Short-Video Advertisements and Chinese Purchasing Decisions:
Testing a New Model Based on Information Processing Theory

Xintao YU*, Takashi NATORI

Graduate School of Technology Management, Ritsumeikan University Osaka Ibaraki Campus 2-150 Iwakura-cho, Ibaraki, Osaka, 567-8570 JAPAN

Abstract

With the launch of 3G technology in 2001 in Japan, the Attention, Interest, Search, Action, Share model (AISAS) arose to lead advertising during that era. However, in 2010, 4G technology was launched, and online diffusion models like AISAS were no longer suitable. This paper proposes a new model, the Attention, Awareness, Affection, and Action (4A) model, and explores how a series of advertisements influence consumers’ purchasing decisions. Structural equation modeling (SEM) was used to test the 4A model, and it was supported in this research experiment.

Keywords: a series of short-video advertisements, 4A model, information processing theory

1. Introduction

With the launch of 3G technology in 2001 in Japan, the Attention, Interest, Search, Action, Share model (AISAS) arose to lead advertising during that era. However, in 2010, 4G technology was launched. As Schadler et al. (2014) Online diffusion models were no longer suitable because the innovation and popularity of smartphones, computers and other technology had initiated a new era of big data, which had thoroughly changed non-virtual life along with advertising[34]. According to eMarketer (2015), one of the largest market research companies in the United States, global mobile advertising spending was due to reach approximately $195 billion for the period between 2016 and 2019, accounting for 70.1% of digital advertisement spending. The United States and China accounted for almost 62% of global mobile advertisement spending in 2016. The United States, China, UK., Japan and Germany respectively spent $57.543 million, $40.604 million, $11.142 million, $7.573 million, and $5.248 million[12]. On the other hand, data from the 44th Chinese statistical report on internet development (2019) shows that by June of 2019, China's internet population had reached 854 million, and 99.1% of these users accessed the internet by phone[39]. Before the 21st century, posters, leaflets, and television were used for advertising. Nowadays, it is everywhere, including inside smartphone applications. Thus, the popularity of mobile devices like smartphones has promoted prosperity for mobile commerce. On the other hand, Shareef et al. (2017) indicated that mobile advertisements possess sufficient information, which can incur higher promotion costs[35]. Also Raphaeli et al. (2017) pointed out that mobile consumer behaviour is unlike consumer behaviour on other online devices, such as personal computers[32]. This led Tseng et al. (2020) to describe three unique characteristics of mobile devices[40]. First, consumers can rapidly access information about more products and their prices due to mobile commerce being more portable and featuring shorter advertisements than traditional advertisements. Users can also browse more information than before. However, this also means that modern consumers lack the patience to sit through a complete advertisement. Second, mobile devices are limited by small screens and less usability, which dictates the type and amount of information that consumers can absorb. Third, mobile commerce makes transactions effortless for consumers, anytime and anywhere. A drawback to this is that consumers may be more hesitant to browse mobile advertisements because of the abundance of information. This has required a new form of advertisement for the new era. Liu-Thompkins (2019) summarised more than 300 articles published the most reputable journals in this field between 2008 and 2018, with results that suggest the field needs to understand better how online advertisements influence consumers long term[25]. The existing research also suggests the demand for studies of serial advertising and exposure, beyond typical considerations of frequency and repetition[25]. Zhang et al. (2019) said that some researchers consider advertising on short-form video apps to be appropriate[42]. As the 44th Chinese statistical report on internet development (2019) showed that such video advertising should be short—under a minute—and uploaded in a series as a string of playlets that are matched to target consumers and push to reach them. Short Message Service (SMS) applications are the longest-running of the top three application types and constitute 14.5% of all applications; online video software represents 13.4%. Notably, short-form video software occupies 11.5%, in spite of its recent origin; the number of users of short-form video software reached 647 million[39]. Yurieff, writing for CNN (2018), indicated that the Chinese short-form video application TikTok had gained global momentum, defeating other popular apps in download overall, such as Youtube, Facebook, and Instagram, in 2018[43]. Zhang et al. (2019) have suggested that applications like TikTok will lead to addiction for some users[42]. In addition, it has been
found that with the arrival of the 5G era and even faster data transmission, advertising is no longer restricted to traditional video advertisements but can also take advantage of new video forms. Certain advertising series on TikTok has been recognised as suitable for research, leading to this paper's proposal of a new model, the Attention, Awareness, Affection, Action (4A) model, for this new form of advertising. This model is developed through chronological summaries of a variety of diffusion models based on information processing theory and exploring how a series of advertisements based on the 4A model influences consumers' purchasing decisions.

2. Theoretical Background

2.1 The Development of Advertising Models

Shuell et al. (1986) suggested that information processing theory describes how people attend to social events, translate information to be learned, and relate it to their existing knowledge to store it in their memory and retrieve it as needed[37]., cited in Pei-Shan (2013) [29] In this section, three chronological tables of advertising models were collated and reviewed. Advertising has existed for millennia; the earliest advertisement has been dated to thousands of years ago. As Behal et al. said that Ancient Egyptians utilised papyrus to communicate business information on wall posters, and people in Ancient China wrote traditional poetry to sell confectionery[6]. Gale (1896), the first modern advertising researcher, tested the degree of attention paid to an advertisement by a consumer[13]. Lewis (1898) proposed the Attention, Interest and Desire model as a guide for sales clerks to be successful in leading consumers to purchase[11]. The model describes the consumer first paying attention to the product, then developing an interest in it, before finally desiring the product. Lewis (1908) later added Action as the last stage, resulting in the acronym AIDA[11]. In the magazine Printer’s Ink (1910), the first hierarchical 4A model was presented, varying from AIDA by changing the third stage to Conviction, giving it the acronym AICA[18]. Numerous advertisements followed this model during subsequent years. Sheldon (1911) considered Satisfaction a crucial addition to AIDA, leading to the longer-term model AIDAS[36]. The concept that diffusion depends on the customer’s psychological state was then proposed, leading to numerous new models, such as Hall’s AICCA (1915), which was regularly used by persuasive advertisements[15]. Kitson (1921) used an Attention, Interest, Desire, Conviction, Action model (AIDCA) to describe how the psychological state of a consumer leads to a purchase decision.[22] Ramsay’s AIDCA(1921) was different from Kitson’s model and was proposed at the beginning of his book on how to write compelling advertising[31]. Osborn’s Attention, Interest, Judgement, Action model (AIJA)[27] and Starch’s See, Read, Believe, Remember, Act model (SRBRA) followed[38]. Attention, Interest, Desire, Memory, Action (AIDMA), modern advertising's representative model, appeared in 1924[16]. These models all share at least two stages, Attention and Interest. Next, Bedell (1940), DeVoe (1956) and other researchers also devoted themselves to the field, realising that the first-generation advertising models had considered unilaterally stimulating the consumer's attention but not whether consumers had comprehended the message[9]. Lavidge's Hierarchy of Effect model (1961) was a watershed moment between the first and second generations. It indicated that the main aim of these models was not only to sell goods but also to act as a communication tool to help consumers understand the goods they wanted to purchase[23]. The concepts of Cognitive, Affective and Conative stage were regarded as critical factors for later advertising models. Additionally, the Awareness stage was different from the Attention stage of previous models. This was more than a semantic concern: the actions required to stimulate motivation may be very different from those that produce knowledge. Using those three forms of comprehension, Colley (1961) proposed his Define Advertising Goals for Measuring Advertising Results model (DAGMAR), which advocates measuring to understand the effectiveness of an advertisement[10]. Some researchers featured in Table 2 still considered attention an essential element. The Advertising Research Foundation (1961) highlighted Communication as a vital element that described the inter-relation of the consumer and the advertisement[1]. Following the Hierarchy of Effect model, numerous similar models were presented. Ultimately, the second-generation advertising models were more concerned with consumers comprehending an advertisement they had seen. With the arrival of the internet era, advertising models have changed again with the diffusion of computers, smartphones, and a variety of other communication technologies. Japan's Denstu Inc. (2004) illustrated AIAS as a useful model for electronic commerce[33]. It builds on older models by adding Search and Share stages, which are appropriate for the Internet. Barry (1987) noted that Attention, or Awareness, continues to be relevant, based on available research. All third-generation models feature variations on the concepts of Cognitive, Affective and Conative comprehension, a viewpoint accepted by most researchers [5].

2.2 The Big-Data Era: Fourth-Generation Advertising Models

As the 44th Chinese statistical report on internet development (2019) showed that smartphone internet users in China account for 24.6% (around 200 million people) of all Chinese internet users. This era can be considered the short-video era, in which is the primary use for short videos is the transfer of information.[39] The 4A model is based on the concepts of Cognitive, Affective and Conative comprehension; it is used experimentally in this study to explore how a long-term series of short video advertisements influences consumer action in the big-data era. It differs from third-generation advertising models because, in the big-data era, material consumers to which are exposed cannot be searched; instead, consumers remember the title of the short video without being able to elaborate search terms to send to the computer. Thus,
3. Methodology

3.1 Research Hypothesis and Method

H1: The series of short video advertisements positively influences consumer awareness of the product.

H2: Consumer awareness of the product positively influences affection for the product’s brand.

H3: Consumer attention positively influences them to give affection to the product persistently.

H4: The series of short video advertisements positively influence the decision to purchase the product.

H5: Consumer affection for the brand positively influences their decision to purchase the product.

H6: Consumer awareness of the product positively influences their decision to purchase the product.

Barry and Hair (2014) suggest that papers using structural equation modeling (SEM) are more likely to produce high-quality findings and that SEM is widely used, with it being used by just under half of all research papers in the high-quality findings and that SEM is widely used, with it being used by just under half of all research papers in the marketing field[4]. As such, Amos22 professional data analysis software was used for SEM of the 4A model and a questionnaire was designed about a series of gummy candy advertisements and then given to test participants in China. The target consumer of this product is young people. The items in the questionnaire were based on related research papers, with appropriate modifications. The control variables of age, gender, income and education were also considered. The questionnaire contained a total of four variables: attention, awareness, affection, action. The respondents were Chinese. One Chinese-speaking professional translator was employed to translate the original English scale into Chinese. Following responses from participants, the original English scale was compared with the translated English scale. Bollen (1989) and James (2011) both suggest that each item use a seven-point Likert scale ranging from 1 for 'strongly disagree' to 7 for 'strongly agree,' adding that each latent variable requires at least three questions, although five to seven is best, and if there are seven latent variables, 35 questions are suitable[7]. As Barclay et al. (1995), Chin (1998), Chin and Newsted (1999), and Kahai and Cooper (2003) have noted, the size of a sample should have a ratio of 10:1 when compared to the observed variable indicators[41]. Given this study featured 20 questions, at least 200 samples were therefore needed.

4. Analysis and Results

Surveying was conducted from April 10, 2020, to April 17, 2020, by the professional questionnaire application Wenjuanxing. At the end of this period, 398 participants had responded, of which 62.02% were aged 18-24; 51.04% were men, and 48.96% were women; 66.77% had a Bachelor's degree; 53.41% received an average discretionary income of under 5000CNY per month.

Figure 2 demonstrates that the 4A model is supported. The process of moving from 'Attention' to 'Awareness' to 'Affection' to 'Action' is reported to be enjoyable for participants. We did the reliability and validity analysis; see Table 3 4, and 5. We have 20 items, and Cronbach's alpha is 0.793 > 0.7, is good; Cronbach's alpha in standardized estimates is 0.785, the value greater than 0.7 is good. We found that some items' CITC is <0.3. Consequently, we kept 12 items to re-test them. Finally, Cronbach's alpha in the re-test is 0.884. A value greater than 0.7 is good. Cronbach's alpha in standardized estimates is 0.883. A value greater than 0.7 is good in 12 items. As a result, each item's mean value and variance show that the data distribution is reasonable and in accord with the result of normal distribution. Results less than 0.3 were screened out from the CITC coefficient of questions, and questions above 0.3 were reserved. After the reliability test of the retained items was performed again, the reliability value was significantly improved, from 0.793 to 0.884, see Table3.
Furthermore, we tested construct validity, KMO is 0.810, and the p-value in the approximate chi-square is distinctly < 0.001, see Tables 4 and 5.

Table 4. KMO and Bartlett’s test

| KMO and Bartlett’s test | Results |
|-------------------------|---------|
| KMO (Kaiser-Meyer-Olkin measure of sampling adequacy) | 0.810 |
| Bartlett’s test | 3137.424 |
| The approximate chi-square | 66 |
| df | 0.000 |

As Table 5 showed, the reset of 12 items met the criterion, and the loading coefficient > 0.7 is accepted. As a result, the load coefficient of the items is above 0.5. The eigenvalue is all >1, all items of the cumulative explanatory variance ratio are >50%.

Table 5. Factor analysis

| Items | Mean value | S. D. | CITC | Cronbach’s alpha of deleted item |
|-------|------------|-------|------|----------------------------------|
| ATT1  | 4.744      | 1.894 | 0.537| 0.773                            |
| ATT2  | 4.736      | 1.852 | 0.487| 0.776                            |
| ATT3  | 4.814      | 1.851 | 0.474| 0.777                            |
| AWA1  | 5.060      | 1.921 | 0.477| 0.777                            |
| AWA2  | 4.927      | 1.982 | 0.504| 0.775                            |
| AWA3  | 5.060      | 1.908 | 0.455| 0.778                            |
| AFF1  | 5.161      | 2.053 | 0.419| 0.780                            |
| AFF2  | 5.118      | 2.096 | 0.413| 0.780                            |
| AFF3  | 5.209      | 2.041 | 0.410| 0.781                            |
| ACT1  | 5.342      | 2.148 | 0.594| 0.768                            |
| ACT2  | 5.372      | 2.132 | 0.583| 0.768                            |
| ACT3  | 5.202      | 1.724 | 0.667| 0.762                            |
| Q13   | 4.588      | 1.690 | 0.385| 0.783                            |
| Q14   | 4.369      | 1.896 | 0.016| 0.804                            |
| Q15   | 4.608      | 1.889 | 0.058| 0.801                            |
| Q16   | 4.771      | 1.873 | 0.141| 0.796                            |
| Q17   | 4.495      | 1.857 | 0.049| 0.801                            |
| Q18   | 4.716      | 1.483 | 0.241| 0.790                            |
| Q19   | 4.480      | 1.865 | 0.046| 0.802                            |
| Q20   | 4.417      | 1.694 | 0.096| 0.798                            |

Finally, we got a questionnaire, see Table 6.

Table 6. Questionnaire

| Path coefficients analysis | Estimate | S.E. | C.R. | P  |
|----------------------------|----------|------|------|----|
| Awareness <- Attention     | 0.302    | 0.058| 5.227| ***|
| Affection <- Attention     | 0.410    | 0.066| 7.178| ***|
| Affection <- Awareness     | 0.170    | 0.062| 3.164| 0.002 |
| Action <- Awareness        | 0.396    | 0.062| 7.89  | ***|
| Action <- Attention        | 0.309    | 0.069| 5.603| ***|
| Action <- Affection        | 0.182    | 0.056| 3.524| ***|

According to Hair et al. (1998), a research paper at least needs to report that whether or not RMSEA, CFI, TLI, and SRMR are in an appropriate range for model fit[14]. Also, Dennis L. Jackson (2009), a research paper in this field, should report Chi-square (X²), noting that a smaller X² is preferable and the degrees of freedom (df), noting that a smaller df is preferable[19]. For these findings, statistical observations are as follows: X² is 91.846; df is 48; X²/df is 1.914; GFI is 0.962; NFI is 0.971; IFI is 0.986; CFI is 0.986; TLI is 0.981; RMSEA is 0.048; SRMR is 0.091. Thus, it can be seen that the model is fit. See Table 7.

Table 7. Model fit analysis

| Criteria | Results |
|----------|---------|
| x²       | 91.864  |
| df       | 48      |
| x²/df    | 1.914   |
| GFI      | 0.962   |
| NFI      | 0.971   |
| IFI      | 0.986   |
| CFI      | 0.986   |
| TLI      | 0.981   |
| RMSEA    | 0.048   |
| SRMR     | 0.091   |

Table 8. Path coefficients analysis

| Path coefficients analysis | Estimate | S.E. | C.R. | P  |
|----------------------------|----------|------|------|----|
| Awareness <- Attention     | 0.302    | 0.058| 5.227| ***|
| Affection <- Attention     | 0.410    | 0.066| 7.178| ***|
| Affection <- Awareness     | 0.170    | 0.062| 3.164| 0.002 |
| Action <- Awareness        | 0.396    | 0.062| 7.89  | ***|
| Action <- Attention        | 0.309    | 0.069| 5.603| ***|
| Action <- Affection        | 0.182    | 0.056| 3.524| ***|

***, p < 0.001
As Table 8, we could see all p-value almost are<0.001. It means that there is a significant positive path effect between variables.

Table 9. Variable effects analysis

| Variable | Effects | Influenced Variable |
|----------|---------|---------------------|
|          |         | Awareness | Affection | Action |
| Direct effects | 0.302   | 0.410    | 0.309    |
| Attention | Indirect effects | -        | 0.051    | 0.203    |
| Total effects | 0.302   | 0.461    | 0.512    |
| Awareness | Direct effects | -        | 0.170    | 0.396    |
| Indirect effects | -     | -        | 0.031    |
| Total effects | -      | 0.170    | 0.427    |
| Affection | Indirect effects | -        | -        |
| Total effects | -      | -        | 0.182    |

Finally, as Tables 8 and 9, we found that H1-H6 was all accepted.

5. Discussion and Conclusion

The 4A model was all supported in this research, thereby contributing a new model appropriate for short-video advertisements suitable for the big-data era in China. As Liu (2019) suggested, despite there being a substantial amount of research on advertisements, a study on a series of advertisements in the context of the purchasing process was needed[25]. The results showed that the series of short-video advertisements positively influenced consumer awareness of the product. In the big-data era, information is diversified, and consumers often lack the patience to watch a complete advertisement unless the advertisement conveys information about a product quickly. Consumer awareness of the product positively influenced their affection for the product's brand. Besides impulse purchasing, rarely buy something they do not comprehend. Consumer attention positively influenced their decision to give affection to the product persistently. Furthermore, consumer affection for a brand's image and positive awareness of the product positively influenced their decision to purchase the product. Also, the series of short-video advertisements positively influence the decision to purchase the product. Due to AI technology is developing, it can not only intelligently recommend audiences something they would like to watch but also integrate other applications to analyze what you want to know. Thus, this is one reason why the 4A model is accepted without "search." Consequently, we inspired more research about short-video for other researchers.

6. Limitations and Future Study

First, the gummy candy short-video advertisements were not the right choice based on feedback suggesting they involved sexual innuendo and were vulgar. Multiple series of short-video advertisements will be used in the next study to test the 4A model better and consider other cultural influences. Second, existing research on advertising suggests short-term online effects mostly regard business-to-consumer exchanges. There are limited business-to-business studies and research into the stores of large e-commerce platforms such as Amazon and Taobao. Third, most research on online advertising focuses only on young people or women, with limited research in the field focusing on children. It should change because children today are of the digital age and are potentially more accustomed to online life than other people. Fourth, it is also the most important we thought being the advertising itself needs more attention and study, such as the definition of advertising in this era.

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