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**Impact of digital advertising on e-commerce retail sales: A comparative study between
China and Japan**

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Impact of Digital Advertising on E-Commerce Retail Sales: A Comparative Study Between China and Japan

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ABSTRACT: The objective of this research is to examine the relationship between digital advertising and e-commerce retail sales in China and Japan. Digital advertising is classified as banner advertising, search advertising, social media advertising, and video advertising. Using a data sample from 2008 to 2018, the results show that all the four formats of digital advertising has positive substantial impact on e-commerce retail sales in Japan. In China, social media advertising and video advertising also show strong positive relationship with e-commerce retail sales. On the contrary, findings indicate insignificant positive impact of banner advertising and non-positive impact of search advertising in China. However, these two variables are justified by literature. While this study is restricted within China and Japan, the findings may correspond to those areas where digital advertising is also a major form of advertising strategy and advertisers can use these results for reference when launching advertising events.

Keywords: *digital advertising; banner advertising; search advertising; social media advertising; video advertising; e-commerce retail sales; online retail sales*

I. INTRODUCTION

E-commerce has growing immensely with the massive development of Internet which provide a channel to perform online transactions (Gibbs et al., 2002). By interaction scope, online retail business can be categorized as Business to Consumer (B2C) and Consumer to Consumer (C2C). What we need to focus on more is the fierce development of e-commerce retail sales as well as the digital marketing in China and Japan. Three reasons explain why. First, e-commerce market is now expanding and the amount of e-commerce retail sales is estimated to grow steady upward to \$4.9 trillion in 2021 (Statista, 2019). Second, China and Japan had the top two retail e-commerce sales in Asia in 2018, thus studying these two markets is important and has practical significance. Third, retailers who want to expand their markets in Asia may have concerns about where to launch their advertisements and how (DigitalCommerce360, 2013). Since China and Japan may be the most possible choices, it is important to distinguish the big difference in these two markets.

Literatures show strong positive stimulus of digital advertising on e-commerce retail sales. A research conducted by Harfoushi et al. (2013) found that digital advertising had positive significant relationship with online retail sales in Europe. When it comes to Asia, several studies have confirmed the positive impact of social media advertising, video advertising, and search advertising on e-commerce retail sales in China (Jiang, 2013; An and Chen, 2008; Yue, 2009). In Japan, advertising on Internet, especially for search ads and banner ads, is considered to be an increasingly efficient approach to accelerate online sales (Statista, 2019).

However, little discussion is focused on the latest impact of digital advertising by five different segments on e-commerce retail sales in China and Japan. These five segments are consisted of search advertising, social media advertising, banner advertising, video advertising, and classifieds (Statista, 2019). Since data of classifieds is limited and incomplete, this research is aimed to identify the relationship between digital advertising and e-commerce retail sales by these first four segments of digital advertising in China and Japan respectively, and to compare the difference in between. This research is important since it uniquely identifies this relationship by these four formats of digital advertising in these two countries based on historical data. By verifying the nature of this relationship, and comparing the results between China and Japan, this study will assist retailers to decide whether and how to endorse their brands online in Asia markets so as to maximum their ROI.

Based on 110 observations including online retail sales and digital advertising spend collected from the National Bureau of Statistics of China, Ministry of Economy, Trade and Industry of Japan, Statista, and eMarketer, this research finds that digital advertising has great association with e-commerce sales. In Japan, all the four formats of digital advertising bring positive effects to e-commerce retail sales. In contrast, only social media advertising and video advertising show significant positive impact on e-commerce retail sales in China. Nonetheless, literature justifies the positive influence of banner advertising and search advertising.

This research contributes to the literature in the following ways. First, it plugs the hole of the connection between digital advertising and e-commerce retail sales by comparing China and Japan. Second, it uniquely tests the relationship by sorting digital advertising into four segments, which shows the effects from a detailed position.

The rest of this paper contains five more segments. Starting from reviewing relevant literature and formulating hypothesis, the paper then describes the methodology, displays research results, discusses the findings, and ends up with making conclusions.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

Overview of Digital Advertising

In the view of marketers, advertising is defined as paid non-private communication designed to persuade engagers through mass media from a branded promoter (Hamilton, Bodle and Korin, 2016). With the rising of Internet, digital advertising has become a new and popular advertising format and Internet has grown as the major medium of advertisement. The first Internet advertisement was born in 1994 as a banner ad launched by AT&T on *HotWired*, the predecessor of *Wired* (Gao, 2017). Prevalence of digital advertising is further accelerated due to three main reasons: more people with greater access to Internet, emergence of search engines, and technological advances (Taylor, 2009).

China

After going through three main periods of development, start-up stage, dormant stage, and outbreak stage, digital advertising has now turned into a typical profit model for network media in China (Wang, 2008). In 2013, Baidu, a leading search engine in China, outstripped CCTV in advertising income, marking the rise of Internet advertisement (Huang and Zhou, 2014). Digital advertising spending in China ranked the second in the world in 2018, up to \$46.9 billion, of which 22.9% was from retail industry and was almost the same as Japan. A noticeable trend in China is the quick development of mobile apps, thus its digital advertising is expected to constantly change from desktop to mobile (Statista, 2019).

Japan

Japan spent \$11.8 billion on digital advertising in 2018, which was one fourth of China (Statista, 2019). Different from China, Japan's unique advertising industry is dominated by two giant advertising agencies, Dentsu and Hakuhodo (Kobayashi, 2012). Another attribute for the advertising industry in Japan is programmatic advertising, which accounted for 54% of the total revenue from digital advertising (Statista, 2019).

Formats of Digital Advertising

According to Statista's 2019 Digital Advertising Report, digital advertising is comprised of four segments: search advertising, social media advertising, banner advertising, and video advertising.

Search advertising

Search advertising, also refers to as sponsored search advertising, is defined as advertisements that are paid for search engines to get displayed with organic search results (Ghose and Yang, 2009). It was the biggest digital advertising sector in 2018 for both China and Japan (Statista, 2019). The underlying reasons here are that millions of Internet users search sites every day and search ads send related commercial information which meets those users' needs (Li and Leckenby, 2004). Search advertising spend in China was around \$21 billion in 2018, almost six times as much as Japan. The most popular and common search engines in these two countries where search ads gathered are Baidu and Yahoo Japan respectively.

Social media advertising

Social media advertising contains advertisement revenues made from social networks, whether appearing alongside organic contents or displaying next to newsfeed. It ranks the second in the digital advertising segments but is the fastest-developing one (Statista, 2019). With the rising of social media, it becomes as an emerging advertising platform where users interact with each other and involves with brands (Chu et al., 2013). Weibo and Wechat are representative examples of China's social media advertising platform. In Japan, LINE and Twitter are the most popular and successful social networks, with an audience reach amounts to 80.8% and 42.8% respectively (Statista, 2019). Marketing through social media empowers word-of-mouth, bringing brand consciousness and multiplying sales (Lee and Hong, 2016).

Banner advertising

Banner advertising includes static formats like skyscrapers, wallpapers, interstitials or pop-ups which connect to the advertisers' website pages, and rich media formats that comprise sounds, animations or videos (Statista, 2019). Banner advertising is regarded as increasing transaction amounts by enhancing the number of exposures, websites, and pages of the products, which have an optimistic impact on the probability of repeat purchase (Manchanda et al., 2019). Click-through-rate (CTR) is a basic index for evaluating the effectiveness of advertising. When AT&T first launched the first banner ad in 1994, its CTR reached up to 44%. While for today in 2019, the number is less than 0.06% at the global scale, a phenomenon known as "Banner Blindness" (Gao, 2017). Banner advertising in China is fairly more effective than that of Western countries, where ad blocking is more common. However, it weighs more in Japan, almost as large as its largest segment search advertising.

Video advertising

Video advertising are text- or picture-based overlays that often appear at the beginning, middle or end of the streamed video (Statista, 2019). It is believed that by 2020, 70% of Internet traffic will be based on video. In China, revenues from video advertising has been boosted by the growth in Internet traffic generated by high-quality homemade and copyrighted video programs (Gao, 2019). Since young web users consume more video contents, users between ages of 12 and 24 accounting for half of online video advertising (Lin, 2014). Bilibili is a typical Chinese video platform where large amounts of video advertising occur. The same is YouTube in Japan. Statista (2019) predicted that online video ad revenue in Japan would see a rise from \$979 million in 2015 to \$2.7 billion in 2021.

E-Commerce Retail Sales

E-commerce is the process of purchasing, selling or supporting products or services through the Internet, including financial transactions and information exchanges (Gibbs et al., 2002). Revenue of e-commerce worldwide totals \$1,589 billion in 2018 (Statista, 2019).

China

In 1998, the first online order emerges in China. Online retail sales market is now thriving and diversified due to improved infrastructure, widespread access to Internet, and increasing wealth among Chinese buyers (DigitalCommerce360, 2013). Taobao, a dominating C2C e-commerce platform in China, reached over 300 billion yuan in its "Double-eleven Shopping Carnival" in 2018 (Zheng, 2019). In addition, with the largest amount of population in the world, China is the most potential market of e-commerce sales (Statista, 2019).

Japan

Japan reached a total amount of \$7,443 billion in retail sales in 2018 and its e-commerce formed 6.2% of total retail sales (Statista, 2019). E-commerce market in Japan is also booming due to several reasons. First, although its population is far less than China, it has a high urban rate of 93%, making its population more quickly to adopt technology such as smartphones and tablets (RetailinAsia, 2017). In addition, Japan has developed infrastructure in payments and logistics. However, suffering from population decline like aging problem and slow economic growth, Japan's e-commerce development is slowing down its pace.

Literatures demonstrates that Internet advertising has a significant connection with e-commerce sales. To improve sales and brand image, many retailers choose to take advantage of online technology (Liu, 2005). Identifying the e-commerce revenue is important since it will be difficult for advertisers to justify substantial investment in digital media if the sales value generated by internet advertising is not clearly realized (Opie et al., 2019).

A total of 16 hypotheses are formulated with 8 null hypotheses and 8 alternative hypotheses. Null hypotheses estimate that there is no relationship between any of the four advertising with the amount of online retail sales in China as well as Japan, while all of the four alternative hypotheses predict that they are positively correlated in both countries.

Null Hypotheses:

- H01:** Banner advertising has no relationship with online retail sales in China.
- H02:** Search advertising has no relationship with online retail sales in China.
- H03:** Social Media advertising has no relationship with online retail sales in China.
- H04:** Video advertising has no relationship with online retail sales in China.
- H05:** Banner advertising has no relationship with online retail sales in Japan.
- H06:** Search advertising has no relationship with online retail sales in Japan.
- H07:** Social Media advertising has no relationship with online retail sales in Japan.
- H08:** Video advertising has no relationship with online retail sales in Japan.

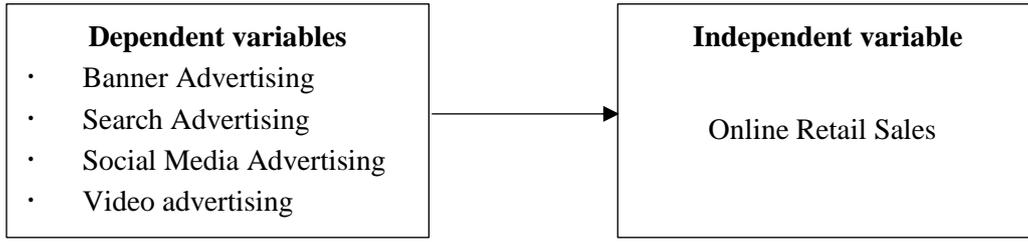
Alternative Hypotheses:

- H1:** Banner advertising has positive relationship with online retail sales in China.
- H2:** Search advertising has positive relationship with online retail sales in China.
- H3:** Social Media advertising has positive relationship with online retail sales in China.
- H4:** Video advertising has positive relationship with online retail sales in China.
- H5:** Banner advertising has positive relationship with online retail sales in Japan.
- H6:** Search advertising has positive relationship with online retail sales in Japan.
- H7:** Social Media advertising has positive relationship with online retail sales in Japan.
- H8:** Video advertising has positive relationship with online retail sales in Japan.

Theoretical Framework

The assumed relationship between digital advertising and e-commerce retail sales in both China and Japan is listed as **Figure 1**. Online retail sales, which is represented as e-commerce retail sales, is dependent variable. Spending on banner advertising, search advertising, social media advertising, and video advertising are independent variables.

Figure 1: Theoretical Framework



III. RESEARCH METHOD

Data Source and Sample Selection

E-commerce retail sales is evaluated by the yearly total amount of online retail sales in both China and Japan. Digital advertising is assessed by the annual amount of spending on the banner advertising, search advertising, social media advertising, and video advertising. Secondary data, including both dependent variable and independent variables, was collected from published reports and yearbooks. The annual amount of expenditures on digital advertising by four formats, which includes banner advertising spending, search advertising spending, social media advertising spending, and video advertising spending, were collected from Statista's Digital Advertising Report. The yearly amount of total online retail sales was collected from Statistical Communiqué of the People's Republic of China, China Statistical Yearbook, and Ministry of Economy, Trade and Industry of Japan. A total of 110 observations was targeted, with 10 observations a year across 11 years from 2008 to 2018.

After data collection, sample data was first listed in Microsoft Excel and then was inputted into SPSS to get several analyses. Descriptive tests, correlation analysis, and Ordinary Least Square (OLS) Regression were conducted in sequence. A linear regression model was formulated as follows to depict the estimated relationship between the dependent variable and independent variables:

$$ORS_i = \beta_0 + \beta_1 BANNER_i + \beta_2 SEARCH_i + \beta_3 SOCIALM_i + \beta_4 VIDEO_i + \omega \quad (1)$$

where:

- i = 1 (China) or 2 (Japan)
- ORS = Total Online Retail Sales
- BANNER = Banner Advertising
- SEARCH = Search Advertising
- SOCIALM = Social Media Advertising
- VIDEO = Video Advertising

IV. RESEARCH RESULTS

When collecting the data, the amount of spending on the four kinds of advertising varied with different data centers like eMarketer and Statista. Data after 2017 were gathered from Statista since it did not disclose the data before 2017, which were collected from tables and figures from eMarketer.

Table 1 illustrates the descriptive results for dependent and independent variable of Japan and China in Panel A and Panel B. Panel A shows that the amount of observations collected

from 2008 to 2018 is 55. The average of banner advertising, search advertising, social media advertising, and video advertising are 36.7, 86.2, 26.2, and 16.9 respectively. The standard deviation of video advertising is 15.8 and it is 4287 for online retail sales. Other descriptive statistics like maximum, minimum, and skewness are listed for each variable as well.

Panel B depicts the observations for Japan is 55, which is the same with that of China. The mean value of four formats of digital advertising are 18.3, 15.9, 3.72, 8.74 respectively. Standard deviation is 4.36 for social media advertising while it is 1814 for online retail sales. Other results such as maximum, minimum, and skewness are also showed in the table.

TABLE 1
Descriptive Statistics

Panel A: China

| | BANNER₁ | SEARCH₁ | SOCIALM₁ | VIDEO₁ | ORS₁ |
|--------------------|---------------------------|---------------------------|----------------------------|--------------------------|------------------------|
| N | 11 | 11 | 11 | 11 | 11 |
| Missing | 0 | 0 | 0 | 0 | 0 |
| Mean | 36.7 | 86.2 | 26.2 | 16.9 | 4265 |
| Median | 35.0 | 62.9 | 6.14 | 12.6 | 2645 |
| Sum | 404 | 948 | 288 | 186 | 46917 |
| Standard deviation | 20.4 | 75.2 | 41.0 | 15.8 | 4287 |
| Minimum | 8.43 | 7.14 | 0.430 | 1.00 | 180 |
| Maximum | 66.1 | 207 | 118 | 43.7 | 12866 |
| Skewness | 0.0976 | 0.530 | 1.80 | 0.620 | 1.03 |

Panel B: Japan

| | BANNER₂ | SEARCH₂ | SOCIALM₂ | VIDEO₂ | ORS₂ |
|--------------------|---------------------------|---------------------------|----------------------------|--------------------------|------------------------|
| N | 11 | 11 | 11 | 11 | 11 |
| Missing | 0 | 0 | 0 | 0 | 0 |
| Mean | 18.3 | 15.9 | 3.72 | 8.74 | 4591 |
| Median | 17.4 | 13.4 | 1.45 | 6.79 | 4428 |
| Sum | 201 | 175 | 40.9 | 96.2 | 50496 |
| Standard deviation | 11.8 | 12.9 | 4.36 | 7.80 | 1814 |
| Minimum | 2.45 | 0.890 | 0.0700 | 0.350 | 1960 |
| Maximum | 35.0 | 35.2 | 11.9 | 20.5 | 7443 |
| Skewness | 0.104 | 0.344 | 1.01 | 0.392 | 0.118 |

Table 2 is the correlation matrix. Panel A shows the correlation value between banner advertising and online retail sales in China is 0.946, which implies a strong relationship in between. It is the same case with search advertising, social media advertising, and video advertising, whose correlation value with online retail sales are 0.979, 0.943, and 0.983 respectively.

Panel B shows the correlation matrix for Japan. The correlation between banner advertising, search advertising, social media advertising, video advertising and online retail sales are 0.993, 0.985, 0.933, and 0.975, suggesting a solid relationship.

| Panel A: China | | | | | |
|---|---------------------------|---------------------------|----------------------------|--------------------------|------------------------|
| Variables | BANNER₁ | SEARCH₁ | SOCIALM₁ | VIDEO₁ | ORS₁ |
| BANNER ₁ | — | | | | |
| SEARCH ₁ | 0.983*** | — | | | |
| SOCIALM ₁ | 0.797*** | 0.860*** | — | | |
| VIDEO ₁ | 0.976*** | 0.998*** | 0.870*** | — | |
| ORS ₁ | 0.946*** | 0.979*** | 0.943*** | 0.983*** | — |
| Panel B: Japan | | | | | |
| Variables | BANNER₂ | SEARCH₂ | SOCIALM₂ | VIDEO₂ | ORS₂ |
| BANNER ₂ | — | | | | |
| SEARCH ₂ | 0.994*** | — | | | |
| SOCIALM ₂ | 0.930*** | 0.958*** | — | | |
| VIDEO ₂ | 0.985*** | 0.993*** | 0.960*** | — | |
| ORS ₂ | 0.993*** | 0.985*** | 0.933*** | 0.975*** | — |
| Note. * p < .05, ** p < .01, *** p < .001 | | | | | |

Panel A in **Table 3** depicts model fit measures of ordinary least square (OLS) statistics of China. The r-square statistic for the OLS model is 0.998 and the adjusted r-square is 0.997, showing that the model has a good fitness. Panel B displays the r-square as well adjusted r-square value of Japan's model, which are 0.992 and 0.987, indicating a good fitness of the model as well.

TABLE 3
Model Fit Measures

Panel A: China

| Model | R | R ² | Adjusted R ² |
|-------|-------|----------------|-------------------------|
| 1 | 0.999 | 0.998 | 0.997 |

Panel B: Japan

| Model | R | R ² | Adjusted R ² |
|-------|-------|----------------|-------------------------|
| 1 | 0.996 | 0.992 | 0.987 |

Panel A in **Table 4** shows the model coefficients of ordinary least square (OLS) statistics for China. The coefficient value of social media advertising is 41.464 and its p-value is less than 0.001, which demonstrates a very significant positive impact on online retail sales. The coefficient value of video advertising is 183.498 which indicates a positive impact, and its p-value is 0.064 which implies that this impact is significant at the 10% level. Banner advertising also shows a positive impact on online retail sales as it has a coefficient value of 41.655, but its p-value is 0.115, demonstrating the insignificance of this impact. The coefficient for search advertising is -13.209. However, its p-value of 0.532 indicates that this impact is extremely weak. T-statistic of social media advertising is 10.694 which shows a substantial positive impact on online retail sales. T-statistic of video advertising is 2.263 which is larger than 2 also indicate a significant positive impact on online retail sales. But the absolute value of the t-statistic of banner advertising and search advertising are 1.842 and 0.662, which are both smaller than 2, therefore social media advertising and banner advertising does not show a strong positive impact on online retail sales.

Panel B in **Table 4** is the model coefficients table of Japan's data. The coefficient of banner advertising is 275.017 with a p-value of 0.48, indicating that it has a strong positive impact on online retail sales. Coefficient of search advertising is 204.102 and its p-value is 0.049, so it has a positive impact on online retail sales. Social media advertising also shows a significant positive impact on online retail sales showing at the 10% significance level since it has a coefficient of 167.239 and a p-value of 0.53. Same in the case of video advertising, which has a coefficient of 66.300 and a p-value of 0.84. T-statistic of all the four types of advertisement are over 2, showing significant positive impact of these advertisement on online retail sales.

TABLE 4
Model Coefficients

Panel A: China

| Predictor | Estimate | SE | t | p | VIF |
|----------------------|-----------------|-----------|----------|----------|------------|
| Intercept | -315.6 | 287.193 | -1.099 | .314 | |
| BANNER ₁ | 41.655 | 22.628 | 1.841 | .115 | 5.766 |
| SEARCH ₁ | -13.209 | 19.946 | -0.662 | .532 | 8.785 |
| SOCIALM ₁ | 41.464 | 3.877 | 10.694 | <.001 | 5.444 |
| VIDEO ₁ | 183.498 | 81.085 | 2.263 | .064 | 7.886 |

Panel B: Japan

| Predictor | Estimate | SE | t | p | VIF |
|----------------------|-----------------|-----------|----------|----------|------------|
| Intercept | 153.173 | 252.653 | 6.175 | .001 | |
| BANNER ₂ | 275.017 | 111.369 | 2.469 | .048 | 3.552 |
| SEARCH ₂ | 204.102 | 295.009 | 2.392 | .049 | 9.505 |
| SOCIALM ₂ | 167.239 | 102.371 | 2.337 | .053 | 4.410 |
| VIDEO ₂ | 66.300 | 311.714 | 2.013 | .084 | 3.851 |

To summary the results above, the p-value and t-statistic of social media advertising and video advertising were good in China and Japan and therefore showed positive substantial relationship with online retail sales in both countries. And the p-value and t-statistic of banner advertising and search advertising also showed optimistic significant relationship with online retail sales in Japan. However, in China, banner advertising showed an insignificant relationship with online retail sales, and search advertising showed an insignificant negative relationship with online retail sales. Based on these results, we can accept H3, H4, H5, H6, H7, and H8, while we cannot reject H01 and H02.

V. DISCUSSION

Digital advertising formats of banner advertising, search advertising, social media advertising, and video advertising present positive significant impact on e-commerce retail sales in Japan. Video advertising and social media advertising also show the similar impact on e-commerce retail sales in China while the unexpected result is that the positive impact of banner advertising is not significant and search advertising does not appear as a positive force on e-commerce retail sales.

Social Media Advertising in China

Jiang (2013) also gave affirmative view on social media by emphasizing that businesses were able to get enormous commercial benefits from social media advertising if making good use of users' social relationship data lied behind of social media. Social media ads are especially

fitted to products that have low attention degree, consumption upgrade, and high purchase frequency, and therefore will bring higher ROI (Xiao, 2017). The most popular application in China in 2018 is WeChat, a social networking platform designed by Tencent. Statista (2019) discovered that China's online businesses spent around 21.7 percent of Internet advertising budget on their WeChat Official Account advertising in 2019 because of its distinctive e-commerce design such as WeChat Pay for businesses to boost sales.

Social Media advertising in Japan

In Japan, a messaging application similar to WeChat called LINE, is extremely attractive to retail marketers with 63 percent of its users view brand messages and 27 percent click the link (AdAge, 2013). In addition, LINE also took the example of WeChat to create payment service called LINE Pay to enable transactions (eMarketer, 2017), and thus bring more sales for e-commerce retail market.

Video Advertising in China

An and Chen suggested (2008) that video ads could help B2C business to trigger the need of consumers and facilitate sales due to its strong interaction with website users. Zou (2010) also responded that video ads would produce benefits for advertisers by accurately targeting. Bilibili, a leading video platforms in China, has over \$66 million revenues generated from advertising with a YoY rate of 191% in 2018 (Bilibili, 2019). Its users are consisted of 328 million generation Z, who show strong willingness to pay and thus are the golden cohort for advertisers. Advertisements are customized and performance-based, so they can be targeted to potential consumers. A top Chinese makeup brand Perfect Diary, for example, makes good use of the user attributes of Bilibili and has sent their cosmetics to many makeup bloggers known as KOLs to advertise their products and thus brings in with explosive growth (Duxes, 2019).

Video Advertising in Japan

Video marketing is also a great triumph in Japan. YouTube got the number one user activity share in Japan among all the social media platforms in the third quarter of 2018 (Statista, 2019). Marketers have generated big success by producing creative video contents on YouTube since over 500 million hours of video are viewed on this platform on a daily basis (Info Cubic, 2019). Moreover, anime and manga are special types of video contents in Japan, and that is an effective marketing strategy for many local brands.

Banner advertising in China

Some types of banner ads are considered as ineffective in China. For instance, banner ads on gaming sites are found to be irrelevant and has a low click-through rate (CTR). Ding's research (2016), which was an experiment on the ignorance of banner ads in China, showed that most people were verified to overlook banner ads and similar messages intentionally or unintentionally due to their chaotic attribute and human's limited ability to process information. While the results in this research also show that banner ads' positive impact on e-commerce retails sales in China is insignificant, literatures have demonstrated that they are indeed the most effective ones on e-commerce sites in China. According to SAMPi (2018), iResearch found out that around 8 in 10 people would notice banner ads on e-commerce websites and more than 60 percent of them would click them. SAMPi also pointed out that banner ads are generally more effective for remarketing in China since it has a 15.3% more than average CTR based on frequency.

Banner Advertising in Japan

Banner advertising market in Japan is considered as cartel-like with popular websites dominating by a few major businesses like Dentsu and Hakuhodo, and it is the main online advertising approach for foreign companies to targeting Japanese online users (JapanInc, 1998). It is a tradition way of digital advertising with a spend of \$3,643 million in 2018 in Japan, ranked the second after search advertising (Statista, 2019). A new-born form of banner advertising, programmatic advertising, has thrived in Japan in recent years, generating 37% of revenues on digital advertising in 2017. Programmatic advertising creates more sales through making transactions easier and faster, and it also makes advertisements to target in a more efficient way by delivering more precise and personalized messages (Info Cubic, 2019). Besides, Banner advertising is popular especially among start-ups and entrepreneurs in Japan, who has great enthusiasm to explore its boundless innovation potential (Statista, 2019).

Search Advertising in China

In China, search advertising may not be that effective. A major cause for this may be the large amount of inauthentic ads and low social credits of search engines. Baidu, went through a big bid ranking scandal in 2008, where it ranked ads for a company who paid the highest amount of fees regarding less of the authentication of its information. This scandal became a social focus again in 2016 when a victim died from receiving unapproved and unproven treatments in a hospital recommended by Baidu (Xinhuanet, 2016). As the major search engine in China, Baidu suffered from a sharp decline on social credit and the search industry has been criticized since then by the public. Even though, search ads on Baidu still can be effective and can generate high ROI, especially for those high-value investments and comparatively small scale purchases in some particular sector (MarketingToChina, 2019). Search advertising is a major segment of China's digital advertising spend with \$207 hundred million in 2018, and previous research also argued that there was a positive relation between search advertisement and e-commerce sales. Yue (2009) asserted that search ads were considered to be the most effective way to directly promote products in the field of Internet marketing in China. Overall search advertising is a strong driving force on e-commerce retail sales in Japan and China, the latter one is justified by literature.

Search Advertising in Japan

Investment on search advertising is the biggest category of Internet advertising spend in Japan since it is considered as the most traditional and effective way to generate sales. In 2018, a total of \$3,518 million was spent on search advertising, accounting for around 39.4% of the total, after that was video advertising (14.0%) (Dentsu, 2019). The most popular online smartphone activity in Japan is using search engines in Japan in 2018, followed by visiting social networks and watching videos (Statista, 2019). Yahoo Japan, one of the most prevalent search engines in Japan, has around 70% local desktop users reach and 90% local smartphone users reach (SearchEngine Journal, 2019). Promotional ads on Yahoo Japan allows businesses to aim at specific audiences with various segments such as gender, age, geographic locations, device, etc., so brands are expected to receive better ROI.

Three limitations appeared during the process of conducting this research. First, Statista divided digital advertising into five segments: banner advertising, search advertising, social media advertising, video advertising, and classifieds. However, this paper did not include

research with regard to classifieds due to its incomplete data: only 2017's and 2018's amounts of expenditure were available. Moreover, variance in the spending amounts on the four formats of advertising in different data sources might influence the result though the number is not large. As a result, further experiments can gather data from the same resource in order to ensure uniformity. Another constraint on this research was time limit. More data on Classifieds might be gathered and more interpretations might be made if additional time was allowed.

This research is reliable and validate since the Variance Inflation Factor (VIF) of banner advertising, search advertising, social media advertising, and video advertising are smaller than 10, which is the threshold of the collinear relationship.

VI. CONCLUSION

In conclusion, digital advertising has substantial influence on e-commerce retail sales in both China and Japan. In particular, social media advertising present positive significant impact on e-commerce retail sales in both China and Japan, with typical advertising platforms like WeChat and LINE. Video advertising also show similar impact on e-commerce retail sales in the two countries where Bilibili and YouTube are the most popular video platforms to advertise. Banner advertising positively affect e-commerce retail sales in Japan and its impact is amplified in recent years with the appearance of programmatic advertising. Results show that the positive impact of banner advertising is insignificant in China while literature justifies its huge effectiveness compared with Western countries. In Japan, search advertising is the strongest positive force on e-commerce retail sales with Yahoo Japan. While evidence from the research does not show positive impact of search advertising on e-commerce retail sales in China, and there are indeed some inherent flaws of the dominant search engine Baidu such as inauthentic ads and low social credits, literature demonstrates that search advertising is still the main segment of digital advertising in China where marketers can expect high ROI.

This research contributes to the literature work by filling in the gap of the relationship between digital advertising and e-commerce retail sales recently in both China and Japan, and the comparison in between. It also helps businesses to identify the most profitable approaches to investing on advertisement, and where to invest. With the help of this recognition, businesses can expect their return on relevant advertisement and choose the one that will benefit the most to invest, as well as justify their significant investment on digital media. While the study objectives are China and Japan, business in other areas where digital advertising is rapidly developing will also find this research of value, and advertisers can select which advertisements to invest with the help of these findings.

Incomplete data of Classifieds, inconsistent data between different sources, and time limit are the obstacles of this research and consequently may affect the results. Hence, the next step is to minimize these impedes as far as possible. Further research can be proceeded with reevaluating the effects of banner advertising and search advertising on e-commerce retail sales in China since things may be different in the future advertising market. And if the data of Classifieds is completely accessible, a new model including Classifieds can be formulated to test the relationship. Besides, the impact of digital advertising on the U.S.'s ecommerce retail market can be assessed, and similarities as well as differences of the impact between China, Japan and the U.S can be identified by making comparisons.

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