20is%20how,focusing%20on%20tasks%20and%20conversations> [Accessed 21 November 2021].
6. J. Boehmer, "Does the game really change? How students consume mediated sports in the age of social media". *Communication & Sport*. 4(4):460-83, Dec. 2016
7. Johan Cruyff Institute, "Getting young people to pay to watch sport on television is a big challenge," 2018. [online] Available at: <https://johancruyffinstitute.com/en/blog-en/football-business/getting-young-people-to-pay-to-watchsport-on-television-is-a-big-challenge/> [Accessed 22 November 2021].
8. L. Riedler, "Traditional and digital marketing towards generation Z," Bachelor's Thesis Degree Programme in International Business, Haaga-Helia University of Applied Sciences, Finland. 2020.
9. A. Anjum, M.R. Thomas, P.K. Prakash. "Digital Marketing Strategies: Effectiveness on Generation Z." *SCMS Journal of Indian Management*. 1;17(2). Apr. 2020.

10. M. Gonzalez-Flower. "Gen Z is fostering a revolution in sports watching habits," [online] Atos. 2021. Available at: <https://atos.net/en/blog/gen-z-is-fostering-a-revolution-in-sports-watching-habits> [Accessed 21 November 2021].
11. D. Voramontri and L. Klieb. "Impact of social media on consumer behaviour," *Int. J. Inf. Decis. Sci.*, 11(3) 209-33. 2019.
12. A. Singh, "Impact of social media on consumer behaviour," *Turkish Journal of Computer and Mathematics Education (TURCOMAT)* 11;12(5) 1216-25. Apr. 2021.
13. C. Kastenholz, "Council Post: Gen Z and the rise of social commerce," [online] Forbes. 2021. Available at: <<https://www.forbes.com/sites/forbesagencycouncil/2021/05/17/gen-z-and-the-rise-of-social-commerce/?sh=4f8cc720251d>> [Accessed 23 November 2021].
14. J. Wertz. "Why instant gratification is the one marketing tactic companies should focus on right now," Forbes (April 30) Retrieved from <https://www.forbes.com/sites/jiawertz/2018/04/30/why-instant-gratification-is-the-one-marketing-tactic-companies-should-focus-on-right-now>. 2018.
15. C.J. Araujo, K.A. Perater, A.M. Quicho, and A. Etrata, "Influence of TikTok video advertisements on generation Z's behavior and purchase intention," *International Journal of Social and Management Studies*, 3(2), pp.140-152. 2022.
16. G.M. Sullivan and A.R. Artino Jr, "Analyzing and interpreting data from Likert-type scales," *Journal of graduate medical education*, 5(4) pp.541-542. 2013.
17. D. Freedman, R. Pisani, & R. Purves. "Statistics," (international student edition). Pisani, R. Purves, 4th edn. WW Norton & Company, New York, 2007.