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Customer engagement, customer equity and repurchase intention in mobile apps

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ABSTRACT

Our study is among the pioneering group in the mobile application (app) literature investigating customers' repurchase decisions. Given the proliferation of mobile devices and the growing attention paid to social media marketing for facilitating customer engagement with brands, research concerning mobile apps' customer engagement and its consequence still awaits to be developed. Our study, thus, explores how mobile apps' customer engagement via various social media communities influences customer equity (brand, value and relationship equity) and repurchase intention. Based on the survey research using a sample of 485 existing customers of Gogoro – the largest electric scooter company in Taiwan – our study extends recent mobile app and service-dominant logic literature in unpacking the stimulus of repurchase intention towards premium brands. This study used structural equation modelling to test its hypotheses. The empirical findings suggest that mobile apps' customer engagement positively affects customer equity, which further enhances the repurchase intention of existing customers. Our findings reveal that customer equity is a crucial mediator in explaining how repurchase intention is encouraged through the positive impact of mobile apps' customer engagement on brand, value and relationship equity accumulation.

1. Introduction

With the rapid growth of smartphone and mobile application (app) usage, organizations have utilized varied social media and unconventional sales channels to communicate and interact with their customers (Nichols, 2013; Dinsmore, Swani, & Dugan, 2017; Arora, Hofstede, & Mahajan, 2017). Seismic shift in both digitalization via mobile apps and customer engagement through varied social media platforms have created compelling channels for companies to offer effective marketing communication, as a result of better and easier acquisition of user/customer data, and increased efficiency in customer service, virtual teamwork and online transaction processing. Mobile apps are defined as end-user software applications that are designed for a smartphone operating system in which the apps extend the phone's capabilities by enabling users to perform particular tasks, such as information search and social networking (Kim, Lin, & Sung, 2013; Purcell, Entner & Henderson, 2010). Mobile apps trump traditional advertisements in part because customers do not perceive them as advertising; customers value them for their functionality and, therefore, do not find them intrusive (Gupta, 2013).

According to the National Development Council report on mobile phone usage in Taiwan (2019), users utilize 206 mobile minutes every day, and on average, they spend more than 98% of their mobile minutes engaged with social media apps. Recent research reveals that around 4000 new apps are being added each day to the existing 5 million apps (Arora et al., 2017). In addition, Global Digital Report (Kemp, 2019) indicates that the number of active social media users across computer- and mobile-based systems worldwide reached 3.484 billion in 2019, among which 93.45% are mobile app users. In response to these phenomenal trends, service-oriented organizations have recognized the value of mobile apps as ultimate marketing vehicles for building customer engagement with their brands (Alalwan et al., 2020; Watson, McCarthy, & Rowley, 2013). It is suggested that organizations often use text messages, push notifications, content marketing, and user-generated advertising in their mobile apps (Nichols, 2013).

Despite the proliferation of mobile devices and the growing attention paid to social media marketing for facilitating customer engagement with brands (Algharabat, Rana, Alalwan, Baabdullah, & Gupta, 2020; Liu, Shin, & Burns, 2019; Kim et al., 2013), empirical research on this new form of social media customer engagement via mobile apps is limited (e.g., Arora et al., 2017; Dinsmore et al., 2017). Research concerning mobile apps' customer engagement, and its consequences, still

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awaits development. A cursory review of recent mobile apps' research shows that the existing literature can be divided into three general categories, based on different mobile apps' usage in achieving marketing performance. Drawing on free sample conceptualization (Holmes & Lett, 1977), the first group of mobile apps' research focuses on the effect of free apps on the adoption speed of paid apps, providing guidance on whether mobile apps operators should continue to offer their free apps to their customers (e.g., Arora et al., 2017). The findings of this research stream indicate that the practice of offering free versions of paid apps is negatively associated with paid app adoption speed. It is also revealed that the relationship between free version presence and paid app adoption speed is also more significant for hedonic apps and paid apps that are in the later part of their life cycles.

The second group, however, focuses on the mobile apps' purchasing decision (e.g., Dinsmore et al., 2017). Studies in this group have pioneered examined the relationship between personality traits and mobile apps' purchasing tendencies. Their findings suggest that personal traits such as bargain proneness positively influence both mobile app payment and in-app purchases, while frugality negatively influences both mobile app payment and in-app purchases. Research in this group also reports the indirect and mediated effects of extraversion and need for arousal on mobile apps' purchasing tendencies. Studies in the second stream suggest that research on mobile apps should consider the mediating effect in their research conceptualization formulation.

The third steam of mobile apps literature examines the impacts of mobile interactivity dimensions, such as active control, personalization, ubiquitous connectivity, responsiveness and synchronicity, on customer engagement and loyalty (e.g., Alalwan et al., 2020). This recent research on mobile shopping indicates the key mediating role played by customer engagement in associating mobile interactivity with customer loyalty. Though useful, one common limitation of the prior literature is the lack of guidance on the repurchase decision (Arora et al., 2017). We contend that repurchase intention is vital in the mobile apps' research because this decision is a key measurement of successful mobile apps' utilization. In a highly competitive mobile apps industry, companies cannot develop sustainable operations based only on customers' single purchase transaction but rather relying on their repeat purchases and an enduring bond to the brands (Barney, 1991).

To achieve this objective, we theorize that understanding the antecedents of repurchase intention for premium brands is particularly important because their products or services are not often linked with transactional benefits, such as lower price or minimized customer switching costs, but rather being associated with customer equity, which is the discounted sum of perceived customer lifetime values throughout the relationship exchanges (Alavijeh, Esmasili, Sepahvand, & Davidaviciene, 2018; Kim & Ko, 2012; Kumar & George, 2007). In this study we endeavor to investigate how a branded product and service provider utilizes mobile apps to constantly stimulate customer engagement and enhance customer equity towards repurchase intention.

Our study offers a number of contributions and new insights to the marketing literature. First, we augment the outcome variables of existing mobile apps' research through the inclusion of outputs such as speed of adoption and purchase decision to the repurchase intention (e.g., Arora et al., 2017; Dinsmore et al., 2017). This new conceptualization significantly broadens the existing research scope of mobile apps in social media marketing. Our findings posit repurchase intention as one of the critical measurements of mobile apps' adoption in marketing performance. Second, our study offers contributions to mobile apps' literature by exploring the full mediation effect of customer equity in linking customer engagement with repurchase intention. Other than personal traits (Dinsmore et al., 2017) focusing on individual customer preferences towards the branded mobile apps, our study highlights the importance of customer engagement via mobile apps and its positive effects on customer equity through value, brand, and relationship aspects in enhancing repurchase intention. Our findings suggest that the repurchase intention of individual customers is encouraged by their perceived customer equity accumulated through the interactions with the brand and with other customers via various social media mobile apps.

Lastly, our study adds new insights to the service-dominant logic theorization by linking customer engagement to customer equity (Vargo & Lusch, 2017). Though recent customer equity research brings together customer value management, brand management and relationship/retention management (e.g., Algharabat et al., 2020; Chae & Ko, 2016; Rust, Lemon, & Zeithaml, 2004), the linkages among marketing inputs, customer equity, and customer engagement, intention and behaviors towards a brand/firm are still unknown. By utilizing the customer equity model framework (e.g., Romero & Yague, 2015; Rust, Zeithaml & Lemon, 2000), our study postulates and investigates the underlying mechanisms between mobile apps' customer engagement and customer equity. In particular, our study reveals and explains how such integration would promote the repurchase intention towards premium brands. By providing a possible linkage between marketing actions (i.e., mobile apps' customer engagement) and customer actions (i.e., repurchase intention) (via customer equity), our study extends the current knowledge of customer engagement and its impact on repurchase intention (Chae & Ko, 2016; Rust et al., 2004). Our study offers new guidance on how firms should consider appropriate social media marketing programs via mobile apps to enhance their customer value, brand and relationship management because these enhancements would increase the repurchase intention of the existing customers (Arora et al., 2017; Dinsmore et al., 2017; Simon, 2016).

Our paper is organized as below. We commence with the theoretical background and hypotheses development. We then present our research methodology and research results. The conclusion and implications of our study are presented next. Our limitations and directions for future research are discussed in the final section. Fig. 1 depicts the conceptual model.

2. Theoretical framework and hypotheses

2.1. Dimensions of customer equity: value, brand, and relationship

As service-dominant logic emphasizes value is cocreated by multi-actors in service exchange contexts (Vargo & Lusch, 2017), the concepts of customer lifetime value (CLV) have taken hold in marketing literature in recent years. CLV has been a practical tool to measure marketing performance and business success (Gupta et al., 2006). As a critical extension of the CLV concept, customer equity is defined as the discounted lifetime values from all customers (Rust et al., 2000), and consists of value equity, brand equity and relationship equity (Kim, Kim, & Hwang, 2020). Customer equity has been conceptualized as a strategic framework that links customers and businesses, creating new sources of revenue as an alternative, emerging strategic guideline for better marketing performance (Lemon, Rust, & Zeithaml, 2001). In today's competitive business environment, including e-commerce or mobile commerce, in which customer engagement has become a norm in marketing processes, customer equity certainly plays a crucial role in determining the survival of a firm (Kim et al., 2020). Recognizing it as a core strategic asset, we propose customer equity as a key mediator of mobile apps' customer engagement in influencing repurchase intention towards a premium brand.

In this study, we apply Lemon et al. (2001) conceptualization on customer equity and classify it into value, brand, and relationship dimensions. Value equity represents an objective appraisal of the brand, including recognition of price, quality and convenience (Kim et al., 2020). Brand equity, on the other hand, is concerned with the subjective appraisal of the brand, including brand awareness and attitude towards the brand (Aaker, 1991; Keller, 1993, 2003). Relationship equity as the third leg of customer equity concept includes special relationship elements that link brands and customers (Rust et al., 2004).

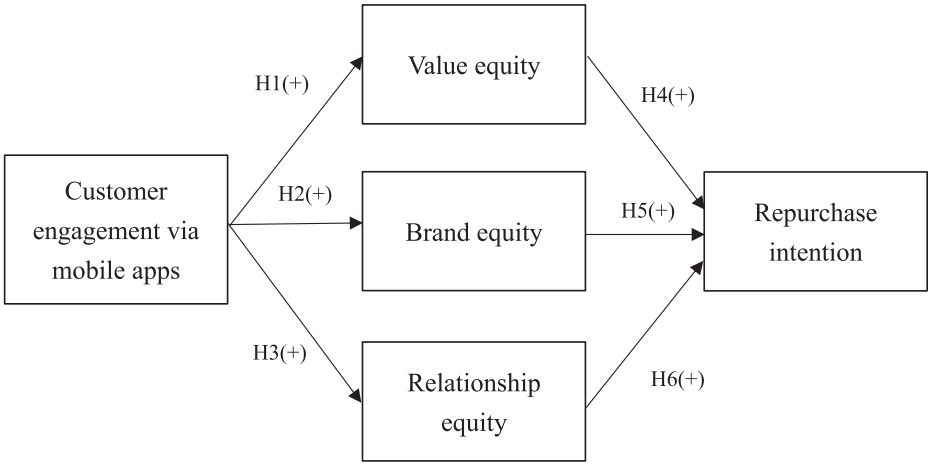

Fig. 1. The conceptual model.

Deriving from value creation based on profit, cost, customers and customer relationships (Wang, Kim, Ko, & Liu, 2016), customer equity overall as a value comes out in the course of keeping lifetime relations with customers on a basis that the lifetime value of a customer is added to the present value of the customer (Blattberg & Deighton, 1996). With the focus on long-term profitability in place of sales, we can expect a tight association between customer equity and firm value (Hogan et al., 2002).

2.2. Mobile apps customer engagement and its effects on customer equity

Customer engagement refers to "customers' behavioral manifestation towards a brand or firm, beyond purchase, resulting from their motivational drivers" (Van Doorn et al., 2010, p. 253). A customer's value equity, on the other hand, denotes the customer's objective assessment of the utility (quality, price and convenience) of a brand/firm, based on the perception of what is given up for what is received (Lemon et al., 2001). According to the service-dominant logic conceptualization, customer value is created by the nature and level of customer engagement with the service organization. Customer engagement consists of a vast array of online and offline activities which may influence customers' consumption intention (Balaji, Jha, Sengupta, & Krishnan, 2018; Viswanathan, Malthouse, Maslowska, Hoornaert, & Den Poel, 2018). Prior literature theorizes that customer engagement has various consequences for different stakeholders including the focal customers, the focal brand/firm, business partners and other constituents, such as customers of other products or brands (Van Doorn et al., 2010). We posit that such influences also exist within the context of mobile media. A number of factors may foster this relationship.

First, with the upsurge of social media customer engagement via mobile apps, brands/firms and customers are working together to create new products, services, business models and values. This two-way mobile marketing communication has increasingly become an indispensable resource for customer decision-making. It has strengthened the brand-customer relationship. It has also enforced the familiar emotions associated with existing brands and elevated brand values by creating a variety of social media platforms to exchange ideas and information among focal and fellow customers (Kim & Ko, 2012; Kim et al., 2013; Pentina, Guilloux, & Micu, 2018). Thus, it is expected that customer engagement has a positive effect on customer equity in mobile apps.

Second, customers can interact with, and create value for, firms via mobile apps that are beyond direct transactions (e.g., e-word-of-mouth, eWOM marketing) because mobile apps can provide new product/service ideas advice through social media platforms. Literature shows that premium brands such as Dolce & Gabbana, Chanel and Louis Vuitton have used mobile apps and social media to obtain direct feedback from their customers (Liu et al., 2019). It is reported that premium brands often invite key opinion leaders (KOLs) to write influential reviews and posts about their products and services, encouraging brand engagement and interactions with focal and fellow customers. As such, changes in consumer behavior have made firms rethink their marketing strategies in the digital domain (Tiago & Verissimo, 2014). Through mobile apps' customer engagement across varied social media platforms, customers' value equity will be promoted. As the value a customer brings to a firm is related to the total profit the customer may provide over the duration of the relationship with the firm (Kumar & George, 2007), value equity becomes the keystone of the brand-customer relationship development and maintenance. Hence,

> ***Hypothesis 1:*** *Perceived mobile apps' customer engagement has a positive effect on value equity.*

Further, the very act of mobile apps' customer engagement may also have a potential to enhance brand equity. A brand's equity is concerned with the customer's subjective and intangible assessment of the brand (Lemon et al., 2001). Organizations can retain existing customers through reminding them about the firm's products and services and creating emotional ties to the firm (Lemon et al., 2001). When a brand utilizes social media marketing via mobile apps to connect to its customers, brand communities' alignment in mobile media is formed (Zaglia, 2013; Zhou, Zhang, Su, & Zhou, 2012). Within such brand communities across social media platforms, the mobile members/ users can share information, and discuss and evaluate a brand's/firm's products and services. Based on the social exchange theory (e.g., Jin, Park, & Kim, 2010), a brand community with high interactivity can better meet member/user needs for social and hedonic benefits (Kuo & Feng, 2013). As a result, these benefits become the driver of future member/user participation in the brand community (Nambisan & Baron, 2009).

While value equity is driven by perceptions of objective aspects of a firm's offerings, brand equity is associated with the customer's subjective and intangible assessment of the brand (Lemon et al., 2001). Brands not only identify goods and services, but also summarize useful information for markets (Romero & Yague, 2015). Brand management incorporates several types of elements, such as product/service information, brand awareness, brand association and brand loyalty, among other aspects (Aaker, 1991; Keller, 1993, 2003). With growing mobile apps customer engagement across social media platforms, it is expected that the connection between customers and brands will become more solid and stronger. This relationship will further result in positive brand images and increased brand awareness. This view is supported in the extant literature. For instance, Park and Lee (2008)

suggested that the creation of eWOM and the volume of eWOM can signal product/service popularity and enhance consumers' brand awareness. Elsewhere, consumers' trust toward, and certainty in, brands is associated with their opinions expressed towards the service provider (Wang, Lu, Chi, & Shi, 2015). Paralleling to this discussion, we therefore propose:

Hypothesis 2: *Perceived mobile apps customer engagement has a positive effect on brand equity*.

Finally, mobile apps customer engagement has the potential to create and improve customers' relationship with the brand. A relationship equity represents the tendency of the customer to stick with the brand, above and beyond the customer's objective and subjective assessments of the brand (Lemon et al., 2001). Given the significant shifts in the new economy – from goods to services, from transactions to relationships, great value equity and brand equity may not be enough to hold customers (Lemon et al., 2001). In response, firms have extensively connected with and engaged their customers through mobile apps' powerful, multidimensional platforms that allow individuals to build, maintain and exhibit a strong brand-customer social networking relationship. As mobile apps' technology merges with social media marketing, a more collaborative and network-focused approach to managing brand-customer relationships has emerged (Kim & Ko, 2012; Trainor, Andzulis, Rapp, & Agnihotri, 2014).

Relationship equity is vital when firms have the opportunity to create learning relationships with customers. When brands gain exposure and strengthen their customer relationships through social media platforms in mobile apps, firms and customers can work together to create new products, services, business models and values with the benefits of precision marketing (Zabin & Brebach, 2004). Mobile apps customer engagement can not only reinforce the familiar emotions customers associate with certain brands (e.g., allowing customers to empathize with celebrity endorsers), but also elevate brand value by creating a vast platform for users to exchange ideas and information. All of this is reflected by the increased relationship equity. Extant research provides evidence on this relationship. For example, Gamboa and Gonçalves (2014) found that being a brand fan of Facebook means individuals are engaged more frequently with the platform. This relationship helps foster a higher customer loyalty. Similarly, in a study on online gaming, Kawale, Pal, and Srivastava (2009) reported that customer engagement, as measured by time spent in a game, is positively linked to the churn of gamers. Taking these points together,

Hypothesis 3: *Perceived mobile apps customer engagement has a positive effect on relationship equity*.

2.3. Customer equity as the driver of repurchase intention

In the contemporary digital world, firms use the worldwide Internet cloud to reach customers in a variety of ways. Given the multidimensional accessibility to customers, firms often face basic challenges regarding how to acquire and retain customers, especially those engaged in mobile commerce. In general, mobile commerce customer management can be realized in two phases. The first phase is primarily concerned with encouraging mobile users to make impulsive purchases, and, thus, transactional benefits (e.g., Kim, Galliers, Shin, Ryoo, & Kim, 2012), such as interface quality, effective mobile apps design, or perceived value, are the key factors in explaining customer purchase intentions and actions. The second phase of mobile commerce is to encourage existing customers to repurchase, in which relational factors – relationship quality or trust (e.g., Chiu, Chang, Cheng, & Fang, 2009; Zhang et al., 2011) – may dominant the repurchase decision-making. We believe that the second phase objective is critical to mobile apps operators' ongoing and substantive operation (Barney, 1991; Chung, Ding, & Ma, 2019). Given that customers' repurchase is critical for sustaining firms' growth and profitability (Barney, 1991), a holistic conceptualization on the antecedents of repurchase intention in the context of mobile commerce is scarce (Arora et al., 2017). Based on the customer equity model (Lemon et al., 2001), where customer equity is theorized to be critical in explaining a firm's long-term success, our study postulates that both perceived transactional (value equity) and relational factors (brand equity and relationship equity) are important explanatory drivers of the repurchase intention derived from mobile apps customer engagement. We focus on the value equity first, followed by brand equity and relationship equity.

A valuable exchange is an important premise of business transactions in both online and offline environments. As customers' objective assessment on the transactional benefits of a brand (e.g., quality, price or convenience) is the basis to activate both purchase and repurchase intentions, a growing body of empirical studies have identified customers' perceived value – the perception of what are the expected gains and losses – as the core construct in the repurchase process (e.g., Holbrook, 1994; Kim et al., 2012). Sirdeshmukh, Singh, and Sabol (2002) proposed value as the superordinate consumer goal in the relationship exchange, while Wu, Cheng, and Ai (2016) postulated that customers' perceived value positively affects their repurchasing intentions. From the e-commerce perspective, Kim et al. (2012) found that customers' intention to repurchase is largely driven by utilitarian shopping value, the degree to which consumers felt their shopping goals have been accomplished and hedonic shopping value, which is the fun and excitement of the shopping experience.

In the context of mobile commerce, McLean, Al-Nabhani, and Wilson (2018) highlighted the utilitarian factors, such as timeliness, customization, convenience, enjoyment and ease of use, in driving effective customer experience. Consistent with the extant literature, empirical firms offer evidence on employing discount promotions (e.g., no shipping charge, coupons, or buy-one-get-one free), complementary services (e.g., express check-out, multiple devilry services, or artificial intelligence chat robot), and other incentives (e.g., diverse payment choices) to deliver superior customer value and promote repurchase intention. In line with the assertions in the prior studies, we propose that value equity accumulated by customers through their own experiences and interactions with the brand and fellow customers across mobile apps is likely to positively influence their intentions to repurchase the firms' offerings.

Hypothesis 4: *Perceived value equity has a positive effect on repurchase intention*.

In addition to the objective perceived value, customers' subjective and intangible assessment of a brand, including brand awareness and attitudes towards the brand (Lemon et al., 2001), also acts as a crucial factor in explaining the repurchase intention. To enhance brand equity in mobile commerce, firms usually apply a variety of marketing communication tools, such as social media posts, blogging or cooperation with KOLs, in order to create and maintain close connections or emotional ties with their customers. For example, Katsileas, Morgan, Leonidou, and Hult (2016) found a positive relationship between the number of target customers who are aware of the firm's marketing program and the number of repurchase selection decisions favoring the firm. By echoing this view, Viswanathan et al. (2018) found that online customer engagement such as viewers' posts on social media can affect consumer attitudes and repurchase behaviors towards TV viewing patterns.

However, given the intuitive association between customer engagement and repurchase intention as stated in the prior studies (Hume & Mort, 2010; Pansari & Kumar, 2017), it is possible that a customer does not make a purchase even if he/she actively engages in mobile apps. Typically, a mobile user's brand equity is affected by his/her engagement in social media or branded mobile apps, such as referral programs (e.g., eWOM), and actions aimed at generating and

disseminating information. This indicates that a customer's repurchase intention is not only derived from his/her own experience but is also linked to content from those people who have yet to purchase any product/service from the firm. For example, a customer's repurchase intention may be influenced by the active social media voicers or KOLs. The active social media voicers or KOLs often express their comments on certain brands (voluntarily or paid by the firm) with positive marketing consequences. This phenomenon is particularly evident in mobile commerce, where company offerings are mainly digitalized information, and the users' perception towards a brand is mainly driven by the customer engagement data available on various social media platforms. As a result, we posit a positive linkage of perceived brand equity and customers' repurchase intention.

***Hypothesis 5**: Perceived brand equity has a positive effect on repurchase intention.*

Lastly, as relationships are a crucial enabling factor in every business transaction, we expect that relationship equity accumulated by mobile users through the interaction with the brand in social media platforms also enhances their repurchase intentions. In the digitalized business environment, experienced firms have realized that the key success factors in mobile commerce are not merely concerned with transactional benefits but rather delivering a high service quality to create stickiness with the customers (Zeithaml, Parasuraman & Malhorta, 2002). The service quality via mobile apps represents the relationship equity that conveys the trustworthiness of the brand to customers (Corritore, Kracher & Wiedenbeck, 2003). Relational equity, such as perceived relationship quality and trust, are particularly important in mobile commerce, where uncertainty, information asymmetry and fear of opportunism exist (Chiu et al., 2009; Zhang et al., 2011). The key layers of relationship equity include special recognition and treatment, and a variety of loyalty, affinity community-building programs and knowledge-building programs that are controlled and managed by the firm.

Relationship equity will become most critical to a firm when the benefits customers associate with the firm's loyalty program are significantly greater than the actual cash value of the benefits received. Such aspirational value of a loyalty program presents a solid opportunity for firms to strengthen relationship equity by creating a strong incentive for the customer to return to the firm for future purchases (Lemon et al., 2001). This is also supported by Raimondo, Miceli and Costabile (2008), whose study found that relational equity, in highly competitive and clear situations, is a determinant of customer loyalty. This effect of relational equity on future purchases increases with the age of the relationship.

Customers often have limited information and cognitive resources available in mobile commerce and, therefore, seek to reduce the uncertainty and complexity of online transactions by applying mental shortcuts (Grabner-Kraeuter, 2002). One effective mental shortcut is the relationship equity that customers have accumulated from their mobile apps' engagement with the brand and fellow customers, reducing undesirable opportunistic behavior. Minimizing the barriers associating with undesirable opportunistic behavior will stimulate customers' intentions to repurchase the firm's offerings. Thus,

***Hypothesis 6**: Perceived relationship equity has a positive effect on repurchase intention.*

3. Research methodology

3.1. Research context and data collection

This study aims to investigate how mobile apps' customer engagement via various social media communities influence customer equity (brand, value, and relationship equity) and repurchase intention. To attain this outcome, our study relies on the customer perception and experience towards a leading Taiwanese electric scooter brand – Gogoro. Founded in 2011, Gogoro, as a venture-based company, has dramatically changed the landscape for the scooter industry worldwide by launching electric scooters and battery swapping infrastructure. While the traditional combustion engines segment of the two-wheeler industry has been falling in Taiwan, electric vehicles supported by a robust government incentive scheme have been booming, with the local brand Gogoro jumping to fourth place with over 50,000 sales, and an up to 30% increase, since 2018 (MotorCycles Data, 2019). In addition to the branded apps – Gogoro Network, Gogoro and GoShare – the electric scooter company has actively promoted its brand and facilitated interaction with focal and fellow customers via various social media platforms. It has an official fan page with 240,000 followers and unofficial Facebook groups gathering over 110,000 members.

As social media enables customers to be more connected in dynamic new ways, a substantial part of customer engagement occurs in mobile apps that represent "groups of Internet (smartphone)-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user generated content" (Kaplan & Haenlein, 2010, 61). The target population of the survey research was Gogoro owners who participate in the brand's official or unofficial social media communities in mobile apps. In particular, this study focused on Gogoro App users. The Gogoro App, as a branded mobile app developed by the firm, not only allows on-board systems to notify the scooter owner of important information but also offers the owner options to personalize the scooter or inquire about its condition, such as battery levels, locations of battery swap stations, diagnostics and customization of the scooter, and many more features. In addition to its personalized interfaces that serve and seize existing customers, Gogoro App has extended functions that link with a wide range of social media platforms, including Line, WeChat, Facebook, Instagram and Twitter. In this regard, the firm can easily reach out and create a relationship with new and potential customers who are interested in its branded app. This community triangle (Muniz and O'Guinn, 2001) via mobile apps can inspire customer engagement, linking the brand with its existing customers, who can also connect with each other, as well as reaching non-customers.

Within the one-week data collection period in early May 2019, we received 537 web-based questionnaires across Gogoro Facebook groups, Line chat groups, and its branded mobile apps. Disregarding the questionnaires with incomplete answers, a total of 485 valid responses were finalized. As shown in Table 1, the sample characteristics reveal that although the percentage of male mobile apps users (54.02%) is slightly higher than female users (45.98%), the majority of users are aged between 18 and 38, accounting for more than 80% of the total sample. In line with this finding, more than 75% of mobile app users have university degrees. Interestingly, all mobile apps users are Gogoro's loyal customers, in that more than 76% of them have purchased more than 2 scooters from the firm. Given that they are rather new to the brand (79% of the mobile users purchased Gogoro scooters less than a year beforehand), about 93% of mobile apps' users perceived Gogoro scooters as their main vehicle in daily commutes.

3.2. Variables and measures

We used five-point Likert-scale survey research (1 = strongly disagree; 5 = strongly agree) to examine the underlying measures of the proposed constructs. Adapting this method from prior studies (e.g., Chiu et al., 2009; Kim et al., 2012; Tsai & Huang, 2007) on repurchase intention, we operationalized this dependent variable as 4-item measures with respect to examining the extent to which Gogoro users are willing to repurchase the brand's offerings (Table 1). In terms of independent variables (Table 1), we examined mobile apps' customer engagement via social media platforms in a thirteen-item Likert-scale, in which the questions are mainly concerned with customer experience

Table 1
Sample Characteristics.

Sample Characteristics	n	%
Gender		
Male	262	54.02
Female	223	45.98
Age		
18–24	123	25.36
24–31	142	29.28
32–38	130	26.80
39–45	63	12.99
45 above	27	5.57
Highest education degree		
Senior high school	114	23.51
University	323	66.60
Postgraduate	45	9.30
PhD	3	0.59
Number of scooters		
1	116	23.92
2	183	37.73
More than 3	186	38.35
Gogoro as main vehicle		
Yes	450	92.78
No	35	7.22
Year of Gogoro users		
Less than 1	174	35.87
1	210	43.30
2	87	17.94
3 and above	14	2.89

and engagement behaviors in social media mobile apps (Kim & Ko, 2012; Kuo & Feng, 2013; Vivek, Beatty, & Morgan, 2012).

Based on Lemon et al. (2001) conceptualization on customer equity, we measured it as a multi-dimensional contract in explaining the varied levels of customer perception towards a firm's value, brand, and relationship developments through the mobile apps (e.g., Alavijeh et al., 2018; Kim & Ko, 2012). Specifically, we operationalized value equity as five-item measures by examining the extent to which a customer attains product knowledge, information, technical help and other consultation services, as well as resolving problems by the means of social media mobile apps (Kuo & Feng, 2013; Kim & Ko, 2012). We also assessed brand equity as five-item measures in investigating the customer's awareness, images and preferences towards a brand via social media mobile apps (Aaker, 1991). Finally, in this five-item scale setting, we measured relationship equity as the extent to which a customer perceives the relationship and interactions with a brand via its mobile apps (Vivek et al., 2012).

We further included five items of control variables to capture the impact of gender, age, education background, scooters owned previously, and the number of Gogoro scooters owned in order to better understand the research target background and different opinions in the study. To examine whether these control variables determined the repurchase intention behavior, we ran a preliminary analysis of variance (ANOVA) via SPSS and the multigroup structural equation modelling analysis (Table 4), and found that the statistical results have no significant differences ($p < .05$); thus, we withdrew the consideration of control variables from our model.

4. Results

We employed standard scale development procedures (MacKenzie, Podsakoff, & Podsakoff, 2011) to adapt existing measures of constructs from previous studies to ensure construct validity. As presented in Table 2, the statistical results exhibited robust composite reliability and convergent validity, because all measures possessed significant factor loadings ($p < .5$) related to their underlying constructs, with the Cronbach's Alpha values ranging from 0.89 to 0.95, and the average variance extracted (AVE) values higher than the threshold value of 0.5. Model fit indices suggest that the data fit the measurement model well ($X^2 = 236.10$, df = 146; CFI = 0.95; RMSEA = 0.06). Though a RMSEA value less than or equal to 0.05 is considered acceptable, a value of 0.05 to 0.08 indicates a good model fit (Schumacker & Lomax, 2010). While each latent construct should be strongly reflected by the assigned measures, they should not have a stronger correlation with any other constructs in the model. Otherwise, it would imply that the construct might not be conceptually different from others by reason of sharing the same types of measures. To examine the discriminant validity of each construct, this research follows the practice of the extant literature by comparing the square root of the shared variance and the construct correlations (Chin, 2010). A construct possesses discriminant validity when the shared variance between the construct and the assigned measures is larger than the variance shared with other constructs. Table 3 indicates that all constructs proposed in this research have discriminant validity because their correlations with others do not demonstrate larger values than the square root of their own shared variances.

To test the hypotheses, this study used structural equation modelling analyses. The parameter estimates and goodness-of-fit indicators of the model are summarized in Table 4. Although the chi-square statistic is significant ($X^2 = 81.42$, $df = 36$; $p < 0.05$), the sufficiently low ratio of chi-square to degrees of freedom (2.26 less than 3) yields a satisfactory fit (Hair, Hult, Ringle, & Sarstedt, 2014). Moreover, the overall goodness-of-fit indices report a good fit for the structural model (i.e. CFI = 0.95; NFI = 0.95; IFI = 0.96; RMSEA = 0.06). To test the significance of the mediating effect in the structural model, we applied Shrout and Bolger (2002) approach with a bootstrapping method based on a resampling number of 5000 (Hayes, 2009). Together, the hypothesized model is a reasonable representation of the data (Schreiber, Nora, Stage, Barlow, & King, 2006).

The parameter estimates in Table 4 indicate that increased mobile apps' customer engagement in social media platforms are positively associated with customer equity in terms of value, relationship and brand developments. These results support H1, H2 and H3. Additionally, the insignificant statistical relationship between mobile apps' customer engagement and repurchase intention confirms the positive, full mediation effect of customer equity across value, relationship and brand dimensions. Finally, our findings reveal that customer equity across value, relationship and brand developments positively affects the repurchase intention. These results confirm H4, H5 and H6. Collectively, our results suggest that although mobile apps' customer engagement does not directly influence customers' repurchase intention, it is a focal antecedent of customer equity, which further determines the repurchase intension of customers.

5. Discussion and conclusions

Our research integrates the service-dominant logic perspective, customer engagement and customer equity to explain the repurchase decision for mobile apps in an emerging market. In particular, our study shows the importance of customer engagement in customer equity and the repurchase decision. The findings of our study provide theoretical and managerial implications.

5.1. Theoretical implications

Our study's findings add a new mediation theoretical framework to the existing mobile apps literature (Alalwan et al., 2020; Arora et al., 2017; Dinsmore et al., 2017). This new insight advances those studies that only explore the effect of customer engagement and purchase decision performance in their research scope (e.g., Dinsmore et al., 2017; Liu et al., 2019; Kim et al., 2013). Among the earlier attempts, our study reveals that customer engagement in social media platforms is a useful explanatory factor for customer equity. We also highlight the effect of customer equity on the repurchase intention. This path model

Table 2
Confirmatory factor analysis on measures.

Construct/Measures	λ	T-value	α	AVE
Mobile apps customer engagement (MA)			0.94	0.58
MA1: Using Gogoro's mobile apps is fun.	0.83	43.55		
MA2: Anything on mobile apps related to Gogoro grabs my attention.	0.75	35.87		
MA3: Contents shown in Gogoro's mobile apps seem interesting.	0.79	43.67		
MA4: Gogoro's mobile apps enables information sharing with others.	0.72	23.23		
MA5: Conversation or opinion exchange with others is possible through Gogoro's mobile apps.	0.76	27.76		
MA6: It is easy to deliver my opinion through Gogoro's mobile apps.	0.75	28.10		
MA7: I can usually get quick responses to any idea I post in Gogoro's mobile apps.	0.78	32.55		
MA8: Contents shown in Gogoro's mobile apps is the newest information.	0.71	24.36		
MA9: Using Gogoro's mobile apps is very trendy.	0.74	27.39		
MA10: Gogoro's mobile apps offers customized service.	0.76	28.25		
MA11: Gogoro's mobile apps offers customized information search.	0.78	31.31		
MA12: I would like to pass along information on brand, product, or services from Gogoro's mobile apps to my friends.	0.78	27.38		
MA13: I enjoy spending time on browsing Gogoro's mobile apps contents.	0.76	33.79		
Value equity (VE)			0.92	0.76
VE1: The Gogoro's mobile apps allows me to increase my knowledge about particular products or usage of the products.	0.70	62.08		
VE2: The Gogoro's mobile apps helps me solve problems associated with product use.	0.78	39.84		
VE3: The Gogoro's mobile apps helps increase my understanding of particular products, accessories, components, and technical development of the products.	0.86	48.09		
VE4: The contents of Gogoro's mobile apps give me product/ service information that is relevant to my needs.	0.83	70.44		
VE5: The contents of Gogoro's mobile apps help me make good purchase decisions.	0.73	51.94		
Relationship equity (RE)			0.95	0.82
RE1: I can make friends with people sharing common interests with me in Gogoro's mobile apps.	0.74	77.76		
RE2: Gogoro's mobile apps helps strengthen my connections with other members.	0.83	125.78		
RE3: I can expand my social network through participation in Gogoro's mobile apps.	0.87	85.41		
RE4: I can have close and intensive interactions with other members of Gogoro's mobile apps.	0.88	112.75		
RE5: I am able to assist other members in mobile apps activities held by Gogoro.	0.84	43.17		
Brand equity (BE)			0.89	0.67
BE1: I recognize Gogoro is the leading brand in electronic scooter industry.	0.82	36.24		
BE2: I recognize Gogoro brand has its personality.	0.83	45.19		
BE3: I have a clear image of the type of customers who would purchase Gogoro's products.	0.72	23.90		
BE4: I know what Gogoro brand stands for.	0.78	37.44		
BE5: Gogoro is my preferred brand.	0.81	39.96		
Repurchase Intention (RI)			0.91	0.78
RI1: I intend to continue purchasing Gogoro's products, accessories, and components in the future.	0.89	61.13		
RI2: I would like to recommend Gogoro's products, accessories, and components to others, even if they are the existing customers.	0.84	56.00		
RI3: I look forward to the new product launches by Gogoro and its associated suppliers.	0.88	43.88		
RI4: I would like to have the first-hand information about Gogoro's new products, accessories, and components.	0.86	65.62		

Table 3
Construct Correlations and Discriminant Validity.

Construct	Mean	S.D.	MA	VE	SE	BE	RI
Mobile apps customer engagement (MA)	3.95	0.87	**0.76**				
Value Equity (VE)	4.12	0.79	0.49	**0.87**			
Relationship Equity (RE)	3.94	0.88	0.52	0.62	**0.91**		
Brand Equity (BE)	4.29	0.78	0.56	0.57	0.53	**0.82**	
Repurchase Intention (RI)	4.22	0.84	0.58	0.62	0.58	0.61	**0.88**

Note: Diagonal terms (in bold) are square root of the average variance extracted. Off-diagonal terms are the correlation of latent constructs.

Table 4
Structural Parameter Estimates and Model Fit Indices.

Paths	Standard coefficient	T-value
Mobile apps customer engagement → Value equity (H1)	0.39***	22.54
Mobile apps customer engagement → Relationship equity (H2)	0.42***	28.53
Mobile apps customer engagement → Brand equity (H3)	0.36***	21.17
Mobile apps customer engagement → Repurchase intention	0.07	1.09
Value equity → Repurchase intention (H4)	0.25***	12.44
Relationship equity → Repurchase intention (H5)	0.23***	10.50
Brand equity → Repurchase intention (H6)	0.43***	32.72
Control variables:		
Gender	−0.05	0.97
Age	−0.01	0.35
Education background	−0.07	1.28
Number of scooters owned	−0.01	0.20
Number of owned Gogoro	−0.02	0.41

Note: Model fit indices: Satorra–Bentler-scaled: $X^2 = (36) = 81.42$; $p < .05$; N = 485. Comparative Fit Index (CFI) = 0.95; Normed Fit Index (NFI) = 0.95; Bollen Fit Index (IFI) = 0.96; Root Mean-Square Error of Approximation (RMSEA) = 0.06.
*: $p < .05$, **: $p < .01$; ***: p less than 0.001.

suggests that firms need to consider customer engagement and customer equity together so that a superior repurchase intention can be obtained. It is concluded that the elements of customer engagement, customer equity and repurchase intention need to be integrated together so that their composite effect can be obtained in the mobile apps sectors. Our study has established a number of key theoretical implications for the extant literature.

Firstly, our research extends previous studies that have mainly focused on the mobile apps' purchasing decision and customer loyalty (e.g., Alalwan et al., 2020; Dinsmore et al., 2017). Our study enhances this stream of the research by providing a new conceptualization, in that firms should consider the effect of customer engagement in customer equity and the repurchase decision. We successfully expand the extant *purchasing* decision framework to the *repurchase* decision

conceptualization. Our new conceptualization provides theoretical guidance on how mobile apps' operators should use their customer engagement in achieving customer equity and the repurchase decision. This is an important step forward in mobile apps research, as mobile apps sectors are highly competitive and firms can be successful on a continual basis only when they focus on repeat purchases (Arora et al., 2017; Dinsmore et al., 2017).

Secondly, our study reveals the mediation effect of customer equity. This new result significantly enhances the extant research that aims to uncover the mediation factors (e.g., personal traits, customer engagement) in mobile apps research (e.g., Alalwan et al., 2020; Dinsmore et al., 2017). Our study confirms that future mobile apps research should consider the mediation role of customer equity in their research design, in addition to those aspects already revealed in the literature. For example, based on our study's findings, research can explore the mediation effect of customer engagement and customer equity within a conceptualization. In this conceptualization, research can investigate and justify whether they have a similar or different extent of influence on the outcome variables (e.g., purchasing/repurchasing decisions), in the mobile apps research. Research can also further explore when and how the mediation effect of customer equity performs in a different research context – e.g., free apps vs paid apps (Arora et al., 2017). Accordingly, our study provides new research directions and simulations for future research.

Lastly, our research successfully adds new theoretical insights to the service-dominant logic theorization by integrating customer engagement with customer equity conceptualization (Vargo & Lusch, 2017). By employing the customer equity model framework (e.g., Rust et al., 2000), our study postulates and reveals the underlying mechanisms between mobile apps customer engagement and customer equity. More importantly, our study shows how the integration of both groups of theoretical conceptualization can result in the repurchase intention process. By revealing a new theoretical linkage between marketing actions (i.e., mobile apps' customer engagement) and customer actions (i.e., repurchase intention) (via customer equity), our study advances the existing knowledge of customer engagement and customer equity (Chae & Ko, 2016; Rust et al., 2004). Consequently, our research offers new theoretical guidance on how mobile apps firms should consider employing social media marketing strategies to enhance their customer value, brand and relationship management as this enhancement can increase the repurchase intention of their existing customers (Arora et al., 2017; Dinsmore et al., 2017; Simon, 2016).

5.2. Managerial implications

While social media marketing and mobile commerce have become dominant marketing tools in the digitalized world, there has been limited knowledge of the possible impacts of mobile apps' customer engagement on firm performance and, in particular, how social media customer engagement via mobile apps influences marketing strategy development and implementation. By unraveling the processes and conditions through which customer engagement and customer equity conceptualization results in customers' repurchase decision of mobile apps, the findings of our study offer managerial implications for mobile apps' operators operating in Asian emerging markets. First, we suggest that executives of mobile apps firms should not only seek the initial purchase but also the repurchase decision of customers in their mobile apps management in order to continue their firms' sustainable advantages in a highly competitive industrial sector (Arora et al., 2017; Dinsmore et al., 2017; Simon, 2016). After acquiring the initial purchase from their customers, executives of mobile apps firms should continue their ongoing efforts in building customer engagement capability. A high level of customer engagement can help firms to establish high customer equity and stimulate the repurchase decision among customer groups. Second, firms with premium brands/products should actively engage in mobile apps development and maintenance to enhance customer engagement across different social media platforms. In this regard, they can stimulate their firms' value, brand and relationship equity among customers' views and their perceptions of the firms' brands. A high customer equity can lead to a high repurchase decision. Third, given that services can now be virtualized and offered by mobile apps, firms should not underestimate the power of eWOM when social media customer engagement has become a norm in mobile commerce. According to the social media report published by Nielsen and NM Incite (2011), 63% of social media users list consumer ratings as their preferred source for information about products/services. As for customer engagement across various social media platforms, 58% admit that they write product reviews to protect others from bad experiences, and nearly 1 in 4 confess that they share their negative experiences to "punish companies". Consequently, how to cope with these negative comments on the branded products/services has become a priority for firms in service recovery mechanisms via mobile apps.

6. Limitations and future research directions

Our research has a number of limitations that need to be addressed by future research. First, our study is mainly related to mobile apps firms in Taiwan. Further research should consider the experience of firms from other emerging markets in Asia (e.g., China, India, Vietnam) as well as other regions (e.g., Mexico) in order to generalize the external validity of the current findings. Our research results would be more conclusive once they are confirmed by further studies. Second, due to new large and complicated databases and data ownership issues associated with customer analytics, as well as the complexity of customer engagement models in the existing literature (Bijmolt et al., 2010), our study may not capture the entire assessment of this key construct. Future research should continue to improve the quality of this construct by adding additional measurement items. The inclusion of further items can also enhance this construct's validity and reliability and its influence in the vital customer engagement-customer equity-repurchase decision path. Lastly, due to the limited research scope and research objective of our research, we have not included all customer equity factors (e.g., customer life value, customer acquisition and retention) in our study scope. Future research should consider these factors in their research design.

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