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Will firm's marketing efforts on owned social media payoff? A quasi-experimental analysis of tourism products

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ABSTRACT

A growing number of travel agencies use social media to promote their services and reach target customers despite some doubt regarding the effectiveness of these tools. Nevertheless, most prior studies adopt a customer-centric perspective to explore the usefulness of earned social media run by third parties. Few have examined a firm's active role in online social interactions. This paper distinguishes owned media from earned media by site ownerships and communication paths, and examines a firm's marketing efforts on its owned Facebook brand page. Working with a leading travel agency, we collected a matched sample of products with Facebook marketing (treatment group) and those without Facebook marketing (control group). Using a quasi-experimental design and difference-in-difference estimation, we evaluate the effect of a firm's efforts on Facebook marketing campaigns after controlling time-fixed selection bias and common time-series heterogeneity. The results show that Facebook campaign activities have a positive impact on sales of tourism products. Furthermore, based on the cognitive fit theory, sales are found to increase when a travel agency promotes tourism products that are highly structured, medium-priced, or medium-length, or that require more tourist involvement. Such effects are further examined across different quantiles of sales and in different time spans to see when product moderations are more prominent. The empirical findings facilitate decision-making of e-commerce managers in the tourism industry not only by justifying the effectiveness as well as budget allocation of owned social media marketing, but also by providing a rudimentary guidance on the product selection in Facebook marketing campaigns.

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1. Introduction

Due to social media's great popularity among consumers, it has become a high corporate priority. However, there is a significant degree of uncertainty among managers with respect to allocating efforts and budgets to social media [61]. According to the Social Media Marketing Industry Report in 2013, 97% of marketers indicate that they participate in social media marketing, but only approximately one in four marketers claim that they are able to measure the return from their social media activities. Additionally, regarding the effectiveness of Facebook marketing, 37% of marketers agree that their Facebook efforts are effective, whereas the remainder is uncertain or has opposite opinions [70].

The same phenomenon is found in the tourism industry. Social media has dramatically changed how consumers plan and buy travel-related products [15]. A study conducted by the Opinion Research Corporation indicates that 82% of respondents expressed that they had checked online reviews, blogs, and other online customer feedback before purchasing a travel-related product [32]. Research from Funsherpa Company illustrates the influence of social media on U.S. travelers, with 52% of travelers having changed their plans after researching their trip on social media sites [10]. This culture change presses tourism businesses to incorporate social media to enrich their multichannel marketing strategies, and many are among the most active companies in the commercial use of social media [26]. The proliferation of social media use among tourism companies has raised questions as to how and what their social media efforts should be made, as well as the effect of their social media efforts, particularly with regard to the effect on sales. These questions require analytical and empirical answers from firms' perspectives.

However, a significant portion of the associated research is focused more on the customer than on the firm [74]. Typical customer-centric studies are related to online product reviews in the form of user-generated content (UGC) or WOM. Most of these studies are mainly developed in the context of *earned social media* where customers are freely

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to create UGC. In this research, we are more interested in exploring tourism firms' efforts on social media, and thus we focus on *owned social media*. Specifically, we adopt the following typology to distinguish owned media from earned media – *who owns the site* [23,31,54] and *who initiates the communication* [36]. Owned media refers to a firm-initiated communication through its own site, such as Facebook fan page while earned media describes a customer-initiated communication through a third-party site, such as blog posts, conversations in online forums and communities, and online ratings and reviews [72]. We note that some other typologies are used to classify marketing-related social media activities (e.g., [5,89]), and we choose this typology because it highlights firms' roles in strategic decision making [38]. Although building owned social media may require more commitment of time and resources, it is recognized by the current industry as the new battleground for differentiation and innovation [13].

Running an owned social media channel raises many managerial issues. For example, in our interview with a leading tourism agency in Taiwan, managers noted problems encountered in developing effective social media marketing campaigns in their Facebook brand page. First, the e-commerce managers lack direct evidence to justify the investments, which significantly affects the budget allocation of the e-commerce expense. Furthermore, without proper performance evaluations, the brand page administrator can only make ad hoc decisions on product selections for marketing campaigns and loses the chance to fully utilize social medial marketing in their owned channel. However, the impact of companies' owned social media on direct marketing outcomes (e.g., product sales) has received disproportionately less attention in the literature. Accordingly, due to the aggregate level of data, most extant studies are unable to uncover critical product-level differences that are essential for a firm's marketing strategy [64]. Although some research has attempted to evaluate the influence of product characteristics, the focus is mostly customer-centric in earned social media. Less of a focus is on a firm's efforts (e.g., marketer-generated content) in owned social media [39].

To fill the research gap, we first examine the effectiveness of a firm's marketing campaigns targeted to all customers in an owned social media. In addition, we explore how firms should operate their social media campaigns from the idea of the 'fit' between a tourism product and social media owned marketing. Given the premise that the suitability of marketing channels depends to a large extent on the characteristics of the products being marketed [62], it is necessary to explicitly consider product characteristics when evaluating the impact of the social media marketing. Based on our field research,[4] tourists usually evaluate tourism products with respect to four attributes, including structure of tourism (package tours versus independent tours), tourist involvement (stimulated versus tranquil journey), price, and length. Many tourism agencies (at least in east Asia) choose the combination of these attributes to position their products in the target market. In this study, we employ the theoretical perspective of the cognitive fit theory to explore how these four product dimensions affect the effectiveness of social media marketing via a firm's owned media.

Specifically, our research questions are as follows:

(1) What are the impacts of owned social media marketing on the sales of tourism products?
(2) How do these impacts vary across different product dimensions?

We collaborate with a leading tourism agency in Taiwan that mainly relies on Facebook fan page to perform owned social media marketing[5] targeted to all customers for product promotions. To examine the effect of marketing campaigns via Facebook, we use the difference-in-difference (DID) approach with a quasi-experimental research design [87]. In particular, we collect sales data for two distinct groups of products: (1) a "treatment" group consisting of products that have run Facebook marketing campaigns and (2) a "control" group consisting of products that do not run any Facebook campaign. This estimation approach addresses issues of time-fixed self-selection bias and common time-series heterogeneity across products [90]. In other words, we are able to control for factors other than Facebook campaigns which also lead to increases in sales and compromise the treatment effect, such as preferences for high-sales products on social media (time-fixed group difference) and tourism seasonality (common time-series heterogeneity). While the method is powerful and intuitive, its validity largely relies on the common trend assumption. We provide a careful discussion on caveats of the DID estimation in the Discussions section, and examine our findings with cautions.

Using the DID estimation, our results indicate a positive effect of Facebook campaigns on purchases of travel products. We also take one step further to explore the types of products that are more favorable in a social media platform such as Facebook. The analysis indicates that trips with high structure, high involvement, medium prices, and medium length are associated with greater sales after Facebook marketing. In addition to testing the moderations of product characteristics, we explore whether such effects vary across sales distributions and change over time spans. Our results indicate that such conditional effects on product features are more prominent for products with the low quantile of sales. In addition, the impact of Facebook campaigns on sales appears in the first month, and shows a decreasing trend over the following two months.

Our study contributes to the literature as well as the practice of social media marketing. To the extent of our knowledge, our study is the first to empirically evaluate a firm's efforts on Facebook marketing at the product level in the tourism industry. While a stream of research focuses on the influences of social media, most studies are based on earned media and discuss how customer reviews impact customer behavior. Few have addressed the firm's perspective and explored a firm's marketing efforts in owned social media. Our study contributes to the literature by empirically examining the effectiveness of firms' marketing campaigns on Facebook brand pages. Furthermore, among those few that have examined the firm's perspective (e.g., [21,89]), they either look at the performance at the customer level (e.g., customer's intention to purchase) or the aggregate sales at the firm level (e.g., stock market return). We complement to the literature by examining sales at the product level and exploring the products that firms should target in Facebook marketing. For practical implications, the empirical results of this study facilitate the decision making of e-commerce managers in the tourism industry. While social media is one of the smart tourism applications that enable opportunities for business operation revamping, firms have doubts on the effectiveness of such investments and look for tactical steps to manage the new operations. Our research findings justify the effectiveness of owned social media marketing and provide an empirical support for the use of owned social media as a sales and marketing channel. Our exploratory analysis of the characteristics of travel products provides rudimentary guidance on the design of marketing campaigns and helps e-commerce managers to allocate resources in a social media marketing campaign.

2. Literature review

2.1. Social media from the firm's perspective: owned media strategy

Literature that examines social media effects can be categorized by two perspectives: customer-centric and firm-centric. Typical results in customer-centric research are as follows: consumers would like to consult product reviews or WOM before product release [53], from

[4] Our field research is based on a panel of industry experts, which include four executives from leading tourism agencies in Taiwan. All executives were at the vice-president level or higher, and were familiar with their company's product management function.

[5] In this study, due to the nature of Facebook fan page, and the marketing operation of the focal company, owned social media marketing refers to marketing campaigns targeted to all customers. Personalization through sponsored ads network is out of the scope.

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reputable reviewers [34], featured with actual text rather than the summary statistics [19,37], posted in a large volume and valence [29,53,59], and focusing on the purchase of niche and less popular products [25]. These studies are developed in the context of earned social media where customers are freely to create user-generated content. In order to explore a firm's social media marketing, we focus on owned social media which allows companies to create their own channels for delivering content to audiences directly, their own communities for building connections with customers, and a context that goes beyond a purely transactional relationship to engage customers through loyalty and reward programs.

As most prior customer-centric studies are in earned social media, few have examined owned social media published by firms. Research is now emerging to help firms understand if their expenditure on this specific media channel can receive payoff. Table 1 provides a summary of existing literature on owned social media marketing. However, the current literature still lags in the following aspects that motivate our study.

First, prior studies that examine the effectiveness of owned social media can be classified by the outcome effects: influences on customer purchasing behavior, on overall firms' financial performance (e.g., a firm's stock price), and on direct marketing outcomes (e.g., retail sales of products). Most of these studies focus on the customer purchasing behavior, and some look at a firm's overall financial performance. For example, Rishika et al. [64] examine the effect of customers' participation in a firm's owned social media efforts on customer visit frequency and profitability. Goh et al. [39] study the relative impact of UGC and marketer-generated content (MGC) on consumers' purchase behavior in a firm's owned social media. Chung et al. [21] explore how consumer behavior (consumer engagement and attention) influences a firm's stock market returns in a firm's owned social media. Xie and Lee [89] and Thornhill et al. [76] conduct a series of studies to explore user-generated and marketer-generated content in a firm's owned social media, and examine the relative impacts of the two types of information on consumer purchase intention, actual offline purchase behavior, and externalities to competing brands. However, rarely focus on direct marketing outcomes (e.g., product sales). Without considering direct marketing consequences (e.g., product sales), firms lose the opportunities to test the appeal of their products or services. Neither can they tell which marketing campaigns can reach customers more effectively, nor do they provide customers with compelling content that can increases sales. Adding to prior literature, our study focuses on the association between companies' owned social media marketing campaigns and product sales, uncovering critical product-level differences in sales that are essential for a firm's marketing strategy.

Second, prior research has not extensively studied the role of product characteristics in owned social media activities. Although some research has attempted to evaluate the influence of product characteristics, the focus is mostly on customers, rather on firms. For example, Senecal and Nantel [67] suggest that online recommendations for experience products are more influential to consumers' choices than search products. Zhu and Zhang [95] indicate that online consumer reviews result in higher incremental sales for less popular products. Dewan and Ramaprasad [25] show that song buzz is negatively associated with sales, especially for niche music and less popular songs within albums. Although the results of these customer-centric studies in earned media may give a hint for marketers to manage their content in owned media, the estimated effects may be biased. The contribution in UGC is voluntary, and no attempt is made to create a representative sample of the population [55]. Thus, product preference may be biased by who contributes the content and factors causing people to contribute content (e.g., different motivations). In addition, UGC in earned media only capture the opinions of users who write a review. These reviews usually focus on extreme product experience (good or bad) [42]. Overlooking silent users' opinions and "average" product reviews prevent companies to get a complete picture of product effects.

In contrast to the afore-mentioned studies that are related to customer-centric earned media, our studies provides firm-centric product analysis by examining the moderating role of product characteristics in the relationship between product sales and a firm's owned social media marketing. In the interview with four executives from leading tourism agencies in Taiwan, they discuss how they use product characteristics to classify their products in the target market. Thus, the examination of those product characteristics can help managers locate proper

Table 1
Summary of prior literature on owned social media effect.

Paper	Industry sector	Owned media type	Outcome variable	Methodology	Major findings
Goh et al. [39]	Apparel	Facebook brand page	Total purchase expenditure	Difference in differences	Engagement in social media brand communities leads to a positive increase in purchase expenditures.
Hilderbrand et al. [96]	Vehicle, Jewelry	Private online community	Product satisfaction	Linear regression and experiment	Receiving others' feedback on initial product configurations affects consumers' ultimate product designs and their satisfaction.
Rishika et al. [64]	n/a	Firm's owned social media website	Visit frequency	Difference in differences	Customer social media participation leads to high customer visit frequency and profitability.
Wu [88]	IT	Private online community	Productivity and job security	Linear and logistic regression	Social media can drive both work performance and job security, but there is a trade-off between engaging in social communication and gathering diverse information.
Li et al. [51]	Coffee (fictitious company)	Corporate Twitter account	Corporate reputation	Exploratory experiment	User engagement and informedness are important in explaining corporate reputation. Moreover, relationship depth, corporate involvement, and channel purpose lead to engagement whereas channel credibility leads to informediness.
Chung et al. [21]	n/a	Facebook brand page	Firm abnormal returns	Three-stage least squares regression	The richness and responsiveness of a firm's social media efforts are significantly associated with the firm's market performance. Such relationship is strongly mediated by consumer engagement and attention.
Xie and Lee [89]	Face-moving consumer goods	Facebook brand page	Propensity to buy and weekly amount purchased offline	Multilevel regression and probit regression	Exposures to MGC and UGC in a brand's owned media can significantly increase consumers' likelihood to purchase, but have almost no impact on the amount purchased offline.
Thornhill et al. [76]	Face-moving consumer goods	Facebook brand page	Weekly amount purchased offline	Seemingly unrelated Regression (SUR)	Exposures to MGC and UGG in a brand's owned media can increase brand purchases, as well as advertising externality to competing brands

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products for marketing campaigns. Especially, firms can easily manipulate such marketing campaigns on a firm's owned social media. Accordingly, the finding can contribute to the literature by addressing the product analysis from the firm's perspective.

2.2. Tourism products through owned social media

Corporate owned social media is widely applied in smart tourism practices to maintain a tourist's emotional connection to a product [83]. Marketers can use owned social media as a source of customer voice and market information to learn about their experiences about the tourism products, identify new tourism destinations, or receive early warnings regarding certain tourism products [73]. Gaining insights from customers can also help marketers engage customers to co-create tourism products or to simply improve existing ones (e.g., using questions, polls, co-creation). For example, Gettysburg National Military Park uses its Facebook brand page to connect followers to some of the battlefield's lesser-known sites. Moreover, the park launched the "52 Footsteps" Facebook Challenge in their brand page, which outlines a weekly story that can lead visitors to specific spots on the battlefield. Upon finding a spot, visitors are encouraged to take a photo and upload it to the park's Facebook brand page [66]. The campaign was a success mainly because it helped establish a more powerful connection with the park and initiate communication with visitors.

STA Travel, the world's largest travel company for young adults, used their owned social media sites to enable customers to help one another solve product-related problems. The company launched an "Unexpected Europe" campaign by sending the company's most socially active customers under 30 years old on a six-city tour in Europe. These customers act as an STA Travel insider, providing unique travel tips and tour guidance and sharing their experience on STA Travel's YouTube channel, blog, and the insider's websites and social channels [63]. Finnair's "Quality Hunters" campaign provides an example for product co-creation. In this campaign, seven people were selected as Quality Hunters whose mission was to travel around the world for 48 days and share their ideas and insights on how Finnair and Helsinki Airport could improve the flight and airport experience through the Finnair blog and Twitter. Visitors to the Quality Hunters website and its owned social media sites could set tasks for them, make comments and share their ideas, while passengers at Helsinki Airport could drop by at the Hunter's Lounge to exchange their opinions. This campaign collected >250 ideas and was recognized as one of the most innovative crowdsourcing initiatives [93].

The above-mentioned examples show that travel providers conduct various owned social media activities to market products. Tourism is one industry with a very close relationship with the new ICTs and is among the most "socially devoted" industries [15,26]. However, research on social media in tourism is still in its infancy [94]. Among the few studies that examine the effects of social media in tourism, their focus is on the effects of UGC on consumers (e.g.,[12,78,80,97]), shedding little light on firms' strategy in owned social media. Some researchers have acknowledged the need for more firm-centric research in tourism (e.g., [17, 26,45]). They find firms' social media initiatives are positively related with consumer engagement, emotional appeal, brand attitude, and corporate reputation. However, to our knowledge, there is no study that directly quantifying the effects of a tourism firm's social media campaigns in relation to number of purchases (sales) and targeted products. Complementing to the literature, our study takes into account the moderation effects of various tourism product attributes on the relationship between product sales and a firm's owned social media campaigns. Thus, the results of our study are expected to have significant implications for tourism firms on social media management.

3. Hypothesis development

Our conceptual model is shown in Fig. 1. We aim to explore the effect of companies' owned social media marketing on sales performance.

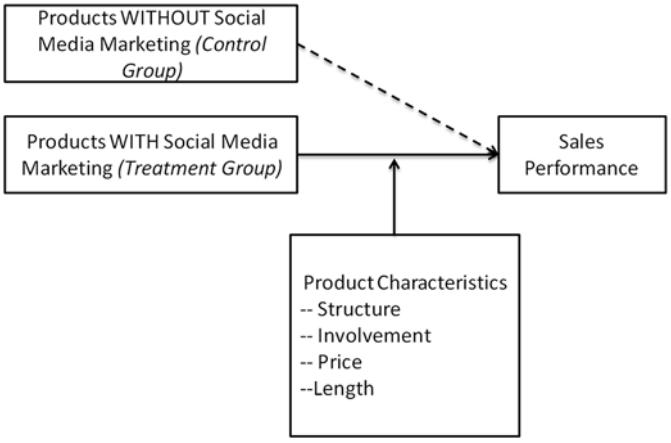

Fig. 1. Conceptual model.

Specifically, we study the impact of social media marketing campaigns conducted in the tourism firm's Facebook brand page. As firms make marketing campaigns via their own Facebook brand pages, product selection is one way that firms can control/manipulate information provided to fit with consumers' information needs. We thus examine the moderating effects of various product characteristics. Cognitive fit theory [16,81] suggests when customers face a decision-making problem, e.g. buying a product, the performances depend on the fit between how information is presented/provided, and consumers' information needs by the nature of a problem. Prior literatures (e.g., [44,79,81]) have applied the theory to explain the fit between forms of information presentation (e.g., tables and graphs) and consumers' information needs for different types of tasks (e.g., get specific price information and evaluate different models of computers). In this study, we extend the theory to examine the relationship between product characteristics and the use of a channel. For one thing, product characteristics (e.g., experience and search goods) are associated different consumers' information needs (e.g., touch and feel versus get prices and product features), which can be fulfilled via information provided by different channels (e.g., physical and online stores). For the other, channels may attract customers with different motives, such as information seeking/planning and economic incentive (e.g., [47,65]). Thus, if channels can provide products with characteristics that fit with customers' motives using the channels, we would expect effectiveness of such channels.

Following the logic, we examine how the four tour characteristics fit with consumers' information needs in a firm's owned Facebook brand page. According to the interviews with the executives from leading tourism agencies in Taiwan, the four tour characteristics: tourism structure, tourist involvement, trip price, and trip length are how they position their products in a target market, and hence are variables of interest. The four product characteristics can be divided as: (1) characteristics that drive consumers' information needs, and in turn fit with information provided by a firm's owed Facebook brand page (2) characteristics that fit with consumers' motives using a firm's owned Facebook brand page. *Trip price and length* are fall into the first classification. Price and length are usually associated with consumers' information seeking and planning efforts, which can be fulfilled via information capability of a firm's owned social media. Since these two characteristics are associated with channel capabilities, we call them as *channel-oriented product characteristics*. Tourism literature has highlighted their explanatory power of the tourist segmentation and of market demand (e.g., [1,2,6,14,30,57,60]). *Tourism structure and tourist involvement* are then in the second classification. Consumers who use Facebook on tour search are prone to detailed information. In addition, those active users of Facebook have preferences on interactive and involved travel experiences [98]. Thus, a firm should provide structured tours with detailed information, and tours with adventure activities to fit with

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consumers' motives using Facebook brand page. Because the two characteristics are related to consumers' motives using Facebook brand page, we call them as *consumer-oriented product characteristics*. These characteristics are widely used in the tourism literature as the basis of classifying tourists and understanding tourist behavior (e.g., [8,22,27,28,35,43,48,91]).

3.1. Effectiveness of owned social media marketing

Traditional e-commerce is enabled by Web 1.0, featuring one-way communication. Social commerce is enabled by Web 2.0, a platform that allows bidirectional communication, informing consumers better than ever before [92]. According to Stephen and Toubia [71], social media allows people to actively participate in the marketing and selling of products and services in online communities. Moreover, Kim and Hawamdeh [50] state that social media help companies improve their marketing strategies and increase website traffic and sales. Dell, for example, states that its use of Twitter has generated $1 million in incremental revenue resulting from sales alerts [49]. The Royal Opera House in London makes 30% of its sales through its Facebook fan page [3]. Old Spice, an American brand of male grooming products, successfully increases its sales through posting on YouTube with millions of downloads, humorous tweets on Twitter, and the creation of a massively popular fan page on Facebook [11].

For the tourism industry, owned social media allows a firm to conduct various marketing campaigns to trigger sales. For instance, in the context of Facebook, marketers can use spellbinding landscape pictures, beautiful words, sweet quotes, questions or contests to engage customers in their brand page. They can also post special offers and links to drive impulse purchase. Literature has found that successful marketing campaigns in social media can attract much more visitors to the company's website because the information delivered through social media has far greater levels of range, richness, reliability, and timeliness than through conventional means [40]. Tourism has been recognized as an 'information-intensive industry' [85]. Information richness is the key to engage customers, build loyalty, and advocacy, which in turn strengthens reputation and drives revenue. In addition, because of information asymmetry, information delivered through a firm's owned channel can better address consumers' needs and reducing uncertainties than through other channels [58]. When uncertainties reduced, consumers will be more likely to purchase a product that fits their needs. Therefore, we expect that tourism agencies can increase the sales of tourism products through creating social media campaigns in their owned social media channel. Our hypothesis is as follows:

H1. *Tourism products with marketing campaigns in a firm's owned social media are likely to achieve better sales performance than those are not.*

3.2. Effect of social media marketing on tourism products

3.2.1. Structure of tourism

The structure of tourism indicates the level of planning that is performed by travel agencies. Highly structured travel refers to package tours that are to a large extent arranged by travel agencies. This type of tour generally contains transportation, food, accommodation, and entertainment, which are advertised and sold together at an inclusive price. In contrast, independent travel is less structured because it does not include a set of scheduled sightseeing activities, and hence, tourists have more flexibility in making their own travel arrangements.

Past literature has indicated that purchasers of package tours are likely to be elderly, be intent on visiting several destinations, and be first-time visitors to the destination [68]. These travelers usually request more detailed vacation information for decision-making and spend more time planning [69]. As customers research products, they usually take advantage of two information sources. One is from brand owner's product newsfeeds, and the other is from peer consumers' word-of-mouth [89]. Studies imply that reliance on either information source is suboptimal [39]. Marketer's content offers informative messages that can increase customers' knowledge of product features and benefits while peer-generated content describes usage experience from a consumer's perspective. A firm's owned social media offers customers a right combination of both information sources. In the context of Facebook brand page, for instance, a marketer can design campaigns to encourage peer discussions and directly communicate in the "comment" entries to address specific customers. Such UGC under MGC model enhances product learning and awareness. Because people who choose package tours are more active in seeking information than those who choose independent travel, we can expect that these travelers are more likely to rely on owned social media for planning purposes. Thus, social media marketing can be more effective while targeting this segment. Our hypothesis is as follows:

H2. *Incorporating social media into the marketing of package tours is more likely to increase the sales than incorporating it into the marketing of independent travel.*

3.2.2. Involvement of tourists

A high-involvement tourist refers to an individual's need for active stimulation from his/her surrounding vacation environment. Their desires can be satisfied by participating in adventure activities, water sports (e.g., sailing, scuba diving, whitewater rafting) or winter activities (e.g., skiing, snowboarding). In contrast, a low-involvement tourist prefers a more tranquil journey that involves little interaction with the local environment. These tourists merely want to relax and escape to a vacation destination. They enjoy the change of places and want to take it easy during their stay [28].

One of the main characteristics of social media is that it gathers engaged and active participants of a given company [49]. Additionally, those who primarily use social media to share their trips appear to want a deeper, more interactive, and more authentic travel experience (Lo et al., 2011). To fulfill those customers' preferences, Bartram [7] has stated that increased exposure of adventure activities in the media may indeed stimulate involvement in an activity. Therefore, using social media to promote tourism products that include more interactive activities may attract active users and increase their intention to engage in these activities and to subsequently purchase the products. Thus, our hypothesis is as follows:

H3. *Incorporating social media into marketing products that require greater tourist involvement is more likely to increase sales than marketing products that require less tourist involvement.*

3.2.3. Price of products

The cost of tourism to visitors includes the cost of transportation to and from the destination and the cost of ground content, such as accommodation, tour services, food and beverages, and entertainment [30]. When the price of a product is relatively high, customers tend to search for more information [9]. Because product price is a stimulus for customer thinking, high-priced products lead customers to devote more thought to their purchase intentions [86]. Additionally, product price is related to perceived risk [84]. That is, higher risk is involved when selecting products with higher prices. According to the findings of Wang and Chang [84], if a product's price is relatively high, the information and recommendations provided by strong-tie contacts from Facebook have a more significant effect on purchase intentions than the information and recommendations provided by weak-tie sources from Facebook. However, this effect is not found for low-priced products. Accordingly, we expect that interpersonal influence and communication on social media are more important when consumers consider

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buying relatively high-priced tourism products. Thus, we develop the following hypothesis:

H4. *Incorporating social media into the marketing of higher-priced tourism products is more likely to increase sales than in the marketing of lower-priced tourism products.*

3.2.4. Length of tour

Length of stay is one of the key elements in a tourist's decision-making process, and promotional campaigns must therefore be adjusted to the tourist's decisions with regard to the length of time spent at destinations [56]. In general, the risk of travel increases with the length of stay. Consequently, the anticipation of a longer trip stimulates more information searching [33]. According to Tsiotsou and Ratten [77], Web 2.0 technologies can foster the sharing of information and lower product uncertainty. Additionally, Litvin et al. [52] described online interpersonal influence or eWOM as a potentially cost-effective means of marketing tourism, especially for high-risk tourism products. Therefore, we believe that social media supported by Web 2.0 technologies can be an effective tool to reduce the perceived risk of a longer trip and thus to promote better marketing effects. Our hypothesis is as follows:

H5. *Incorporating social media into the marketing of longer trips is more likely to increase sales than in the marketing of shorter trips.*

4. Data

To explore the impact of social media on travel sales, we collect our empirical data from the case company: Company A. Company A was founded in 1978 and is one of the most well-known travel agencies in Taiwan. Company A has three subsidiary companies, one of which is responsible for managing e-commerce and online marketing. The company sells various tourism products on the official website, including domestic travel, international travel, personal travel, corporate travel, and inbound tourism. When business would most likely benefit from the advantages of Web 2.0 applications, Company A began to exploit them for interactions with consumers. Company A built its own Facebook brand page as a marketing platform to interact with its consumers in September 2009, and the page currently has >250,000 Facebook fans.

While various social interactions can be performed on a social media platform [99,100], we focus on Company A's Facebook marketing campaigns that are directly related to product sales. On the brand page, the company posts fascinating landscape pictures and inspirational quotes regarding the attractions, as well as special offers about tours to engage customers. Most importantly, links to sales pages of related products are usually included in those posts. In addition, we focus on products of international travels, as most travelers rely on travel agencies (like Company A) for traveling abroad. According to the official tourism bureau, 85% of travelers in Taiwan seek assistance from travel agencies for international tours, whereas <5% would utilize travel agencies for domestic trips [75]. We obtain data on international trips from February 1, 2012, to November 30, 2013. The dataset contains both trips with and without Facebook campaigns as the treatment and control groups. Details comparing the two groups are described in the section of model estimation.

We use travel sales as the performance metric. The case company indicates that the price of each product changes over time, and hence, the company uses the number of customers/orders to evaluate annual sales performance. Accordingly, we use the number of customers to measure travel sales in the study. In addition, we examine whether the effect of Facebook campaigns varies by product characteristics, including the structure of tourism, the involvement of tourists, the price of products, and the length of tour. Table 2 provides summary statistics and detailed definitions of travel sales, comparison groups of products for estimation, the four production characteristics, and additional variables controlling for product variations other than the influence of Facebook campaigns.

5. Model estimation and results

5.1. Difference-in-difference estimation

We employ a DID approach to estimate the impact of Facebook campaign activities on travel sales. We adopt the DID method because it controls for time-fixed self-selection (e.g., products with higher sales are more likely to be chosen for Facebook campaigns) as well as common time-series heterogeneity (e.g., seasonality that affect travel sales over time in a manner common across travel products). According to DID, we first compares trips with the aid of Facebook campaigns (treatment group) to a matched sample of trips without Facebook marketing (control group). The treatment group is exposed to Facebook marketing in the second period but not in the first period. The control group is not exposed to the treatment during either period. This method first calculates the average gain in sales of the treatment (control) group before and after the event of Facebook campaigns to remove any time-fixed heterogeneity resulting in different usages of Facebook activities. The second differencing is applied on the average gains between the treatment and the control group to eliminate other factors leading to common increases in sales over time [46].

We first identify international tours that have been marketed using the Facebook campaigns from February 1, 2012, to November 30, 2013. Because we want to inspect the changes in the sales of tourism products before and after Facebook campaigns, we exclude products that might have few or no purchases before or after Facebook campaigns (i.e., departure dates of trips are just a few days before the marketing campaigns are posted; travel products would be removed from the online store soon after the campaigns). For each Facebook campaign, we focus on sales within three months before/after a campaign [90]. In other words, sales before a Facebook campaign are measured by those orders within three months before the campaign. Sales after a Facebook campaign are calculated by those orders within three months after the campaign. Because sales durations of products vary, some have one month after a Facebook campaign, while others have two months after a campaign. We thus measure performance before and after a Facebook campaign by average monthly sales. Consistent with the firm's custom, average monthly sales are approximated by the average monthly number of customers (see Section 4 for details). Finally, some products are marketed in more than one campaign. For those products, we calculate sales in the three months before and after the first campaign. The subsequent campaign whose duration exceeds four months from the first one would be viewed as a separate event. Overall, total (monthly average) sales of all products are 28,774, and that for the pre-camp period and post-camp period are 13,343 and 15,431 respectively.

Based on the selection criteria above, we end up with 188 travel products with the aid of Facebook campaigns. For each product with a Facebook campaign (treatment group), we match it with a product without a Facebook campaign (control group). When choosing the control group, we select products that are similar to the matched samples in the treatment group. By doing so, we are able to control for factors other than Facebook campaigns that cause changes in sales between the treatment and the control groups. We match products by sales duration, geography of destination, and product structure (i.e., independent or packaged travels). For each product in the treatment group, we first find a set of products with similar sales durations. Among those products, we further identify the product with a similar geography of destination and/or product structure as the paired sample in the control group. When there are more than one candidates, we consult the company to pick the most similar product.[6] Sales duration controls for seasonality and geography of destination, and product structure ensures

[6] With due diligence, we ensure product similarities of *observables* between the groups. In addition, DID estimation can remove/control for bias in sales due to *unobserved, permanent* differences between groups [46,90].

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Table 2
Variable definition and summary statistics ($n = 752$).

Variable	Description	Mean	Stdev.	Min	Max
Dependent variable					
Log(Sales Measure)	Sales are approximated by monthly average number of customers. We take the log of the sales measure to address the skewness of data distribution.	3.118	1.068	−1.109	6.184
Comparison groups for estimation					
Group	Dummy variable: 1 for the group with Facebook marketing & 0 for the control group	0.5	0.5	0	1
PostCamp	Dummy variable: 1 for post-campaign period & 0 for before-campaign period	0.5	0.5	0	1
Product characteristics					
Structure	The level of planning that is performed by travel agencies. Thus, independent trips with air tickets and accommodations only are low-structured products. Package trips with additional sightseeing scheduled are high-structured products.	0.620	0.486	0	1
Involvement	The extent of needs for active stimulation from the surrounding vacation environment. Thus, trips with at least one adventure activity (e.g., whitewater rafting, scuba diving, visiting a theme park or amusement park) are products with high involvement. In contrast, trips without any adventure activity are products with low involvement.	0.316	0.465	0	1
Price	Because the price of a trip may vary due to different sales channels, group discounts and other factors, product price is measured by the average price of all orders (in thousands).	35.976	30.301	9.598	246.733
Length	Because consumers who buy independent trips may stay longer than scheduled, product duration is calculated by the average length of all orders.	5.564	2.497	3	16
Control variables					
EastAsia	Trips with destinations in east Asia (other destinations as the base)	0.601	0.490	0	1
SouthAsia	Trips with destinations in southeast Asia (other destinations as the base)	0.170	0.376	0	1
MultipleTheme	Trips with destinations more than one city	0.644	0.479	0	1
Quarter: qd1	Trips held in the 1st quarter (4th quarter as the base)	0.237	0.425	0	1
Quarter: qd2	Trips held in the 2nd quarter (4th quarter as the base)	0.277	0.448	0	1
Quarter: qd3	Trips held in the 3rd quarter (4th quarter as the base)	0.231	0.422	0	1

consistency of product content. Consistent with the treatment group, we have 188 samples in the control group.

Table 3 presents the mean comparison of the treatment group and the control group before the event of Facebook marketing. We measure the means of products by product structure, geography of destination, price, and length. Accordingly, we examine those means by a *t*-test for continuous numbers and a *z* test for proportions under the null hypothesis that the means are equal in the two groups. The results suggest no significant difference between the two groups. In other words, we show our due diligence by having a pair of similar samples to fulfill the common trend assumption as much as we could. Aside from sample matching, the critical assumption is carefully examined in the Discussions section to validate our findings and interpret our results with limitations specified.

Table 3
Mean comparison of the two groups.

Variable	Samples in		Statistics
	Treatment group	Control group	
1. Product structure			
a. Independent travel	37.77%	38.30%	0.106
b. Package tour	62.23%	61.70%	−0.106
2. Destination			
c. East Asia	60.64%	59.57%	−0.211
d. Southeast Asia	15.96%	18.09%	0.549
e. Europe	10.64%	11.70%	0.327
f. America	7.45%	3.72%	−1.572
g. Oceania	4.26%	5.85%	0.706
h. South Africa, Middle East, South Asia	1.06%	1.06%	0.000
3. Price	36.347	35.607	−0.236
4. Tour length	5.54	5.59	0.206

Using the DID method, we estimate the effect of Facebook marketing on travel sales by the following model specification:

$$\begin{aligned}\text{Log}(\text{SalesMeasure}_i) = {} & \alpha + \beta_1\ \text{PostCamp}_i + \gamma_1\ \text{Group}_i \\ & + \delta\ \text{PostCamp}_i * \text{Group}_i + X_i\ \eta + \varepsilon_i \end{aligned} \quad (1)$$

The variable of *sales measure* represents the monthly average sales of a product approximated by the average number of customers. *Group* and *postCamp* are the indicator variables to represent control/treatment groups and before/after-campaign stages, respectively. The *interaction term* of postCamp and group captures the *effects* between the *differences* in groups after the campaign and the *differences* in groups before the campaign. This difference-in-difference estimation allows us to control for time-series heterogeneity and self-selection bias and measure the effects of social media marketing on sales more accurately. We also include the geography of the destination (i.e., *eastAsia*, *southAsia* and *others*), number of destinations (i.e., a *multiple-theme* tour is arranged to more than one city), and seasonality (i.e., a year is in four quarters: *qd1–qd4*) as the control variables to reflect other factors that may lead to variations in sales between products with Facebook marketing and those without it. X_i represents these control variables.

In addition to the average effect of Facebook marketing on sales, we are interested in whether the effect varies by product characteristics. To incorporate effects of product characteristics in DID estimation, we

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follow the analysis approach by Campbell and Frei [18] and Chuang et al. [20] to divide one DID estimator (δ) into two parts: the part of DID for a high level of a product characteristic (δ_H), and the part of DID for a low level of a product characteristic (δ_L). For example, trips can be classified by product structure as those with basic planning (i.e., independent trips with flight tickets and accommodations only) and those with additional sightseeing activities arranged. The former are defined as products with *low structure* ($n = 286$), and the latter are products with *high structure* ($n = 466$). Accordingly, to examine whether the effect of Facebook marketing varies by level of product structure, we use the model below for estimation:

$$\begin{aligned}\text{Log}(\text{SalesMeasure}_i) = {} & \alpha + \beta_2\,\text{PostCamp}_i + \gamma_2\,\text{Group}_i \\ & + \delta_{\text{structure}-H}\,\text{PostCamp}_i * \text{Group}_i \\ & * \text{H}-\text{structure}_i + \delta_{\text{structure}-L}\,\text{PostCamp}_i \\ & * \text{Group}_i * \text{L}-\text{structure}_i + X_i\,\eta + \varepsilon_i \end{aligned} \quad (2)$$

We decompose the DID estimator and examine the effect of Facebook marketing for products with high structure (PostCamp * Group * H-structure) and that for products with low structure (PostCamp * Group * L-structure). We include three additional product characteristics for analysis. Trips that include at least one adventure activity are products with *high involvement* ($n = 238$), and those that do not include any adventure activity are products with *low involvement* ($n = 514$). We can also classify trips by product price: those with an average price that is 0.5 standard deviations greater than the mean price are viewed as products with a *high price* ($n = 130$), those with an average prices that are 0.5 standard deviations lower than the mean price are viewed as products with a *low price* ($n = 246$), and those with average prices between a high and low price are viewed as products with a *medium price* ($n = 376$). The last product characteristic is product duration. Products with an average length that is 0.5 standard deviations greater than the mean number of travel days are defined as products with a *long length* ($n = 154$), those with an average length that is 0.5 standard deviations lower than the mean number of travel days are defined as products with a *short length* ($n = 256$), and those with average lengths between a long length and a short length are viewed as products with a *medium length* ($n = 342$). To avoid the multicollinearity issue,[7] we specify a separate equation for each product characteristic. The following three models explore whether the effect of Facebook marketing varies by level of involvement, product price, and product duration:

$$\begin{aligned}\text{Log}(\text{SalesMeasure}_i) = {} & \alpha + \beta_3\,\text{PostCamp}_i + \gamma_3\,\text{Group}_i \\ & + \delta_{\text{involvement}-H}\,\text{PostCamp}_i * \text{Group}_i \\ & * \text{H}-\text{involvement}_i + \delta_{\text{involvement}-L}\,\text{PostCamp}_i \\ & * \text{Group}_i * \text{L}-\text{involvement}_i + X_i\,\eta + \varepsilon_i \end{aligned} \quad (3)$$

$$\begin{aligned}\text{Log}(\text{SalesMeasure}_i) = {} & \alpha + \beta_4\,\text{PostCamp}_i + \gamma_4\,\text{Group}_i \\ & + \delta_{\text{price}-H}\,\text{PostCamp}_i * \text{Group}_i * \text{H}-\text{price}_i \\ & + \delta_{\text{price}-L}\,\text{PostCamp}_i * \text{Group}_i * \text{L}-\text{price}_i \\ & + \delta_{\text{price}-M}\,\text{PostCamp}_i * \text{Group}_i * \text{M}-\text{price}_i \\ & + X_i\,\eta + \varepsilon_i \end{aligned} \quad (4)$$

$$\begin{aligned}\text{Log}(\text{SalesMeasure}_i) = {} & \alpha + \beta_5\,\text{PostCamp}_i + \gamma_5\,\text{Group}_i \\ & + \delta_{\text{length}-L}\,\text{PostCamp}_i * \text{Group}_i * \text{L}-\text{length}_i \\ & + \delta_{\text{length}-S}\,\text{PostCamp}_i * \text{Group}_i * \text{S}-\text{length}_i \\ & + \delta_{\text{length}-M}\,\text{PostCamp}_i * \text{Group}_i * \text{M}-\text{length}_i \\ & + X_i\,\eta + \varepsilon_i \end{aligned} \quad (5)$$

[7] We also try out the full specification with all the interactions in one model. However, the estimation is not feasible because the variable inflation factor (VIF) of the estimation is far beyond the common-recognized threshold (VIF = 10).

5.2. Results

Table 4 presents the estimation results for the effect of Facebook marketing using the DID method. For such an analysis, we collect 188 samples in the treatment group, and keep track of their performances before and after the Facebook campaigns ($188 * 2 = 376$). Another 188 samples are collected in the control group for those tours without Facebook campaigns. Similarly, each tour is recorded for performances of the same months before and after the Facebook campaign ($188 * 2 = 376$). Those 752 observations (376 from the treatment and 376 from the control) are then applied to the five model specifications stated above. The first column corresponds to Eq. (1). According to the DID estimator (δ), the use of Facebook marketing is linked to 45%[8] increases in travel sales ($p < 0.01$), supporting H1. Note that because we use difference-in-difference estimators, it is unlikely that the result is due to self-selection between products with and without Facebook marketing. Columns 2 to 5 are used to examine whether the effect of social media marketing varies by product characteristics. Four product characteristics corresponding to Eqs. (2) to (5) are explored. For each product characteristic, the DID estimator is decomposed into either δ_H/δ_L (high/low-level groups) or $\delta_H/\delta_M/\delta_L$ (high/medium/low-level groups). In column 2, we find that the effect of Facebook marketing is associated with a 57% increase in travel sales ($\delta_{\text{structure-H}}$ at $p < 0.01$) for products with high structure (i.e., package tours), compared to 26% increases in sales ($\delta_{\text{structure-L}}$ not significant) for products with low structure (i.e., independent tours). This result is consistent with H2. In column 3, the effect of Facebook marketing is linked to a 68% increase in sales ($\delta_{\text{involvement-H}}$ at $p < 0.01$) for products with high involvement (i.e., trips with adventure activities), relative to a 34% increase in sales ($\delta_{\text{involvement-L}}$ at $p < 0.05$) for products with low involvement (i.e., trips without adventure activities). This finding is consistent with H3.

Similarly, we find the results related to product price in column 4. The effect of Facebook marketing is linked to a 68% increase in sales ($\delta_{\text{price-M}}$ at $p < 0.01$) for products with a medium price, whereas the effect for products with high and low prices are related to 25% and 17% increases in sales ($\delta_{\text{price-H}}$ and $\delta_{\text{price-L}}$ not significant). In column 5, the effect of Facebook marketing is linked to a 72% increase in sales ($\delta_{\text{length-M}}$ at $p < 0.01$) for products with a medium duration, relative to 20% and 27% increases in sales for products with long and short durations ($\delta_{\text{length-L}}$ and $\delta_{\text{length-S}}$ not significant). According to the results of the two columns, we do not find support for H4 and H5. However, the results indicate an interesting finding: social media marketing is especially effective for travel products with medium prices and durations.

We further statistically examine the differences in the effects of Facebook marketing among products with different characteristics. We use the Wald test under the null assumption that the decomposed DID estimators are equal. Table 5 shows that sales after the use of Facebook marketing for products with high structure increase 31% more than that for products with low structure ($p < 0.05$). Similarly, we perform the test on the other three product characteristics. For products with high involvement, sales after the use of Facebook marketing are 34% more than for products with low involvement ($p < 0.05$). For products within a medium range of prices, sales after the use of Facebook marketing increase 51% more than for products within a low range of prices ($p < 0.01$). For products within a medium range of durations, sales after the use of Facebook marketing increase 52% more than that for products within a low range of durations ($p < 0.01$).

5.3. Additional analysis

In additional to performing the ordinary least squares on *expected sales*, we further explore the effect of a firm's owned social media across the whole sales distribution. In other words, we are interested in

[8] When the dependent variable is in logarithmic form, the interpretation of coefficient is approximately a percentage change [87].

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Table 4
Effect of Facebook marketing.

Variable	DID (1)	DID by structure (2)	DID by involvement (3)	DID by price (4)	DID by length (5)
PostCamp	−0.136	−0.137	−0.136	−0.135	−0.138
	(0.110)	(0.111)	(0.111)	(0.111)	(0.111)
Group	−0.054	−0.051	−0.054	−0.055	−0.054
	(0.103)	(0.103)	(0.103)	(0.103)	(0.103)
PostCamp * Group (DID)	0.451***	–	–	–	
	(0.148)				
DID by StructureH ($\delta_{structure\text{-}H}$)		0.566***	–	–	
		(0.159)			
DID by StructureL ($\delta_{structure\text{-}L}$)		0.261	–	–	
		(0.179)			
DID by InvolvementH ($\delta_{involvement\text{-}H}$)			0.678***	–	
			(0.168)		
DID by InvolvementL ($\delta_{involvement\text{-}L}$)			0.342**	–	
			(0.161)		
DID by PriceH ($\delta_{price\text{-}H}$)				0.249	
				(0.213)	
DID by PriceL ($\delta_{price\text{-}L}$)				0.172	
				(0.192)	
DID by PriceM ($\delta_{price\text{-}M}$)				0.683***	
				(0.162)	
DID by LengthH ($\delta_{length\text{-}H}$)					0.201
					(0.200)
DID by LengthL ($\delta_{length\text{-}L}$)					0.276
					(0.179)
DID by LengthM ($\delta_{length\text{-}M}$)					0.717***
					(0.171)
Control variables					
EastAsia	0.704***	0.715***	0.723***	0.690***	0.667***
	(0.090)	(0.090)	(0.908)	(0.093)	(0.093)
SouthAsia	0.559***	0.560***	0.539***	0.514***	0.501***
	(0.112)	(0.112)	(0.112)	(0.114)	(0.117)
MultipleTheme	0.248***	0.205**	0.244***	0.247***	0.244***
	(0.086)	(0.089)	(0.085)	(0.086)	(0.088)
QD1	0.047	0.033	0.036	0.027	0.029
	(0.107)	(0.107)	(0.107)	(0.107)	(0.107)
QD2	0.274**	0.265**	0.269**	0.268**	0.265**
	(0.105)	(0.108)	(0.108)	(0.107)	(0.108)
QD3	0.178*	0.157	0.162	0.127	0.158
	(0.106)	(0.107)	(0.106)	(0.109)	(0.107)
n	752	752	752	752	752
R^2	0.103	0.108	0.108	0.116	0.115

* Significant at $p < 0.1$.
** Significant at $p < 0.05$.
*** Significant at $p < 0.01$.

assessing whether the effect of Facebook marketing campaigns is different for products with high sales (e.g., 75% quantile) versus for products with low sales (e.g., 25% quantile). We apply the quantile regression on the simple DID model (Eq. (1)) as well as the models with product moderations Eqs. (2)–(5). We mainly report effects that are consistently significant (see Table 6). Consistent with the findings from Table 4, the effect of owned social media marketing is significant at all ranges of sales. Products with high structure, high involvement, medium price, and medium length are found to respond to owned social media marketing effectively. In addition, we find that the effect of Facebook marketing is more prominent for products with the low quantile of sales (e.g., $\delta_{10\%} > \delta_{50\%}$).

Other than distinguishing effects by different quantiles of sales, we further explore whether the impact of Facebook marketing changes over months during the post period. From Fig. 2 below, we can see the effect of Facebook marketing monthly average sales over the three post-campaign months ($t = 1$ for the effect of campaigns for at least one month, $t = 2$ for the effect of campaigns for 2 months or more, and $t = 3$ for the effect of campaigns for three months). We note, for models with moderations, we mainly focus on product characteristics that are consistently significant. We find that impact (δ) of Facebook

Table 5
Difference in effect of Facebook marketing among product characteristics.

Level of product characteristic	DID by structure	DID by involvement	DID by price	DID by length
High	0.566***	0.678***	0.249*	0.201
Low	0.261	0.342**	0.172	0.276
Medium	–	–	0.683***	0.717***
Difference	0.306**	0.336**	0.511***	0.516***

The difference is calculated by the largest effect minus the smallest effect.
* Significant at $p < 0.1$.
** Significant at $p < 0.05$.
*** Significant at $p < 0.01$.

Table 6
Effect of Facebook marketing by sales quantiles.

Effect of social media	10% sales	25% sales	50% sales	75% sales	90% sales
DID (δ)	0.625*	0.453**	0.424**	0.361**	0.307*
DID by Structure ($\delta_{structure\text{-}H}$)	0.598*	0.611**	0.468**	0.407**	0.426**
DID by Involvement ($\delta_{structure\text{-}H}$)	0.908**	0.685**	0.656**	0.462**	0.438**
DID by Price ($\delta_{price\text{-}M}$)	0.833**	0.675**	0.665**	0.424**	0.508**
DID by Length ($\delta_{length\text{-}M}$)	0.800**	0.617**	0.713**	0.619**	0.497**

* Significant at $p < 0.1$.
** Significant at $p < 0.05$.

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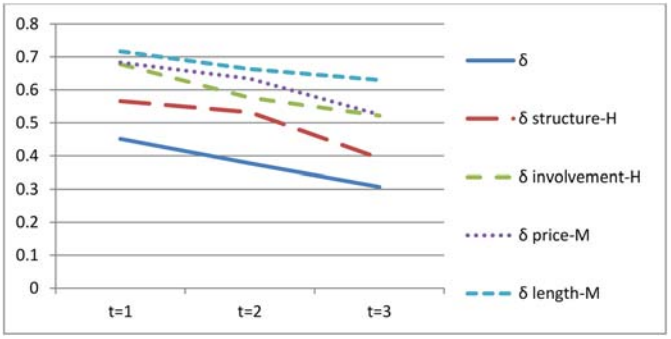

Fig. 2. Effect of Facebook marketing by months.

campaigns on sales is prominent in the first month, and shows a decreasing trend over the following two months. The finding holds not only in the simple DID model, but also the models with the four product characteristics. Furthermore, the four dotted lines are above the solid line (the base case) without intersections, indicating the moderations of the four product characteristics are all positive and significant across the three months. The finding reinforces the average effect in Table 4. In sum, the additional analyses corroborate the findings on the significant product moderators, and also offer potentially useful insights on how effects vary across sales quantiles and campaigns periods.

6. Discussions

As social media represents a two-way communication, Godes et al. [38] and Chung et al. [21] comment that few have examined firms' initiatives in social interactions. Aral et al. [4] further suggest that "how firms should communicate with customers and employees via social media" is one emerging area for research. By highlighting the role of firms' owned social media and its impact, we emphasize that firms can actually transform their role to be more proactive. Our study responds to the call by investigating a firm's efforts through marketing campaigns on its Facebook brand page. By collaborating with a leading travel agency in Taiwan, this study evaluates the effectiveness of Facebook marketing. Using the data of international trips provided by the case company, we find that products with Facebook marketing on average have 45% more sales than products without the aid of Facebook marketing. The results demonstrate that a firm's owned social media is an effective channel for driving product sales.

Aside from the overall impact of marketing campaigns, one relevant question a firm might ask is what types of products being marketed can stimulate the most sales. Our study thus examines the moderating effects of product types. By considering product characteristics when evaluating the impact of a corporate brand page on social media, we emphasize the "fit" issue in social media marketing, thereby complementing and enriching past works. Consistent with the testing of our hypotheses, our findings suggest that social media marketing is more effective when firms promote products that are packaged tours featuring prescheduled sightseeing activities (high structure) and that include spectacular adventure activities (high involvement) to solicit interactions with customers. The results also show that products with a medium price and duration can stimulate more sales. Intuitively, products with a high perceived risk are usually related to further information seeking. Compared to low-priced products, the threshold for a customer to make purchase decisions for medium-price products is higher, and therefore, interactions from the social media platform facilitate purchases and, consequently, the sales of medium-price products. With regard to products with high prices and long durations, information received from a social media campaign may not be sufficient for a customer to make purchases.

In sum, from a firm's standpoint, our findings suggest that marketing campaigns on corporate owned social media might have different results when targeting different products. Furthermore, the design of the campaigns must consider the product features being marketed. Our additional analysis indicates that such moderation effects are robust across different quantiles of sales. Especially, the empirical finding suggests that the moderation effects are more prominent for products with low levels of sales. Accordingly, when choosing product features that fit with Facebook campaigns, managers could allocate more efforts on products with low sales. Not only those products require promotions, but also they can be better improved by Facebook campaigns. In addition to different quantiles of sales, the product moderation effects are further examined over different time periods. The result shows that the moderation effects are consistent higher than the base case in the three months, and the impacts are more effective in the first month than in the third month. It is reasonable that effects of campaigns decay over time. As a firm usually has only one social media administrator, effective time management is critical. The finding suggests the administrator to distribute his/her working time along with the recency of marketing campaigns.

This study also offers practical implications for e-commerce managers of travel agencies. Since our analysis provides empirical support for the use of corporate-owned social media as an effective sales and marketing channel, we suggest that firms actively initiate company-owned pages or accounts (e.g., Twitter account, Facebook brand page) to promote products, build brand awareness, and facilitate peer support and services. Furthermore, managers thus have the ground to justify the e-commerce budget allocation on owned social media. Our exploratory testing on characteristics of travel products also provides a rudimentary guidance on resource allocation to e-commerce managers. As managers always face limited resources, our finding on product priorities help managers to make an informed decision to allocate their limited efforts on social media marketing campaigns.

Due to a lack of research on firms' behavior, Godes et al. [38] propose a research framework on the role that a firm may implement in managing social interactions. Among the four possible strategies, including observer, moderator, mediator, and participant, our research context falls into the type of mediator where a firm plays an active role and can determine what information will be disseminated. Accordingly, the case company builds a Facebook brand page and provides product information through marketing campaigns to involve social interactions with customers. Responding to the research framework, our study examines the effectiveness of the role of mediator using sales of posted marketing campaigns. In addition, with sales of travel products, we examine how a firm as a mediator should determine the selection of product information. Future researchers are encouraged to explore other roles, and enrich the research area on firms' behavior in online social interactions.

From the view of the tourism industry, tourism organizations have increasingly implemented smartness to improve their product and service design, marketing, and customer support. The corporate owned social media community is one of the smartness that tourism firms can take advantage of to enhance their competitiveness. However, past literature in tourism focuses mainly on the general discussion about social media's impact on the tourism industry. Although some research has touched on the use and impact of social media in travelers' planning processes, the discussion focuses mostly on the customer's perspectives of the tourism system. When social media provides tourism firms new ways to reengineer and implement their business models and operations, there are calls for more firm-related research, in particular with regard to social media strategies at both the strategic and tactical levels to ensure that emerging applications are turned to the advantage of tourism firms to enhance their innovation and competitiveness [15]. This research fills gaps in literatures by analyzing how tourism firms should manage their marketing campaigns on their social media brand pages.

Though we have shown due diligence, this study still has several limitations. First, the idea that the quasi-experimental design and DID estimation enables us to evaluate the effect of Facebook marketing on

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sales beyond associations is under one crucial premise: *common trend assumption*. In other words, the treatment and the control groups present the parallel trends, and thus the average change for the treatment group *without treatment* would have been equal to that for the control group. Under this assumption, any deviation from the average change can be attributed to the effect of treatment. When multiple periods before treatment are available, one simple approach to examine the assumption of parallel trends is to visually inspect the pre-treatment time trends between the two groups [41]. Because our data is only in two periods (orders within three months before and after campaigns), we acknowledge that we are unable to directly inspect the assumption. Instead, we partially verify the assumption by ensuring similarity between the treatment and the control groups beforehand. Table 3 shows the mean comparison of the two groups prior to the treatment across various product characteristics, as well as the regression coefficient of the group dummy (γ_1–γ_5) indicates the group difference before the treatment. Both results show no significant difference between the two groups. Therefore, we could expect that the two groups with similar products share the same trends. Other than similarities beforehand, an alternative approach to address non-parallel outcomes between groups is to adjust the treatment effect conditional on observables of group differences. We thus perform propensity score DID [82] to estimate the effect of Facebook marketing after accounting for observed group differences. The estimate is consistent with our original finding though we acknowledge that we have limited observables of group differences. In addition to tackling observed group differences through propensity score DID, DID by construction (differencing) accommodates time-invariant group differences.

The common trend assumption also requires that no exogenous event results in changes of the time trend. In our case, additional promotions run *simultaneously* on the treatment group can lead to changes of the time trend. We have confirmed with the company that the manager only runs Facebook campaigns on the treatment group. In other words, the only outstanding difference between the treatment and the control groups is Facebook marketing. Besides, our experiment period, six months instead of multiple years, is rather short. We could expect or reasonably assume no significant changes in time trends, i.e., *common shocks* on the two groups. Still, we acknowledge that we are unable to exclude the possibility of exogenous events, and are confined by data availability. Last, we perform the permutation test to validate the DID estimate beyond the normality assumption of the error distribution [24,41]. We randomly shuffle the treatment group as "placebo treatment" and perform DID on the placebo treatment. The process is repeated over n permutations. We then have the density function of estimates of the placebo treatment. Under the placebo treatment, we find that the distribution is centered on zero for no causal effect. Furthermore, the real DID estimate is in the right tails of the placebo distribution (see Fig. 3 below). Thus, we can reject the null hypothesis of no treatment effect, i.e., the true DID estimate is equal to the placebo estimate. The above discussion illustrates how we examine the common trend assumption, and validate our research findings. The readers should interpret the research implications with these cautions in mind. Furthermore, the discussion can serve as a simple guidance on caveats of DID estimation, as studies in the IS field tend to focus on the power of the model, but somewhat under-investigate model limitations.

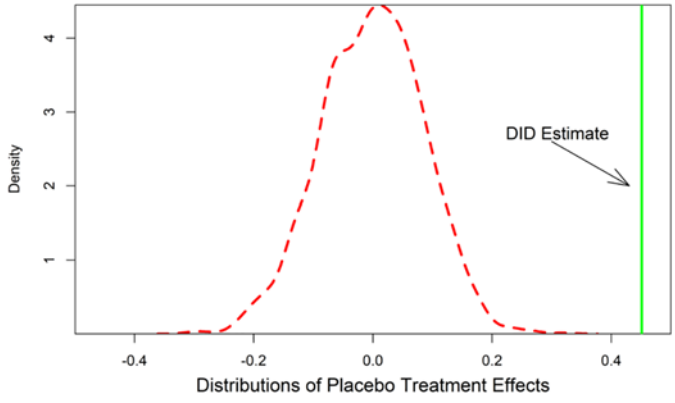

Fig. 3. Distribution of placebo treatment effects.

Other than the limitation of DID, our data are collected in only one case company for 188 products. Findings are derived from the limited data in a two-period experiment. Whether the results can be generalized to other tourism companies and even other countries deserves further research. We note that countries in east Asia like Korea, Japan and even China share similar economic status and cultural background. Researchers can start from those countries, and use our study as the referential point to further evaluate the implications. Aside from data availability, our research context is set on a firm's active role in its owned social media. All the content, despite product variations, are common across customers. However, not all customers are created equal. Rishika et al. [64] state that customers with different characteristics, such as loyalty in terms of purchasing amounts or a customer's focus on a specific type of products, respond to social media activities differently. With data on customer purchase patterns, future researchers can extend from generalized marketing in owned social media to personalized advertising in paid social media platforms (i.e., sponsored advertising network). In sum, our study is merely a starting point to examine a firm's *active* role in online social interactions. We expect researchers, when proper research context and empirical data available, continuously work on the above limitations and hence potential research directions to further extend and accumulate our understanding of online social media.

7. Concluding remarks

As social media are fundamentally changing the way we communicate, collaborate, consume and create, researchers have made various investigations into the relationship among social media, business, and society [4]. Due to the nature of Web 2.0, which emphasizes the idea of collaboration where customers create content and deliver content to others, most prior studies have mainly adopted a customer-centric perspective to explore the usefulness of eWOM and its influence on customer behavior. Among those studies, a majority is performed under the context of earned social media where customers control content generation via blog post and conversations in third-party online communities. The unbalanced number of research on earned social media may have caused an erroneous notion that a firm can only play a passive role. Our study aims to extend the research stream by exploring a firm's active role in its owned social media to post marketing campaigns, and by examining the effectiveness of firms' efforts and the management of product characteristics.

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