A THESIS

FOR THE DEGREE OF MASTER OF SCIENCE

App Attributes and Perceived Values Determining Chinese Consumers' Intent to Reuse Fashion Shopping Apps

Yu Sun

Department of Fashion & Textiles

GRADUATE SCHOOL
JEJU NATIONAL UNIVERSITY

August 2019

App Attributes and Perceived Values Determining Chinese Consumers' Intent to Reuse Fashion Shopping Apps

Yu Sun

(Supervised by professor Heesook Hong)

A thesis submitted in partial fulfillment of the requirement
for the degree of Master of Science
2019. 07. 04

The thesis has been examined and approved.

Sookhee Kwon

....

Thesis Director,   Department of Fashion & Textiles
Prof. Sook Hee Kwon   College of Natural Sciences

HeeSook Hong

....

Thesis Committee Member,   Department of Fashion & Textiles
Prof. Heesook Hong   College of Natural Sciences

Jaejung Kang

....

Thesis Committee Member,   Department of Business Administration
Prof. Jae Jung Kang   College of Economics & Commerce

July 2019

Department of Fashion and Textiles
GRADUATE SCHOOL
JEJU NATIONAL UNIVERSITY
Republic of Korea

Acknowledgements

After an intensive period of seven months, today is the day: writing this note of thanks is the finishing touch on my dissertation. It has been a period of intense learning for me, not only in the research area, but also on a personal level. Writing this dissertation has had a big impact on me. I would like to reflect on the people who have supported and helped me so much throughout this period.

Throughout the writing of this dissertation I have received a great deal of support and assistance. I would first like to thank my tutors, Heesook Hong, for her valuable guidance. You provided me with the tools that I needed to choose the right direction and successfully complete my thesis. You always worked tirelessly to train my patience. Your continuous encouragement is my greatest motivation.

Meanwhile, I would like to express my gratitude to my parents. Your encouragement brought me power, aroused my enthusiasm and helped me to make progress every day. You make me believe that if I try my utmost to do everything, the future of my life will be hopeful and promising. Finally, there are my friends, who were of great support in deliberating over our problems and findings, as well as providing happy distraction to rest my mind outside of my research.

Thank you very much, everyone!

<div align="right">Yu Sun</div>

Contents

List of Tables

List of Figures

Abstract

Over the last few years, the number of Chinese consumers who purchase fashion products via mobile apps has been increasing. This study aims to identify the app attributes which significantly influence Chinese female consumers' perception of utilitarian and hedonic values of fashion shopping apps, and their intention to reuse such apps. Another objective of this study is to clarify how app attributes influence the reuse intention of the apps, using the S-O-R model.

The research data for this study were collected from Chinese female consumers via a survey, and a total of 304 usable data were analyzed. The respondents in this study were in their 20s (36.2%), 30s (33.9%), 40s (22%), and 50s (7.9%). Most respondents were employees (85.9%) and married women (75.7%), and college graduates (75.4%). Approximately half of the respondents (54.3%) reported their household monthly income to be from 5,000 yuan (US$ 723) to less than 10,000 yuan (US$ 1,446). Metropolitan residents (48.3%) from places such as Beijing (14.1%), Shanghai (15.8%) and Guangdong (18.4%) accounted for about half of the respondents. The measurement items used to assess the attributes, perceived values and reuse intention of fashion shopping apps were selected from previous research and modified, or were newly developed based on the focus group interviews conducted prior to the survey. The data were analyzed by exploratory factor analysis and regression analysis.

As a result of factor analysis (principal components, varimax rotation, extracting factors with eigenvalues above 1.0), the attributes of fashion shopping apps were categorized into twelve factors: payment, privacy/security, app design, entertainment, real-time communication, fashion information,

customer reviews, live streaming sales, photo sharing through SNS, product assortment, money-saving price, and delivery.

Based on the results of regression analysis, attributes such as app design, fashion information, and product assortment were seen to significantly influence the perceived utilitarian value of fashion shopping apps (H1). In addition, five attributes, namely payment, customer reviews, entertainment, product assortment, and money-saving price, were observed to have significantly positive effects on perceived hedonic value of the apps (H2). This means hypothesis 1 and hypothesis 2 were partially supported. Real-time communication, live streaming sales, photo sharing through SNS and money-saving price were determined to have significantly positive effects on the reuse of fashion shopping apps (H3). This implies that hypothesis 3 was partially supported. The perceived utilitarian value (H4) and hedonic value (H5) of fashion shopping apps were also ascertained to have positive influence on the reuse intention of apps, supporting hypothesis 4 and 5 were supported.

Based on analyzing the significance of the indirect effects of the app attributes on the reuse intention of the apps, the app design, fashion information, and product assortment were seen to indirectly influence the reuse intention of fashion shopping apps through perceived utilitarian value, though the three attributes had no direct effect on the reuse intent of the apps. Similarly, four attributes, namely payment, entertainment, product assortment, and saving-money price, also indirectly influenced the reuse intention of the apps through perceived hedonic values. However, the indirect effect of customer reviews on the reuse intention of fashion shopping apps was not significant. On the contrary, two attributes, namely privacy/security and delivery, had no both direct and indirect effects on the reuse intent of fashion shopping apps.

The findings of this study can help to understand consumers' shopping app choice behavior by determining which and how app attributes influence the reuse intention of fashion shopping apps. The research findings can serve as a guide to companies planning app-marketing and app-commerce targeted at Chinese consumers who use apps for fashion shopping.

Keywords: Fashion shopping apps, Mobile app shopping, Fashion apps, Perceived value, Utilitarian value, Hedonic value, Reuse intention, Chinese consumers

I. Introduction

1. Research Background and Research Objectives

In recent years, the number of mobile users in China has been increasing rapidly. According to research, smartphone users spend almost 90% of their time on mobile apps and just 10% of their time on mobile websites (Fritschle, 2017). Companies have realized the need to effectively use mobile channels to acquire customers by starting new operations or expanding existing ones through mobile apps. Several studies, have defined a mobile app, which is short form for "mobile application", as an application software running on a smartphone and which can be used anytime and anywhere through a wireless device(e.g., Bowerman & Delorme, 2014; Food and Administration, 2011; Maguire, 2013). Mobile apps are aimed at providing consumers with a variety of information, entertainment or purchasability, and can be relatively selective and personalized through various functions and multimedia environments (e.g., Korea Internet & Security Agency, 2013; Nayebi, Adams & Ruhe, 2016; Asia Distribution & Retail, 2018). Through mobile apps, firms can offer better customer personalization, easily send notifications, and push users down the conversion funnel (Kumar, 2019).

These advantages of mobile apps have accelerated the number of mobile users in China, where mobile infrastructure is more popular than web-based Internet. It is reported that China ranks first globally in the number of mobile app users ("China mobile app user insights 2018", 2018). According to China Internet Network Information Center (CNNIC), about 97% of China's population using the Internet (about 727 million people) access the Internet through smartphones, a figure that is about three times bigger than the 270 million mobile users in the US (Bernard, 2018). In addition, the number of

mobile payment users in China rose from 578 million in 2016 to 726 million in 2017, according to QuestMobile ("China mobile app user insights 2018", 2018). In 2018, China's mobile commerce conducted on smartphones was estimated at about $1 trillion, with the majority of mobile commerce coming from Chinese app users, who are more than 713 million (Bernard, 2018). In this background, substantial research on the factors that predict Chinese consumers' app preference, choice and reuse has been conducted for various types of apps, such as brand apps (Fang, 2019), catering apps (e.g., Wang, Tseng, Wang, Shih & Chan, 2019), mobile coupon apps (e.g., Liu, Zhao, Chau & Tang, 2015), social shopping curation apps (Wang & Lee, 2015), app-based tour guide (Lai, 2015), and so on.

One of the most popular products that Chinese young consumers have purchased through mobile shopping apps is reported to be fashion goods. For instance, a survey of 600 Chinese millennials (18 and 35 years old) residing in Shanghai, Beijing, Guangzhou, Wuhan and Chengdu found that most Chinese millenniums buy clothing at least every two to three weeks, over 82% of Chinese millennials use apps from apparel brands to check out new apparel items, buy clothes, or check out the latest promotions (Asia Distribution & retail, 2018). However, little research has been done on Chinese consumers' usage of fashion apps. A few studies have focused on fashion apps but in different contexts, including Korean context (e.g., Choi & Lee, 2012; Choi & Kim, 2011; Lee & Lee, 2013; Heo, Bae, Gang, U, Han & Kim, 2016; Sung, 2013; So & Kim, 2013; Kho & Lee, 2015; Kang & Sung, 2014), Spanish context (e.g., Romo, Contreras-Espinosa & Medina, 2016; Park & Ko, 2014), British context (e.g., Parker & Wang, 2016) or American context (e.g., Ju, Lee, Jeon & Lee, 2013). Furthermore, most of the existing studies analyzed the contents and functions of fashion apps, and only a few researches investigated consumers' use of fashion apps, though they still

focused on Korean consumers (e.g., Lee & Lee, 2013; Soo & Kim, 2013; Heo et al., 2016).

However, Chinese consumers have been reported to be different from consumers in other countries in several aspects, including cultural values. For instance, Chinese people focus more on collectivist values, power distance, and long-term oriented goals than people of other nationalities (Hofstede, 2001). Although Chinese people's sense of masculinity was similar to that of Americans (Hofstede, 2001), recent studies have indicated that it is lower than that of Americans (Lu, Wong, Gallagher, Tou, Young & Loh, 2017). In particular, uncertainty avoidance among Chinese people was slightly lower than that of Americans (Hofstede, 2001; Lu et al., 2017). In fact, an empirical study showed there were differences between Chinese and American consumers in regard to cultural factors influencing consumers' continuous intent to shop products using mobile devices (Lu et al., 2017), though the investigation was not based on an app use context. Owing to the unique cultural context of China, it is expected that Chinese consumers' app shopping behavior could be differentiated from those of other countries. Therefore, the current study examined the use behavior of fashion shopping apps among female consumers in China, a country with the largest population in the world (Xinhuanet, 2019) and the highest mobile app usage rate ('China mobile app user insights 2018', 2018). Specifically, this study focused on fashion shopping apps that allow users to shop and purchase fashion products from the app itself.

The current study adopted the S-O-R model (Mehrabian & Russell, 1974) as the theoretical framework of the study. The S-O-R model explains how the behavior of shoppers in a store changes according to the stimuli in the store. According to the model, the environmental elements (stimuli) in a store could influence shoppers' internal state (organism), such as their psychological

state, and in turn, their internal state could influence shoppers' behavior (response) in the store. This model has been applied in offline and online stores and mobile environment and has been confirmed as a feasible model for explaining the effect of environmental stimuli on consumer behavior.

The first purpose of this study is to identify relevant app attributes (S) that determine perceived utilitarian and hedonic values (O) and the reuse intention of fashion shopping apps (R) for Chinese female adults who have had fashion shopping experience through mobile apps. The second objective of this study is to investigate how app attributes (S) affect the reuse intention (R) of fashion shopping apps, based on a multi-dimensional approach of perceived values (O) for fashion shopping apps.

This study was conducted in three steps. In the first step, potential attributes of fashion shopping apps in China were investigated and determined. In the second step, focus group interviews were held with Chinese students attending one of Korean universities to find out the importance of each app attribute. Finally, the hypotheses were tested by a survey with a large sample of Chinese female adults living in China. The findings of this study will provide useful ideas for app developers and managers so they can develop app marketing strategies for Chinese consumers, who account for the largest market share in the world. This study will also expand the academic knowledge base of app shopping behavior.

2. The Structure of This Paper

This paper consists of five parts that are structured as follows:

Part 1 presents the background and objectives of this research. Part 2

consists of four chapters. The first chapter highlights the definitions and types of mobile apps available in China. The second chapter presents the definitions, types, and characteristics of fashion apps and discusses previous studies on consumer behavior of fashion apps. The third chapter presents the definitions and dimensions of perceived values, as well as the definitions and previous studies on utilitarian and hedonic shopping values. The fourth chapter presents the Stimuli-Organism-Response model as the theoretical frame for this study. This chapter also presents previous studies that established or implied the relationship between app attributes and perceived utilitarian value (hypothesis 1), the relationship between app attributes and hedonic value (hypothesis 2), the relationship between app attributes and behavioral intention (hypothesis 3). In addition, the chapter discusses previous studies drawing the relationship between perceived value and behavioral intention (hypothesis 4 and hypothesis 5).

Part 3 of this study describes the research method, which is composed of five sub-sections, namely prior investigation, focus group interview and questionnaire development, measurement of research variables, data collection, and respondent characterization.

Part 4 presented the research results, which are related to exploratory and hypothesis testing. Part 5 consists of three chapters, which include the discussion and summary of the research results, academic contributions and practical implications, and study limitations and future research direction.

Ⅱ. Theoretical Background

1. Mobile Apps

1) The definition and type of mobile apps

The term "app" is an abbreviation of "application" which means literally an application, and is also called an apple. The definition of an app is slightly different for every scholar. As shown in Table 1, some scholars defined apps very simply and comprehensively (Bowerman & DeLorme, 2014; Maguire, 2013), while some scholars defined apps very specifically in relation to devices (Nayebi et al., 2016; Lee & Lee, 2013; Korea Internet & Security Agency, 2013), and functional aspects (Korea Internet & Security Agency, 2013; S.S.Kim, 2011). Based on the existing researchers' definitions of an app or the type of apps, an app can be defined as a "category killer" type of application software running on various devices (e.g., smartphone, web, PAD, etc.). The apps can provide consumers with a variety of information, entertainment or purchasability and it can be selective and personalized for an individual through various functions and multimedia environment. While apps can run on both web and mobile smartphones, consumers tend to consider apps as mobile apps, as most consumers have recently used apps on their smartphones frequently rather than the web(Lockwood, 2018; Xia, Zhang & Zhang, 2018). Taking a look at the definition of a mobile app in Table 1, an mobile app is defined as an application software running on a smartphone and used anytime and anywhere through a wireless device.

Table 1. The definition of mobile apps

Authors	The definition of mobile apps
Oh, Kim and Moon(2010)	Application(app), it means all software executed on an OS.
Nayebi et al.(2016)	Apps, which are improving and promoting a more notable way of releasing software directly to consumers with promoting phases that are way shorter than those of traditional software
Maguire(2013)	A software application that can be executed (run) on a mobile platform, or a web-based software application that is tailored to a mobile platform but is executed on a server
Food and Administration (2013)	A software application that can be executed (run) on a mobile platform (i.e., a handheld commercial off-the- shelf computing platform, with or without wireless connectivity), or a web-based software application that is tailored to a mobile platform but is executed on a server.
Bellman, Potter, Treleaven-Hassard, Robinson and Varan(2011)	Software that is downloadable to a mobile device and prominently displays a brand identity, often via the name if the app and the appearance of a brand or throughout the user experience.
Bowerman and DeLorme(2014)	Mobile apps are special software programs that smartphone owners can download to their phones.
Korea Internet and Security Agency(2013)	The application is an application program installed on a smart phone, a PDA, a smart pad, etc. It can be utilized to user's convenience such as information searching, entertainment, and memo, and it allows various multimedia environment configurations.
Lee and Lee(2013)	Applications are applications that run on smart devices and which bring new information technologies with the nature of the web and the characteristics of mobile devices.
Kim, S. S. (2011)	A smartphone application is an application that can be installed on a smart phone, and which can perform various functions such as new work, information search in a mobile environment.

Mobile apps can be divided into different types because they are often developed focusing on one specific purpose. The types of mobile apps are shown in Table 2. For example, mobile apps can be roughly classified as game apps (e.g., Engybird, Candy Crush), informational apps (e.g., apps related to news, weather, traffic information, airline reservation), social network apps (e.g., Twitter, Facebook, and Instagram apps), location-based apps (e.g., apps related to navigation and directions), augmented reality apps,

branded apps(e.g., Chanel, Gucci, Adidas brand apps.), and retail-specific apps(e.g., Taobao apps). In particular, the definitions of branded apps were shown in Table 3. Branded apps are a type of mobile app that can be downloaded via a smartphone and can be described as apps that offer various functional and empirical benefits to indirectly and directly promoting brand identity and image. Branded apps can be also divided into apps that only have promotional features and apps that have sales capabilities.

Table 2. The types of mobile apps

Authors	Types of mobile apps
Wood, Robson, Thompson and Johnson(2016), Kim, S.S.(2011)	Native apps, mobile browser apps, hybrid apps
Park(2016) Apple app store	Health and fitness, games, finance, education, weather, navigation, news, newsstand, book, lifestyle, business. photos and videos, productivity, social networking, sports, entertainment, travel, utilities, food and drink, music, medicine, reference, catalog
Park(2016) Google play	Games, health & fitness, education, transportation, finance, weather, news and magazines, decorations, tools, books and resources, live wallpapers, libraries and demos, lifestyle, comics, media and video, business, photography, production lines, social content, shopping, sports, entertainment, travel and local information, widgets, music and audio, medical, communication
Han,Yang and Sung(2015)	Reward apps (unlock type, ad-viewing type, mission participation type)
Choedon and Lee(2018)	Mobile tourism apps
Karjaluoto, Shaikh, Saarijärvi and Saraniemi(2018)	Financial services apps
Mota, Ruiz-Rube, Dodero and Arnedillo-Sánchez(2018)	Augmented reality apps
Wang et al.,(2019)	Catering app
Zhao and Balague´(2015)	Branded apps (tool-centric apps, game-centric apps, social-centric apps, m-commerce-centric apps, design-centric apps)
Oponiti (2012)	Branded apps(promote the brand image apps, generate new revenues apps, offer additional services apps)
Choi and Kim(2011)	Branded apps, basic information apps, additional information apps
Won and Park(2015)	Augmented reality app (Informative, game type, virtual experience type,visual ejector type)

Table 3. The definition of brand apps

Authors	The definition of brand apps
Bellman et al. (2011)	The branded app as software that is downloadable to a mobile device and prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon throughout the user experience.
	Software downloadable to a mobile device which prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon, throughout the user experience
Kim, S. Y. (2011)	A branded app is an abbreviation for a branded application, which refers to an application used to promote or market a brand rather making sales revenue.
Ryu and Shin (2013)	An brand app that is designed for companies to advertise their brands.
Cho (2011)	An application that can directly or indirectly promote a brand or allow users to experience a brand in through the app.
Ryu (2013)	Smartphone software applications that companies make and distribute to create awareness about their brands, products, and services. It is a combination of brand and application.
Park, Lee and Lee (2011), Yang(2012)	Smartphone applications that companies create and distribute to promote and sell their brands and products.
Kim and Yoo (2011)	An application that can be downloaded directly by users, and which is provided by an organization or a variety of organizations for the purpose of advertising their brands, products, and services.
Lee (2012)	Apps for smartphones or tablet PCs designed to sell or promote products or services.
Jang (2011)	A fashion brand application is defined as an application designed to promote a certain fashion brand.
Ozturk, Bilgihan, Nusair and Okumus (2016)	Branded apps, as digitally enabled services, are distinguished from mobile technologies in the delivery of intangible services.
Kim, Lin and Sung (2013)	A software application downloaded to a mobile unit that helps to identify a brand and to construct its identity.
Ahuja and Khazanchi (2016)	Apps that allow consumers to search for products, categories and brands, make comparisons and place orders using their smartphones
Zhang, Zhu and Liu (2012)	An extension of e-commerce where business activities are performed in a wireless environment using mobile devices
Charland and Leroux (2011)	A mobile app, or mobile application, is a software program installed on a smartphone that presents formatted information to users, based on a self-contained user interface.

2) Mobile apps used in China

As the use of smartphones in China increases, the downloading of mobile apps by Chinese people is also surging. According to China Internet Network Information Center (CNNIC), about 60% of China′s population are Internet users, and among them 97% are smartphone users (Bernard, 2018; Chang, 2019). As mentioned previously, the Chinese market comprises approximately 727 million mobile users, a figure that is three times as big as that of the US market having approximately 270 million mobile users(Bernard, 2018).

In fact, China boosts the largest mobile commerce volume in the world (Bernard, 2018; "China was the largest app market", 2018), as well as the most extensive Internet connectivity via mobile phones (Biggs, Chande, Matthews, Mercier, Wang & Zou, 2017). On average, Chinese consumers invest more than 30 minutes a day in Taobao app (the largest e-commerce market in China), which is about three times longer than Americans typically spend on Amazon (Biggs et al., 2017).

In Korea and most countries in Asia and Europe, consumers download and use apps for free from Apple's App Store, Google's Android Market (Google Play) and Microsoft′s Windows Marketplace etc., (Palomba, Linares-Vásquez, Bavota, Oliveto, Penta, Poshyvanyk & De Lucia, 2017), which are provided by global companies rather than being locally-developed. In China, however, Chinese consumers mainly use local app stores, because, currently, access to Apple's App Store or Google Play is prohibited nationally or permitted most limitedly. Unlike Korea and other countries where apps from a few global firms (e.g., Apple's app store, Google's google play) dominate the app market, there are so many local app stores in China, whose market share is fragmented across the whole app market in China (Ao, 2018; "App Annie 2017 retrospective", 2018; Chang, 2019; "China was the largest app market",

2018; "Mobile app spend soars with China a top market", 2019).

By the end of April 2018, there were about 4.14 million apps available in China, with game apps accounting for about a quarter of them (about 1.45 million), and the number of life service apps and e-commerce apps also increased steadily and was about 498,000 and 392,000, respectively ("How many mobile apps", 2018). Moreover, there were 366,000 audio and video player apps and 13,000 online payment apps ("How many mobile apps", 2018).

In 2017, China's mobile commerce conducted through smartphones was estimated at about $1 trillion, with most coming from more than 713 million e-commerce app users (Ao, 2018; Bernard, 2018).

According to i research, a market research firm situated in China (Jung, 2017), the top 20 mobile apps used by Chinese people in 2017 were communication apps (e.g., Wechat, Kyukyu), video apps (e.g., Aichi and Yuki), utility apps (e.g., Baidu search, Qumyu browser, Baidu Chinese typing machine, free vaccine, Shanda Wifi, Yousa browser, Kyukyu Secure), an e-commerce app (e.g., Taobao), and music and audio service apps (e.g., Kugo, Kyukyu Music). In particular, since world-renowned social network services (e.g., Facebook, Instagram, and Twitter) are banned or restricted in China, Wechat and QQ, which are SNS channels developed by Chinese companies, rank as # 1 and # 2 in the Chinese app space (Jung, 2017). The Wechat app, a messaging app with integrated shopping features and which is similar to Korean Kakao talk and Kakao story, has about 800 million monthly users. The QQ app (a popular messaging app with a greater focus on interactive games and blogging) has about 550 million users per month, and the Sina weibo app (China's biggest social media platform, twitter-like microblogs) is used by about 400 million people per month (Biggs et al., 2017).

The third most popular Chinese app is Iqiyi video app, which provides a

video streaming service that replaces YouTube, and dominates China's video platform (Jung, 2017). Together with PPS, Iqiyi video app enjots 20% of the video streaming market (Biggs et al., 2017). In China, video streaming apps (Youku, Tudou 20%, Tencent video 15%, LeTV, Sohu, Bilibili, 25%) are gaining more active users (Biggs et al., 2017).

Taobao, China's largest e-commerce platform and which integrates entertainment functions and social networking functions, is the sixth most widely used application in China (Jung, 2017). Taking into account that Tmal is also China's largest third-party platform for brands and retailers, the two e-commerce apps share a market share of 75-80% between them. Further, Jingdong is a direct sales e-commerce platform (JD managers works merchandising and pricing) similar to Amazon, and its market share is estimated to be 10-15% (Biggs et al., 2017).

The Alipay app, which is usually used for both online and offline payments, is ranked 7th in terms of market share (Jung, 2017). Alipay is also China's biggest online third-party payment system with more than 450 million active users, compared with ApplePay's 12 million users, and it has a market share of 50% (Biggs et al., 2017), followed by Wechat pay (20%) and Baidu Wallet (5%).The Baidu search engine ranks ninth in the number of app users (Jung, 2017), accounting for 75% of the search app market (Biggs et al., 2017).

In addition, apps that are mainly used by Chinese consumers, are game apps, information apps such as news and airline reservation apps (e.g., Tencent news, Variflight.com), car-sharing service apps similar to the Uber app in America (e.g., Di Di), video platform apps similar to South African TV (e.g., MeiPai), location-based service apps(e.g., Amap), brand promotion or business apps(e.g., HLA) and so on.

Although it is not easy to establish accurate and official statistical data on

the number of users or market share, Chinese consumers also frequently use fashion apps as part of their daily life. In fact, fashion items are the most popular products purchased by Chinese consumers through mobile apps. In addition, about half of Chinese respondents reported that they received information regarding latest fashion trends and styling tips through mobile apps, while more than 82% of Chinese millennials have reported using apparel brand apps to look for new apparel items, buy clothes, or check for new promotions or offers (Asia Distribution & retail, 2018). Given these facts, it is quite necessary and meaningful to investigate Chinese consumer behavior in using mobile app for fashion shopping.

2. Fashion Apps

1) The definition and types of fashion apps

As shown in Table 4, the definition of a fashion app is expressed in terms of the devices which it runs on, as well as the content, service, functionality, or its role and features. Referring to the various definitions constructed by various researchers, a fashion app simply refers to a software application that runs on devices such as smartphones and PADs, or on the web, and which offer anything related to fashion. In other words, a mobile fashion app can be defined as a smartphone software application that focuses on fashion, in terms of information, brand advertising and promotion, commerce, virtual reality and augmented reality, entertainment, interaction with others, and so on.

The classification categories of fashion apps varied across researchers depending on the number and content range. The different types of fashion apps discussed in previous studies are presented in Table 5. For example, Jang (2011) classified fashion apps as information apps, brand apps, shopping

apps and magazine apps, based on the content provided by the apps. Similarly, based on the purpose and use of fashion apps, Kim (2012) categorized fashion apps into four types, namely information apps, brand apps, shopping apps, and style management apps. In particular, Ju et al. (2013) investigated 120 fashion apps downloaded with Korean accounts and 120 fashion apps downloaded with US accounts, and which were registered in Apple's App Store, and classified the apps into information apps, shopping apps, coordination apps, magazine apps, game apps and SNS apps. The number and types of fashion apps being developed are constantly increasing year by year.

Considering all of the recently developed fashion apps, fashion apps available in Korea and China can be divided into eight categories based on their purpose, core functions or services, and content. A fashion brand app is an app that provides brand-related core content and a variety of additional content aimed at promoting new brand products and building brand assets. Global brand apps include Chanel, Gucci, Uniqlo and H & M apps, and China fashion brand apps include Ochirly and Baleno, Typical branded apps with sales capabilities include Etam, Duoyi and HLA. However, among branded apps in Korea and China, apps with sales functions are very few (Park & Ko, 2014).

Fashion shopping apps are mobile apps with payment functions for merchandise sales, and they can be classified further into fashion brand apps and retail apps providing purchase functions. Gmarket app and Taobao app are representative retail shopping apps in Korea and China, respectively. User-initiated editing shop apps, such as PocketStyle with Korea account, which incorporate a variety of fashion shopping malls and allow users to create own editing shops by adding frequently visited stores, and to pay for items in the editor's shop wish list, can be regarded as a kind of fashion

shopping apps (Jang, 2012).

Augmented reality fashion apps allow users to input their personal information (physical condition, face, body type) or photo images, and to virtually wear suggested mall items (e.g., SimCoordi) or items owned by users (e.g., Kshstyle). In some augmented reality fashion apps (e.g., fitUin), users can virtually simulate both suggested app items (e.g. SimCoordi) and items owned by users (Kang, Kim & Lee, 2017). Beauty apps that reproduce the colors and images of people's registered faces, heads, and hands, using lipstick, hair dye, and manicure products available or sold from apps (e.g., Sephora), are also examples of virtual experience apps riding on augmented reality technology.

According to a previous study by Jang (2012), fashion game apps are apps which provide users with fun and entertainment through simulation activities, such as costume design and styling of avatars (e.g., Canvasee Fashion Holic Lite), or the building of fashion stores and interior displays, as well as store operations (e.g., Fashion Story, Fashion City).

Fashion information apps collect varied information, including trends, collections, models, and hot news, and provide app users with more organized information by re-editing information already surveyed by their own or released by others. Fashion information apps provide real-time information about global street fashions (e.g., Sikufid), hot fashion news (e.g., Style.com), and styles worn by celebrity stars in dramas and TV shows (e.g., Vogue Girl Star Style) (Jang, 2012; Kim, 2012). Fashion magazine apps could also be regarded as fashion information apps because the core function and aim of magazine apps is to provide app users with information related to fashion.

Conversely, fashion coordination apps provide style information through creative works rather than the style information that is searched or collected

as is typical with fashion information apps. According to previous studies (Kho & Lee, 2015; Jang, 2012), fashion coordination apps can be divided into style suggestion apps and wardrobe management apps. A style suggestion app is an app that gives you possible combinations of fashion items available in shopping malls included in the app depending on the date and occasion (e.g., Dr. Style). App users can shop and purchase the suggested combination items from the online shopping malls and even share the styling and particular items with other people. Typical examples include apps which provide 365 items and coordination styles that can be used in daily life for male consumers (e.g., Dr. Style), apps which suggest color coordination (e.g., Whos' HOT), and apps which analyze users' body shape and suggest styles that match their body shape (e.g., Style me). Unlike style suggestion apps, closet management apps provide users with coordinating styles based on users' own closet items (e.g., triMirrorFashion Closet, Cool Guy, Quakeup Media Production Inc, Volygon Inc.).

Fashion consulting apps (e.g., Hello Codi) are communication apps that enable consumers to talk with a fashion expert for advice on fashion styles that fit an individual's body shape, personal preference, and individuality (E. Y. Kim, 2015). Fashion social network service apps are similar to fashion consulting apps in terms of communication, but they differ from consulting apps because a user talks to and receives feedback from a general consumer, and not an expert. According to previous studies (Jang, 2012; E. Y. Kim, 2015), with such apps, users can photograph and upload their own fashion styles and receive general consumers' feedback, such as responses, evaluations and questions. Meanwhile, app users can also evaluate and ask questions about other fashion styles that people have shared (e.g., styleShare, LuknFeed).

The development ratio, usability, and utilization of each type of fashion

app are very different. For example, according to a study (Ju et al., 2013) that analyzed fashion apps registered in Apple's App Store (122 apps for Korean accounts and 150 apps for US accounts), the percentage of magazine apps was higher than that of other types of apps in both Korean and US accounts. Among apps in the Korean account, shopping apps accounted for the highest percentage, while the majority of apps in the US account were game apps. In the case of apps (game, buyer, information apps), there were more free apps in the Korean account than in the US account.

Furthermore, after evaluating the usability of fashion apps from Korean and American app users through focus group interviews, Ju et al.(2013) found out that the usability of both SNS and information apps was more favorable than that of shopping or brand apps. Similarly, Sung (2012) established that fashion information apps (e.g., magazines, fashion trends, collection apps, etc.) were the most popular apps among Korean consumers. In particular, Korean consumers were reported to use global SPA brand apps or overseas luxury brand apps more than local Korean brand apps (Sung, 2012).

However, according to recent research investigating the number of app downloads, customer reviews and consumer ratings of top 50 brand apps and top 50 shopping apps in both Korean accounts and Chinese accounts (Sun & Hong, 2018ab).

Therefore, this study focuses on fashion shopping apps in the Chinese consumer market. In this study, a fashion shopping app is defined as an app that allows users to shop and purchase fashion products from the app itself regardless of the app's original or core service functionality. In other words, even if the app is designed to promote a brand and build brand image, but it allows users to search, order, and pay for a fashion item from the app itself, then it is regarded as a fashion shopping app. On this basis, retail apps that sell fashion products are fashion shopping apps.

Table 4. The definition of fashion apps

Authors	The definition of fashion apps
Kim (2010)	Fashion apps means applications which provide various contents related to fashion and consumers can download or buy fashion apps registered on various mobile app stores for a free or for a fee. An application that can be installed on a mobile device such as a smart phone, PDA, or smart pad to perform various functions such as new work, information search, and entertainment.
Chopdar, Korfiatis, Sivakumar and Lytras (2018)	Fashion apps with mobile purchasing function and which provide a thorough understanding of the various elements influencing their use.
Kim (2010)	Fashion application that can be accessed without logging on to a computer, and which enables users to watch shows, know what's new, save their favorite looks, share their interests with others, browse or shop, and to find the nearest store, all at the touch of a button.
Bae (2010)	The app is a fashion-related information application and is availed to consumers through the smartphone's App Store.
Korea Internet and Security Agency (2013)	A fashion information app means a mobile app that can be installed on a smart phone to enable one to information related to fashion, exchange information with others, and search for various information.
Kim, Y. C. (2011)	It is defined as an application program that can perform various functions such as new work, information search, and entertainment, and which is installed on a mobile device, such as a smart phone, PDA, or smart pad.
Lee (2012)	Fashion apps that can provide information about fashion, such as brands, shopping, and magazines.
Kim, Y. C.(2011)	A fashion app is a communication medium that connects a fashion company with a consumer on a smart phone, and it can also be defined as an application program that serves as a mediator between a brand and consumers of various tastes.
Sung (2012)	Mobile fashion apps are fashion related apps on mobile
So and Kim (2013)	Fashion apps downloaded from smartphone and used as fashion apps.
Choi and Lee (2012)	The fashion application is a fashion-related information application available on the App store
Heo et al.(2016)	Fashion application is a communication medium that provides services such as fashion brand information, advertisement, and mobile commerce using an application installed on a smart phone.

Table 5. The types of fashion apps

Authors	Types of fashion apps
Choi and Lee (2011)	Fashion brand, fashion information, fashion shopping, fashion coordination, fashion magazine
Kho and Lee (2015)	Fashion information, fashion shopping, fashion brand, fashion coordination
Kim, Y. C. (2011)	fashion brand , fashion information, fashion shopping
Jang (2011)	Fashion brand, fashion magazine, fashion coordination, fashion shopping
Kim (2012), Kim, Y. C. (2011), Jang (2011), Choi and Lee (2011)	Fashion brand, fashion coordination, fashion information, fashion shopping
Choi (2012)	Fashion brand, fashion non-brand
Lee (2012)	Fashion entertainment, fashion information , fashion community
Bae (2010)	Fashion brand, fashion magazine, fashion information, fashion shopping
Kim (2012)	Fashion magazine, fashion information
Park and Ko (2014)	Fashion magazine, fashion information, fashion brand, fashion shopping, fashion coordination
Kang and Sung (2014)	Fashion information, fashion coordination

2) The attributes and characteristics of fashion apps

Attributes refer to the properties or characteristics of an object (The Oxford English Dictionary, 2014). Few studies have directly examined the attributes of fashion apps, while several other studies have investigated the contents or features of fashion information apps (Choi & Lee, 2012; Kho & Lee, 2015; E. Y. Kim, 2015) and fashion brand apps (Choi & Kim, 2011;Kim, 2010; Kim, 2012; Park & Ko, 2014).

For instance, Kim (2010) analyzed contents of fashion brand apps (e.g., overseas luxury brand, global SPA brand, foreign brand, domestic brand, and sports brand) and fashion retail brand apps, and discovered various contents, such as information (e.g., product photos, product details, collection videos, store information, news, etc.), purchase-related features (e.g., purchase

제주대학교 중앙도서관
JEJU NATIONAL UNIVERSITY LIBRARY

function, wish list, coupon, search function, customer reviews, style suggestions, order functions), social networks (e.g., Facebook, Twitter, e-mail, me2day), entertainment (e.g., game, wallpapers, movies, online cards, music, style suggestions) and practicality-related features (e.g., clocks, alarms).

In addition, Choi and Lee (2012) reported that fashion brand apps have diverse contents with varied benefits, which include informational benefits (e.g., brand information, latest news, product image information), economic benefits (e.g., mobile coupons, discount events and discount coupons), recreational benefits (e.g., watches, weather, music, games, and health care), magazine information (e.g. street fashion information, and style information), coordination (e.g., situation-specific costumes, and virtual coordination), interaction (e.g., sharing style, recommendation, and comment), and wardrobe management (e.g., photo storage of own clothing, and style calendar).

Kim (2012) pointed out several characteristics of fashion brand apps, namely interactivity, dynamic variability (ubiquitous, virtual reality), and multimedia integration. The author also reported that fashion brand apps were characterized by information-oriented contents (e.g., brand, product, store-related information, video information, and concrete and detailed objective information), emotion-oriented contents (e.g., video, audio), entertainment contents, which promote participation and sharing among users, and experiential contents, which can generate users' interest through direct experience.

While investigating the characteristics of fashion brand apps, Choi and Kim (2011) found the reactivity (capability to induce customers' interest and reaction through product customization), reality (capability to combine virtually-created information or images with actual environments, using augmented reality technology), immediacy (capability to acquire information and goods at any time and any space), empathy (capability to share other

users' opinions, and to evaluate products that they have purchased or are interested in). In addition, Park and Ko (2014), through the analysis of 22 domestic fashion brand apps and 37 international fashion brand apps, also argued that characteristics of fashion brand apps can be categorized into seven aspects, which include basic information, social network, augmented reality, location-based services, entertainment contents, shopping, and live broadcasting.

Almost all of the findings of the above-mentioned studies are based on case studies or content analysis of fashion branded apps. Indeed, it is rare to find studies that directly investigate what is considered to be important or useful attributes for consumers. In the context of fashion apps, or even mobile apps, important app attributes for app users were found only two qualitative studies which interviewed Korean consumers(Sung, 2012; Lee & Lee, 2013). For instance, Lee and Lee (2013) conducted a focused group interview with Korean graduate students majoring in fashion, and found out that contents, downloading feature, community, ongoing management, and design/visibility are important app features when considering which fashion apps to use.

Based on previous studies investigating the contents, characteristics, and important, useful and interesting attributes of fashion apps through case studies, content analysis, and focus group interviews, regardless of the fact that the majority of these researches mainly focused on fashion brand apps, the overall attributes of fashion shopping apps can be summarized as follows: information, economics, interactivity (social connectivity, empathy), social connectivity, virtual experience (augmented reality), entertainment, practicality, ubiquity(immediacy), customer responsiveness, location-based services, live broadcast, downloading, design/visibility, and shopping and purchase-related features (search, order, payment, delivery).

3) The studies on consumer behavior studies of fashion apps

As mentioned in the literature review, in Korea, the United States and Spain, only little research has focused on fashion apps (Choi & Lee, 2012; Kim, 2012). Most studies have only reported on the types of fashion apps (Choi & Lee, 2012; Bae, 2010; Kho & Lee, 2015; Y. C. Kim, 2011; Kim, 2012; Jang, 2011; Park & Ko, 2014; Kang & Sung, 2014), typical examples of each type of fashion app, important elements taken into consideration in the design of fashion apps (Y. C. Kim, 2011; Lee & Lee, 2013), and useful contents and features based on consumers' use of fashion apps (Heo et al., 2016; E.Y. Kim, 2015; Sung, 2012)

As shown in Table 6, almost all studies on consumers' use behavior of fashion apps are limited to Korean consumers. Most studies identified the contents and characteristics of fashion apps, consumer's perception of fashion apps, and the behavioral intention to use fashion apps. For instance, Lee and Lee (2013) determined fashion app features that positively affect the perceived ease of use, perceived usefulness, and perceived enjoyment of fashion apps. The author also found out that fashion app attributes (design/visibility, downloading, ongoing management, or contents) were significantly related to consumers' mobile shopping motivation, such as convenience and buying motivation(Lee & Lee, 2013). In addition to information quality, Kim, Y. C. (2011) pointed out a couple of attributes of smartphone fashion apps (convenience, and location-based services) that positively influenced satisfaction with the apps. Park (2016) also pointed out some characteristics of fashion apps (innovation, visibility, newest, familiarity or accuracy) that had a significant effect on satisfaction and continuous use intention of the apps. Sung (2013) conducted an empirical study that revealed there is a positive relationship between users' evaluation of service attributes and users'

attitude toward fashion apps.

Korean researchers also investigated whether antecedent variables such as consumer characteristics (shopping orientation, shopping motivation, fashion involvement, gender), perception of fashion apps (perceived risk, perceived usefulness, perceived ease of use), and perceived atmosphere of fashion apps do influence the attitude, satisfaction, or behavioral intention of using the apps (Heo et al., 2016; E. Y. Kim, 2015; Sung, 2012).

Fashion involvement moderated the relationships between characteristics of fashion apps and consumer responses, such as satisfaction and continuous usage of apps (Park, 2016). Additionally, consumer's hedonic shopping orientation was determined to also have significant influence on the shopping behavior of apparel products through mobile apps (Lee & Kim, 2018). In particular, highly perceived usefulness and low perceived risk (security risk, product quality risk) in fashion shopping apps was seen to increase consumers' favorable attitudes toward shopping through fashion apps (Sung, 2013).

As mentioned in literature review, there is barely any research on Chinese users of fashion shopping apps. In particular, app attributes that contribute to the perceived utilitarian value and hedonic value of fashion shopping apps were yet to be directly and systematically examined. Furthermore, as far as the author knows, there is almost no research to identify the relationship among attributes of fashion shopping apps, perceived value of the apps, and the reuse intent of the apps for shopping or purchase of fashion items. Therefore, in a fashion shopping context and a Chinese consumer context, the current study examined the relationship among the mentioned app attributes, the perceived value of apps, and the reuse intention of the apps for fashion shopping.

Table 6. Various studies on fashion apps

Authors	Subjects, app type, theoretical frame or research method	Research topics
Kim, Y. C. (2011)	■ Korean consumers ■ Fashion apps ■ UTAUT	A study on factor of acceptance for mobile fashion applications
Kim (2010)	■ 29 free fashion brand apps ■ 362 customer reviews ■ Fashion apps ■ Content analysis	A study on mobile applications of fashion brands
Choi and Kim (2011)	■ 30 fashion brand apps ■ Fashion brand apps ■ Content analysis	Mobile shopping motives and importance of fashion application attributes
Kim (2012)	■ Fashion apps ■ Content analysis	Model study of fashion application "Style By Me"
Lee (2012)	■ Korean consumers ■ Fashion apps	Mobile shopping motives and importance of fashion application attributes
Jang (2012)	■ 408 fashion apps ■ Content analysis	The use of an application as a mobile fashion tool
Sung (2012)	■ Korean consumers ■ Fashion apps	An exploratory study of smartphone fashion applications to promote mobile shopping
Choi and Lee (2012)	■ 150 iPhone fashion apps ■ Content analysis	A study on information-seeking benefits of fashion applications for users and their effects on loyalty and satisfaction: focused on iPhone-based fashion applications
So and Kim (2013)	■ Korean consumers ■ Fashion apps ■ Experience economy theory	The effects of augmented reality fashion application on pleasure, satisfaction and behavioral intention
Lee and Lee (2013)	■ Korean consumers ■ Fashion apps	Mobile shopping motives and fashion application acceptance
Magrath and McCormick (2012)	■ Fashion retail app ■ M-branding design framework ■ A case study	Branding design elements of mobile fashion retail apps
Ju et al.(2013)	■ 122 Korean apps ■ 150 US apps ■ Content analysis	An exploratory analysis and usability evaluation of fashion mobile applications: focus on Korea and U.S. app stores

Table 6. (continued)

Authors	Subjects, app type, theoretical frame or research method	Research topics
Kang and Sung (2014)	■ Korean consumers ■ Fashion information apps	An analysis of group characteristics according to technological innovativeness and clothing involvement: focused on the usage status of smart phone fashion information applications
Park and Ko (2014)	■ Fashion brand apps ■ 59 fashion brand apps ■ Content analysis	The analysis of the characteristic types of fashion brand applications: concentrating on Korean application cases
Kho and Lee (2015)	■ Fashion coordination apps	Information architecture design for fashion coordination apps based on the men's need for fashion information
Kim, Y. (2015)	■ hello codi app ■ Fashion coordination apps ■ Case study	A study on development of application focusing on personalized fashion coordination
Kim, E. Y. (2015)	■ Korean consumers ■ Fashion apps	Effects of mobile browsing motives on using fashion app contents
Park (2016)	■ Korean consumers ■ Fashion apps ■ ECM	The effect of characteristics of mobile fashion applications on satisfaction and continuous usage intention
Romo et al. (2016)	■ 10 fashion branded apps ■ Spain context ■ Content analysis	Branded apps in Spain as a Means of Communicating Trends in Fashion
Heo et al. (2016)	■ Korean consumers ■ Fashion apps	Effects of search motives and content usage of mobile fashion applications on purchase intentions
Parker and Wang (2016)	■ Fashion retail apps ■ The UK participants	Examining hedonic and utilitarian motivations for m-commerce fashion retail app engagement
Sornapudi and Mahesh (2017)	■ Fashion brand apps ■ Case study	Fashion on smartphone: apps that connect with consumers

3. Perceived Value

1) The definition of perceived value

The definition of perceived value vary across researchers and researchers' diverse perspectives depend on the types of sacrifices that are made in the process of purchasing or the types of benefits that are gained by using certain goods and services. The initial research on perceived value defined "sacrifice" in monetary sense, and mainly defined "benefits" in terms of quality. For instance, Fornell, Johnson, Anderson, Cha and Bryant (1996) defined perceived value as "the perceived level of product quality relative to the price paid" (p. 9). On the other hand, Stevens (1992) defined perceived value as "the relationship between price, quality and quantity" (p. 44). Unlike the view of sacrifice in monetary sense, some researchers have considered sacrifices as non-monetary factors such as time, effort, poor performance risk, etc. (Snoj, Korda & Mumel, 2004). In other words, perceived value is defined as "the mental estimate that consumers make of the product, where perceptions of value are drawn from a personal cost/benefit assessment" (Morrison, 1989).

In particular, Zeithaml (1988) expanded the range of sacrifices by including various risks that need to be taken into consideration when purchasing and acquiring goods, in addition to searching, waiting and all other efforts invested to obtain such goods. Zeithaml (1988) also defined the range of perceived benefits more broadly ("what is received"), by putting forward that perceived quality depends on the consumer's judgment of the overall excellence or superiority of a product or service. Based on this broad perspective, Zeithaml (1988, p. 14) described perceived value as "the consumer's overall assessment of the utility of a product based on the

perceptions of what is received and what is given". According to the definition of Zeithaml (1988), the perceived value can be regarded as the result of personal comparison of the benefits gained after the purchase action and individual sacrifice (both monetary and non-monetary), but this concept is considered to be very subjective and personal (Parasuraman, Zeithaml & Berry, 1985).

Therefore, even though the definition of perceived value is expressed slightly differently according to the narrow or broad viewpoints of researchers, the core of the concept is consumers' assessment (Zeithaml. 1988, p. 14), cognitive judgment (Dodds, Monroe & Grewal, 1991, p. 361), or mental estimation (Morrison 1989), based on the comparison of sacrifices made and benefits received in the process of obtaining or by obtaining products or services. These definitions of past researches on perceived value are based on a one-dimensional perspective and focus on just the utilitarian aspect.

As a consequence, some researchers believe that this definition, which describes perceived value only as a uni-dimensional view of 'comparison of what is gained and sacrificed', is too simplistic and too restrictive to be able to capture the comprehensive meaning and scope of the concept (Woodruff & Gardial, 1996; Sinha & DeSarbo, 1998). From this critical point of view, another point of view was presented, which argued that the various dimensions of social psychology experienced in the purchase or consumption process can also be included in perceived value concepts. In other words, the literature of perceived value showed two main research streams, namely uni-dimensional and multi-dimensional approaches of perceived value construct.

2) The dimensions of perceived value

As can be inferred from definitions of perceived value by several researchers (e.g., Monroe, 1979; Zeithaml, 1988; Bolton & Drew, 1991), the uni-dimensional approach emphasizes that perceived value results from personal comparison of the benefits gained (positive side) and the sacrifices made (negative side) after the purchase action. The multi-dimensional approach of perceived value is based on consumer's perception toward various types of consumption values, which are independent and make differential contributions in any given situation (Sheth, Newman & Gross, 1991, p. 160). For instance, Sheth et al. (1991) identified five dimensions of perceived value, namely social, emotional (affective), functional (useful), epistemic and conditional values. Here, social value means the acceptability at an individual level and relations with the social environment (e.g. acceptance from peer group, the expression of social status), epistemic value means arousing curiosity and satisfying the desire for knowledge, and conditional values means values which are related to specific social situations.

The number and types of the dimensions of perceived value are very diverse across researchers. For example, Sweeney and Soutar (2001) derived three values (functional, social and emotional values) from Sheth et al. (1991)'s original five dimensions, and developed a scale known as PERVAL scale used in retail purchase situations (Sweeney & Soutar, 2001). In this scale, functional value is further divided into two different components of quality (performance quality) and price (value for money) based on Zeitham (1988)'s study. The PERVAL scale was found to be valid and reliable in both pre-purchase and post-purchase situations (Morar, 2013).

In a service context, Petrick (2002) proposed five dimensions of perceived value (quality, emotional response, reputation obtained by acquiring the

service, and the monetary price as the benefits which consumers received by purchasing a service/product), and then developed the PERVAL SERV scale. Similarly, Sánchez, Callarisa, Rodriguez & Moliner (2006) proposed three dimensions (functional, emotional, and social values) for measuring post-purchase perceived value in the tourism field. In addition, Sanchez et al. (2006) developed the GLOBAL scale, which considers both the consumption and the purchase experience.

A few studies have been interested in investigating the values experienced online and in mobile environment contexts, which tend to be different from a brick-and-mortar retail context (Scarpi, Pizzi & Visentin, 2014). In their assessment of perceived values, online shoppers mainly refer to their experience in respect to the search, order, and delivery of products, as well as the design and variety of contents provided by a website. On the other hand, offline shoppers mainly rely on the point of contact (e. g. sales persons), location, and merchandising, and other factors in their assessment of perceived values (Grewal, Levy, & Kumar, 2009). Research focusing on an online and mobile environment has also presented the multidimensionality of perceived value, and pointed out that wider conceptualization of perceived value is desirable in order to capture its complex and multidimensional nature (Sweeney & Soutar. 2001). According to Gentile, Spiller and Noci (2007), a consumer's experience in an online shopping context is based on interactions between the consumer and the e-retailer. It is strictly personal and it involves active participation at different levels in terms of rational, emotional, sensorial, physical, and spiritual aspects (Gentile et al., 2017, p. 397).

These different aspects can be broadly classified into two psychological dimensions, namely cognitive and affective, which have been consistently identified in many researches as significantly influential factors of consumer behavior (Martin, Mortimer & Andrews, 2015; Rose, Clark, Samouel & Hair,

2012). For example, in a survey of online store customers in Taiwan, Chiu, Wang, Fang and Huang (2014) ascertained the effects of utilitarian and hedonic value on repurchase intentions of consumers and the role of perceived risk in moderating the relationship. Similarly, in explaining and predicting the adoption of mobile data services, several studies have also confirmed the saliency of utilitarian and hedonic values (e.g., Kim, Chan & Gupta, 2007; Turel, Serenko & Bontis, 2007). Therefore, perceived values can be categorized into two broad dimensions, i.e. utilitarian and hedonic values (Im, Bhat & Lee, 2015), in a mobile shopping app context.

On this basis, a few empirical studies have directly investigated the relationships between utilitarian and hedonic values perceived in mobile shopping apps (particularly mobile apps for fashion shopping) and other constructs. Thus, this current study focused on two dimensions of perceived values (utilitarian and hedonic values) which can be cognitively and affectively assessed or experienced by consumers, investigated what attributes contribute to perceived values in a fashion shopping app context, and also identified whether the two dimensions of perceived values influence consumers' reuse intention of fashion shopping apps.

3) Utilitarian and hedonic shopping values

Consumer shopping is usually discussed in terms of its utilitarian and hedonic value (Scarpi et al., 2014). In earlier studies with traditional perspectives, shopping is considered as the activity of examining goods and services with the intent to buy and/or to hunt, through the market, for the best purchase option (Hong & Kim, 2016). This idea is based on the maximization of utilitarian value. A utilitarian shopping value is characterized by task related, goal oriented, rational, and useful shopping, which takes

shopping some kind of "work" (Griffin, Babin & Modianos, 2000, p. 3). In the shopping context, utilitarian value is mainly achieved when searching for products and making decisions on purchases (Hirschman & Holbrook, 1982), and it is evaluated by consumers' cognitive judgment, which is associated with the thinking or conscious mental processes (Gentile et al., 2007).

As for hedonic value, researchers argue that consumers can experience different types of feelings, and criticize the notion that the rational perspective only emphasizes product function and ignores the emotional arousal taking place while purchasing or shopping for products (Hirschman & Holbrook, 1982). While utilitarian value comes from effectively or efficiently obtaining the desired product during a shopping trip, hedonic value is derived from the pleasure, enjoyment and satisfaction experienced in a shopping process (Holbrook & Hirschman, 1982; Bellenger, Steinberg & Stanton, 1976; MacInnis & Price, 1987). In other words, the hedonic value of shopping is related to consumers' affective state experienced when examining window displays, browsing shelves, chatting with staff, finding bargains, and such, even if shopping does not result in an actual purchase (Markin, Lillis & Narayana, 1976; MacInnis & Price, 1987; Babin, Darden & Griffin,1994). The freedom, fantasy and escape experienced by enjoying the shopping process or from the mood of the shopping environment are also components that can contribute to hedonic value (Hirschman, 1983; Bellenger et al., 1976).

In an online shopping context, both perceived utilitarian and hedonic value can be key factors in explaining consumers' preference for online stores. In an online shopping context, shoppers enjoy convenience or efficiency because of the reduced shopping time, effort and money spent on browsing, searching, ordering, and delivery of products (Rintamäki, Kanto, Kuusela & Spence, 2006), which can explain why they make a decision to embrace online shopping. Online shoppers also experience hedonic value as well as utilitarian

value, which is derived from design cues (e.g. colors, layout, background color and patterns, or fonts), animation, music and sounds, entertainment (e.g., games or contests), and photo images of merchandise (Eroglu, Machleit & Davis, 2003), even though they cannot touch, smell, or taste products when shopping online (Childers, Carr, Peck, & Carson, 2001).

Considering the above points, several researchers have recently reported the limitation of Davis (1989)'s Technology Acceptance Model (TAM), which indicates that the acceptance of online shopping systems is based on only an utilitarian aspect, such as perceived usefulness and ease of use (e.g. Ahuja & Khazanchi, 2016; Chopda et al., 2018; Venkatesh, 2000). By taking these limitations into consideration (Venkatesh, 2000), modified and expanded the TAM by adding other influential factors (e.g. enjoyment, subjective norm, etc.) to the original TAM, and by including utilitarian factors (performance expectancy, effort expectancy, facilitating conditions and price) in addition to the hedonic and social factors (The Unified Theory of Acceptance and Use of Technology: UTAUT).

Although only a few studies directly examine perceived utilitarian and hedonic value in the mobile app context (particularly fashion shopping), according to several studies on the use of mobile data service through smartphones (Kim & Han, 2011; Li & Mao, 2015), utilitarian and hedonic values are also experienced in a mobile context. For instance, Kim and Han (2011) argued that mobile data service can be useful and convenient for a task at any time and in any place, and that data users can perceive hedonic value, such as pleasure and fun, which are derived from the visual contents or other features of mobile data service in the case of experiential usage or when using it as a non-instrumental tool rather than as a task tool (Kim & Han, 2011; Li & Mao, 2015).

As established by studies that are based on a brick-and mortar retail,

online shopping and mobile context, utilitarian and hedonic values are universally accepted as two important dimensions or types of perceived values, and the measurement of both of these values is proved to have good reliability and validity by empirical studies (Rintamäki et al., 2006; Gutman, 1982; Smith & Colgate, 2007; Chang & Tseng, 2013).

In this current study, the perceived utilitarian value of mobile shopping apps refers to the consumer's overall assessment of various functional, economic and convenient benefits, as well as the effectiveness, efficiency and practicality of the apps, which can come from a physical product itself, an intangible service, system factors of app device, the various types of text and visual contents or other features availed by mobile shopping apps. In addition, the perceived hedonic value of mobile shopping apps refers to the consumer's experience of affective benefits related to potential entertainment, enjoyment, or pleasure derived from the sensual elements, technological components, various types of contents, or other features availed by mobile shopping apps.

4. Theoretical Frame and Research Hypotheses

1) Stimuli-Organism-Response theory

The Stimuli(S)-Organism(O)-Response(R) theory, which was first introduced by Mehrabian and Russell (1974) serves as a framework for understanding how and what attributes of fashion shopping apps contribute to consumers' continuous adoption of the apps and constant purchase intention of fashion products available on the apps. The original S-O-R Model indicates that stimuli(S) in various physical and social environments is related to how retail stores influence individuals' internal (emotional) states (O),

which in turn evoke the individuals' approach or avoidance responses (R). In the original S-O-R Model, Mehrabian and Russell (1974) presented individual's internal emotional states as pleasure (or displeasure), arousal (or non-arousal), and dominance (or submissiveness), which is also known as PAD.

Donovan and Rossiter (1982) conducted a study based on the O-R link and established that shoppers' states influenced their behavioral intentions (to spend, interact with sales personnel, and make purchases in the store), and that their experiences in the store also influenced the time and money they spent in that particular store (Donovan, Rossiter, Marcoolyn & Nesdale, 1994). Subsequently, Babin et al. (2003), focusing on the S-O-R link, concluded that color in offline retail stores (S) influenced shoppers' affect (O), which in turn influenced their patronage and purchase intent (R). In addition, several studies have confirmed that certain stimuli (color, arrangement, noise, lighting, publicity) in physical stores trigger emotional responses from shoppers, which lead to access or avoidance behavior (Wu, Lee, Fu & Wang, 2013).

In particular, in an online context, Eroglu, Machleit and Davis (2001, 2003) modified and extended the original S-O-R model by including cognition state as another aspect of organism (O), and which is regarded as an internal state. In other words, the modified model emphasizes that website cues, such as colors, graphics, layout and design, and product reviews, usually influence consumers' information processing ability as well as affective states (Eroglu et al., 2001).

A series of experimental studies have, on the basis of the original or modified S-O-R Model, demonstrated that various micro-sensory attributes and atmospherics of websites influence consumers' affect (O) and/or cognition (O), which in turn influence shopping behaviors (R) in an online environment. Ha and Lennon (2010) confirmed the effect of visual merchandising (VMD)

cues on consumers' affective states, such as pleasure and arousal state, in purchasing and browsing situations. Likewise, music and product presentation (Kim, Kim & Lennon, 2009), as well as information available on a website, were determined to have some effect on consumers' responses in an online shopping environment (Kim & Lennon, 2010).

Other empirical studies have also revealed that consumers' perceptions of website features influence their internal states and shopping behaviors without stimuli manipulations. For instance, Chang and Chen (2008) empirically confirmed the significant influence that website quality had on Taiwanese shoppers' cognitive states (perceptions toward trust and risk of websites) and purchase intention. Likewise, Koo and Ju (2010) determined empirically the effects of atmospheric cues and perceptual curiosity on Korean shoppers' emotions and online shopping intention. Similarly, in a fashion shopping context, Hong and Kim (2016) established that existing customer reviews influenced Korean shoppers' cognitive state (perceived usefulness), and also indirectly influenced patronage intent of the online store hosting the reviews.

The mentioned studies have demonstrated that the S-O-R Model may be useful in explaining consumer behavior in a mobile app context and in both website and brick-and-mortar retail environments. However, most studies on the adoption behavior of mobile apps are based on the TAM model (e.g., Jang & Lee, 2014; Kang & Jin, 2007; Kim, Hwang & Cho, 2015) or on modified and extended TAM models (Chopdar et al., 2018), and only a handful of studies have made use of the S-O-R model to investigate consumers' acceptance of mobile apps.

In the context of mobile shopping apps, several studies have investigated online shopping experiences of both Chinese and Indian app users on the basis of the‐S-O-R theory. For instance, Liu and Lu (2017) surveyed Chinese consumers in Guangdong, Hunan and Hubei provinces, who had

experiences in online and app shopping, and found out that shopping apps features (knowledge, convenience, and entertainment) significantly influenced the consumers psychological emotions, such as pleasure and arousal (the link of stimuli-emotional state link), which made the consumers to have impulse buying intent when using the apps (the link of organism-behavioral response). In addition, Chopdar and Sivakumar (2018) investigated Indian users who had used mobile shopping apps, and used the S-O-R model as the theoretical framework. The authors established that a mobile buyer's encounter with psychological contract violation (stimulation) alters service quality and perceived value (organism), which in turn contributes to a positive WOM intent (response) for mobile shopping apps. All of the above studies suggest that the S-O-R Model can be successfully applied to mobile app shopping research.

2) The relationship between app attributes and perceived value

(1) System-related attributes

In the context of mobile shopping apps, system-related attributes are related to essential features that enable consumers to shop or purchase items through the apps anytime and anywhere, and elements contributing to system quality which means technical success (DeLone & McLean, 1992, 2003). For example, if an app does not have search, payment, privacy or security features, or a visually designed virtual space, consumers will not be able to shop or buy items through this app. Similarly, without these features, companies will not be able to do business with this app. Generally, system-related attributes are built into the system during the app development process, and system quality is mainly evaluated by its'

superiority in terms of ease-of-use, functionality, reliability, flexibility, data generation, portability, integration, and so on (DeLone & McLean, 2003).

These functional or practical attributes, such as system quality, cost saving, accessibility and convenience can be associated with the perceived utilitarian shopping value in a mobile app shopping environment (Cha & Park, 2017). In a fashion app context, only a few empirical studies have identified the relationship between system attributes and consumers' response. Lee & Lee (2013) investigated Korean consumers and revealed that the downloading of fashion apps is related to the ease of use and perceived usefulness of fashion apps. Although previous studies have not empirically and statistically examined the direct effects of system attributes on consumers' responses, a few studies have pointed out the existence of a relationship between system attributes and perceived utilitarian value. For instance, referring to Parker and Wang (2016)'s in-depth interview with the UK fashion consumers in m-commerce retail app context, consumers emphasized the importance of easy processes, quick downloading, and accessibility when it comes to saving time, money, and energy, subsequent to which they recognized that m-commerce retail apps are 'easy to handle or almost easy to use'.

In the context of non-fashion apps, such as branded apps, catering apps, or mobile coupon apps, a few studies have identified the effect of system quality, privacy, or security on the perceived utilitarian value of such apps. Tseng and Lee (2018) investigated the relationship between system quality and perceived usefulness of mobile commerce-centric branded apps across different brands (Amazon, Etsy, Macy's, Walmart, Target, Walgreen, Home Depot, Domino's Pizza, Starbucks, Adidas, Samsung, Loreal, Zara, Gap, Nike, and Apple). The authors found out that the perceived usefulness of branded apps was affected by system quality, which was measured by simple layouts, efficient search for products, easy navigation, and appealing appearance of

branded apps. Similarly, in a mobile catering app context, Wang et al., (2019) confirmed that system quality, which was evaluated from consumers' perception of the degree of ease of use, reliability without error, high efficiency and user familiarity with the app, had a significant effect on the uni-dimensional perceived value, which translates to 'value for money'.

In regard to the direct effect of privacy or safety on the perceived values of an app environment, Liu et al. (2015) conducted an empirical study on Chinese consumers' acceptance of mobile coupon apps and reported that consumers' perception of privacy risk had a negative effect on uni-dimensional perceived value of the apps, which was measured by the value, benefits, and worthiness of the apps compared to sacrifice (money, effort, time). In addition, in the context of mobile augmented reality shopping apps, Dacko (2017) reported that US consumers presented possible negative or drawback aspects of the apps, such as "have to give too much personal information", "not reliable enough to use regularly", "time consuming to learn" and "difficult to use". Although it was not a study of app shopping, Assarut and Eiamkanchanalai (2015)'s study on mobile shopping revealed that Bangkok mobile shoppers' positive perception of security increased the perceived value of mobile shopping for fashion goods and for reserving accommodations. Therefore, our study has assumed that system attributes will be related to utilitarian value in a fashion shopping context.

The effects of app designs of mobile apps on users' response have received little attention from researchers. Considering previous researchers have stated that hedonic value tends to be more personal and subjective than utilitarian value and that it is related to customers' senses and emotions, then empirical attributes (e.g., positive or negative feelings or aesthetic properties like color, form, background design) can increase consumers' perception of hedonic value (Brakus, Schmitt & Zarantonello, 2009; Cha & Park, 2017).

Parker and Wang (2016) held in-depth interviews with UK consumers and established that one of the reasons why consumers enjoy shopping for fashion products through apps is for "leisure and relaxation" and "reducing pressure". Kim, Lin and Sung (2011) also reported that Korean smartphone users mentioned pleasure as one of factors influencing their decision to shop or purchase though apps.

While there are almost no studies confirming the significant effect of system attributes of an app on hedonistic value, it is still possible to establish a meaningful relationship between the two constructs considering that searching information, browsing across products, and uploading pictures can be classified as experiential behavior (Ahuja & Khazanchi, 2016). In other words, due to overly large download volumes, privacy issues and insecure payment methods, as well as the limited payment options, app users may feel frustrated when downloading apps or when browsing, searching and shopping for products through apps (Gove & Mirza, 2016). This implies that system properties of mobile apps can contribute to shoppers' perception of hedonic value in an app shopping context.

Studies on the relationship between app design and hedonic value were not found, but according to several studies examining the effects of website design on consumers' response, the shapes of graphical buttons, pictures, menu boxes, overall layout and background color were determined to deliver an exciting experience and to influence the levels of pleasure and arousal (Ha & Im, 2012; Rowley, 2004; Wu et al., 2013). For instance, Ettis (2017) confirmed that in an online store context, consumers' perceptions of enjoyment were different depending on whether the background color is a warm hue (yellow) or a cool hue (blue). In other words, online store color played an important role in creating an enjoyment experience for users, with a blue hue observed to induce more enjoyment than a yellow hue.

Although the exact effect of app design on perceived value in the mobile app context is currently unknown, several studies on web design or online stores have reported the importance of high standard layouts and the proper use of color, photo image and other elements. In particular, due to small size of screens in an app environment, imperfect app layouts may limit the efficiency of online fashion shopping (Magrath & McCormick, 2013). This assumption is based on the finding that the color of online stores determines the perceived utilitarian value of online shopping. For instance, Ettis (2017) confirmed that online stores with a blue atmospheric hue (cool color) boost shoppers' concentration, which translates to extensive navigation and focused attention, more strongly than online stores with a yellow atmospheric hue (warm colors). In the meantime, according to research on websites, a website layout is related to the function and use of navigation buttons to browse the website (Harris & Goode, 2010), and it makes it easy to find information on the website (Chung, Song & Koo, 2010). Although these results are from research on online stores or websites, previous findings have hinted at the impact of app design on shoppers' perception of the utilitarian value of mobile apps.

Thus, based on past literature on fashion and non-fashion apps, including mobile and online shopping literature, system-related attributes of fashion shopping apps will have significant effects on the perceived utilitarian value or hedonic value of fashion shopping apps.

(2) Service-related attributes

In mobile environment, system properties are pre-fixed in the app development process, but service-related attributes are changeable from time to time while using mobile apps. Service attributes can contribute to service

quality, which refers to service excellence emanating from comparisons of expectations with service performance (Parasuraman, Zeithaml & Berry, 1988). Responsiveness, trust, and personalization have been noted to be important factors contributing to e-service quality (Lee & Lin, 2005). In a fashion shopping app context, only a few studies have examined the direct effect of service attributes on the utilitarian and hedonic values of apps. In previous studies on apps, including studies on the aspects of non-fashion apps, the effect of service attributes on perceived value was mainly identified in terms of an app's overall service quality, information service, personalization, augmented reality, location based service, and interactivity.

The effect of service quality of mobile apps on their perceived utilitarian value has been discussed in Wang et al. (2019)'s Taiwan consumer research, which is based on a catering app context. The authors surveyed Taiwanese consumers with experience of using catering apps to order meals through the food and beverage board of the biggest bulletin board system, and found out that service quality, which was measured by aspects like problem solving, privacy/safety, and personalization, was significantly related to the uni-dimensional perceived value of apps.

Information services provided by mobile app stores selling fashion products are fairly diverse depending on sources (e.g., firm or customer oriented information), formats (e.g., text or image based information), quantity (e.g., online simple evaluation or highly detailed description) and quality (e.g., symbolic mark or written information). Lee and Lee (2013) reported that information about various fashion app attributes was significantly related to Korean consumers' perception of ease of use and usefulness of fashion apps. In a branded app context, Tseng and Lee (2018) revealed that information quality, which refers to the accuracy, truthfulness, relevance, and concreteness of message and contents (DeLone & McLean, 1992), had a significant effect

on perceived usefulness. Similarly, an empirical study on catering apps conducted by Wang et al. (2019) revealed that information quality, which was evaluated by precise, sufficient, and up-to-date information, significantly influenced the uni-dimensional perceived value of the apps from a utility viewpoint.

Customization or personalization refers to something being tailored to fit a person's needs. In an app context, the relationship between personalization and perceived value was found in studies of consumers in the UK (retail apps) and Korea (fashion apps and branded apps). According to Parker and Wang (2019)'s in-depth interviews, the UK respondents mentioned that they enjoyed personalized services (locational sensitive services, personalized product promotion, and browsing history record) provided by mobile retail apps, when shopping fashion products. In a fashion app context, Kim et al. (2015) conducted a study that confirmed the effect of personalization on Korean consumers' perception of utilitarian value (ease of use and perceived usefulness) of the apps. Other two studies about branded apps focusing on Korean consumers (Kwak, Yim & Kwon, 2014; Jang & Lee, 2014) also confirmed the relationship between customization and perceived utilitarian values, i.e. the customized features of branded apps had a significant effect on the perceived usefulness of the apps.

Augmented reality (AR) is characterized by a combination of real and virtual images with real-time interactive and virtual worlds according to the theory of augmented reality (Azuma, 1997). The significant relationship between AR and perceived value was found for Korean consumers (fashion related AR) and the US consumers (shopping related AR). In regard to augmented reality fashion apps, So and Kim (2013) confirmed that users' experience of entertainment and aesthetics positively influenced Korean consumers' pleasure while using the apps. In a retail environment, AR

includes all approaches to combining computer generated images with real image and/or location information for a richer and more impressive retail experience (Papagiannidis, Pantano, See-To & Bourlakis, 2009). In Android-based mobile AR shopping apps, Dacko (2017) found out that over 50% of users in the US perceived aspects related to utilitarian value (more efficient or better value shopping) and hedonic value (more entertaining, more visually appealing, higher service quality, more intrinsically enjoyable shopping)

The location-based service (LBS) is a service that provides useful functions by utilizing location information based on GPS or mobile communication networks (Han, 2012). LBS services are reported to be more active among food and beverage companies (Kim, Park & Jeon, 2016). In a food and beverage brand app context, Kim et al. (2016) showed that the convenience and informativeness of location-based service had a positive impact on Korean consumers' app engagement. Here, app engagement is related to utilitarian value because this variable was measured as information capturing the user's attention, information enticing the user to click, and concentration when using the app.

The concept of interactivity consists of reciprocity and double-way communication (Alba, Lynch, Weitz, Janiszewski, Lutz, Sawyer & Wood, 1997), and user-to-user dialog (Evans & Wurster, 1997; Johnson, Bruner & Kumar, 2006). From a user perspective, interactivity is defined as the degree to which two or more communication parties can act on each other on the communication medium and on the messages (Liu & Shrum, 2002, p. 54). In retail apps for fashion shopping, shoppers interact with app managers via e-mail, message and phone, and shoppers also interact with other shoppers through customer reviews provided in several formats, such as text reviews, photo reviews, instant messages, and so on. In particular, according to the

authors, sharing photographic images of various products that Chinese app users consider good to purchase with friends on SNS platforms (e.g. Wechat, QQ etc.) makes it possible to interact with other consumers in the external environment in real time and at the point of purchase.

A few studies have empirically demonstrated the impact of these real-time interactions on consumer responses in an app context through a large-scale sample. One study, which is not particularly about real-time interaction, implied the meaningful relationship between interaction within apps and perceived utilitarian value. Wang and Lee (2015) investigated Chinese customers who had experience of making purchases through social shopping curation apps, and found out that interactions among customers and sharing of information (the tendency of possession of information across members) increased Chinese consumers' expectation of effort in a social shopping curation app context. According to the authors' explanation, consumers' expectation of effort refers to the capability to solve their problems easily and quickly when using social shopping curation apps. In a survey of the U.S. smartphone users, Kim and Baek (2018) concluded that both time convenience and interactivity positively influenced mobile app engagement, which is an indication of inspiration from an app, an emotional connection to an app, and learning of new things from an app. Thus, it can be said that service-related attributes of fashion shopping apps will have significant effects on perceived utilitarian and hedonic values of fashion shopping apps.

(3) Marketing mix-related attributes

A marketing mix, also called a "4p" mix, is a marketing strategy that combines or mixes well products, places, prices, and promotions. The elements of a marketing mix can contribute to a consumers' perception of

utilitarian value and hedonic value in mobile fashion shopping apps. First, in the case of fashion products which are visually presented and expressed in the format of photo images, the image itself becomes some form of information. Owing to such nature of fashion products, app shoppers can perceive both utilitarian and hedonic values when browsing and searching for fashion products. In fact, Park, Jin and Park (2018) showed that fashion products positively influenced Chinese and Korean shoppers' pleasure in the context of app shopping for fashion products. However, in a study on Taiwan consumers' use of catering apps (a non-fashion shopping context), Wang et al. (2019) found that product quality (e.g., products meeting consumer needs, reliable quality products, new products, consistency between the displayed and real products) had no significant effect on the uni-dimensional perceived value which was measured by the items evaluating utilitarian value. This inconsistency in study results can be blamed on the different product types (i.e. fashion and non-fashion products).

Two studies examining the impact of product prices of mobile apps on consumer response were conducted for the same Taiwanese consumers, but still gave inconsistent results. Wang et al. (2019) showed that the price factor, which was evaluated as cheaper price and saving of money, negatively influenced the uni-dimensional perceived value in catering apps. However, in a social shopping curation app context, Wang and Lee (2015) didn't have that discount price was related to 'expectation of effort'. Even if two independent studies surveyed consumers in the same country, discrepant results may still be generated due to differences in the types of apps under survey.

Regarding the promotion of mobile apps, both a Korean consumer study on the use of fashion shopping apps and a Taiwanese consumer study on the use of catering apps gave consistent results. In other words, Lee and Lee (2013) reported continuous promotion (e.g, push notifications) was positively

related to the perceived usefulness of fashion shopping apps, and Wang et al. (2019) also reported that promotions (e.g, frequently offering valuable mobile coupons) positively influenced the uni-dimensional perceived value of catering apps.

To generalize the research results, it is necessary to study various kinds of apps and various products available on apps. When giving emphasis to studies conducted in the context of mobile apps for fashion shopping (Park, Jin & Park, 2018; Lee & Lee, 2013), it is assumed that products and promotions of mobile apps will also influence consumers' perception of the utilitarian value or hedonic value of the mobile apps.

In addition, several studies in a retail context, but not a mobile app context, showed there is a significant relationship between price and perceived utilitarian value and hedonic value (e.g., Hong & Lee, 2005; Jin, 1998). For instance, Hong and Lee (2005) confirmed that in an online shopping environment, fashion product prices and product assortment contributed to fashion shoppers' positive emotional experiences. Based on the mentioned literature, the marketing mix attributes of fashion shopping apps will have significant effects on the perceived utilitarian value or perceived hedonic value of fashion shopping apps.

As seen in previous studies on online shopping, mobile shopping, fashion and non-fashion app shopping mentioned above, it is clear that attributes related to system, service, and marketing mix can also influence Chinese female consumers' perception of the utilitarian value and hedonic value of fashion shopping apps. On this basis, the following hypotheses were established.

Hypothesis 1: The attributes of fashion shopping apps will have positive effects on the perceived utilitarian value of fashion shopping apps.

Hypothesis 2: The attributes of fashion shopping apps will have positive effects on the perceived hedonic value of fashion shopping apps.

3) The relationship between app attributes and behavioral intention

The direct effects of app attributes on consumer behavioral intentions have been explored in a number of contexts, including fashion apps, brand apps, AR apps, and shopping apps, for consumers in various countries, such as Korea, China, Taiwan, India and the US.

Among system-related attributes, the impacts of privacy and security on consumers' app use behavior have been investigated in the context of mobile shopping apps. According to Chopdar et al. (2018), privacy risk negatively influenced Indian consumers' intention to use mobile shopping apps, while it had no impact on the U.S. consumers' intention to use the same apps. In addition, the authors found out that security risks had no influence both Indian and the US consumers' intention to use the apps. However, according to a study by Ryu and Shin (2013) on service and tourism industries, it has been shown that the security of branded apps affected Korean consumers' purchase intention of the apps. The direct effects of app design on consumers' use behavior have been also identified in the context of a mobile shopping app (Park et al., 2018) and brand app (Ryu & Shin, 2013). In particular, research has established that both Korean and Chinese consumers'

loyalty for mobile shopping apps is influenced by app design (Park et al., 2018). In a hospitality and tourism context, the design of branded apps has also been noted to influence Koreans' purchase intention (Ryu & Shin, 2013).

Research to determine the direct impact of service quality of mobile shopping apps on consumers' behavioral intent has been conducted through a survey of Indian consumers with mobile shopping experiences. Based on Indian consumer data, Chopdar and Sivakumar (2018) confirmed that service quality had a significant effect on word-of-mouth, which was measured by the degree of recommendation of shopping apps as well as purchases made on the shopping apps.

In addition, the direct effects of service attributes of mobile apps on consumers' use behavior were identified in terms of augmented reality and information services, including services that facilitate user-to-user interactions as well as interactions between app managers and app users. Through research on various information services provided by fashion apps, Choi and Lee (2012) established that basic, additional and convenient information had an effect on app loyalty among Korean consumers, but social network information had no influence on their app loyalty. Another study on mobile fashion shopping apps (Heo et al., 2016) also found out that information about price and special products significantly influenced Korean consumers' intent to use such apps. In the context of mobile shopping apps, which are non-fashion apps, Kwak et al. (2014) confirmed that the information offered by mobile shopping apps positively influenced the repurchase intention of app shoppers.

In a study investigating cross-shoppers, Park, Jin and Park, (2018) determined that mobile shopping app attributes, such as customer reviews, information, and manager's immediate responses, affected app loyalty among Korean consumers. The authors also reported that app loyalty among Chinese shoppers was positively affected by managers' prompt responses. The

information accuracy and immediate responsiveness of branded apps in the hospitality and tourism industries were also found to influence the purchase intention of Korean consumers (Ryu & Shin, 2013). Moreover, a study on mobile AR shopping apps conducted by Dacko (2017) established that about 40% and above of the US app users had intent to purchase AR retail apps.

Among marketing mix-related attributes, whether the products and promotions offered by mobile apps directly affect the use intent of mobile apps has been investigated. Based on empirical data, Sung (2013) reported that product attributes positively influenced Korean consumers' intent to use mobile apps for fashion shopping, and that product quality risk negatively influenced the same. However, according to another study on fashion shopping apps (Heo et al., 2016), product image and promotion program had no effect on the use intent of mobile fashion shopping apps. Thus, it is clear that only a few studies have examined the effects of products and promotions of mobile shopping apps on consumers' intention to use the apps, though such studies showed mixed results in a Korean consumer context. Nevertheless, in a mobile shopping or online shopping environment, previous studies have revealed that marketing mix factors had a significant effect on consumer behavior (e.g., Hsiao, Chuan-Chuan Lin, Wang, Lu and Yu, 2010; Jin, 1998; Sung, 2013; Zeithaml, Parasuraman & Malhotra, 2002). Considering the findings of these studies, it is meaningful to clarify the effect of marketing mix factors of fashion shopping apps on Chinese consumers' usage behavior in this study.

Despite targeting limited Korean and Chinese consumers, a few studies that focused on fashion shopping apps reported that some system attributes, service attributes and marketing mix attributes were significantly related to consumers' intention to use such apps. On this basis, the following hypothesis is assumed.

Hypothesis 3. The attributes of fashion shopping apps will have a positive effects on Chinese female consumers' intention to reuse fashion shopping apps.

4) The relationship between perceived value and behavioral intention

The effect of factors related to utilitarian and hedonic values on consumers' intent to use mobile apps have been explored through surveys of consumers across several countries and in diverse categories of mobile apps, such as fashion shopping apps (Korean consumers), augmented reality fashion apps (Korean consumers), commerce-centric branded apps (the US consumers), catering apps (Taiwanese consumers), tour guide apps (Macao travelers), social shopping curation apps (Chinese consumers), food and beverage brand apps (Korean consumers), grocery shopping apps (Indian consumers), branded apps (Korean consumers) and mobile apps (Korean consumers).

In a fashion shopping context, Sung (2013) confirmed the 'ease of use' perceived during app shopping increased Korean consumers' intention to use the apps. Additionally, So and Kim (2013) found out that the pleasure experienced in augmented reality fashion shopping apps increased Korean shoppers' intention to reuse and make purchases through the apps. According to a study on cross-over shoppers in a mobile fashion shopping context (Park, Jin & Park, 2018), Korean shoppers' flow experience, which means users' feeling fun, enjoying freedom and forgetting about things around them during app shopping for fashion products, increased their app loyalty, but Chinese shoppers' flow experience was not related to app loyalty. In another study on Korean consumers' use of food and beverage brand apps (Kim, Park

& Jeon, 2016), app engagement, which means users' concentrating and paying attention to an app, was seen to have a positive effect on users' intention to use the apps.

According to research on Chinese consumers' intention to use social shopping curation apps (Wang & Lee, 2015), consumers' expectation of effort, which refers to using social shopping curation apps easily, positively influenced consumers' constant intention to use the apps. In another study on the technological acceptance of an app-based mobile tour guide (Lai, 2015), perceived informativeness and entertainment from the apps were determined to have positive influence on Macao travelers' intent to use the guide apps.

Similarly, other studies have implied the significant relationship between utilitarian value and the use intent of mobile catering apps, grocery shopping apps, and mobile commerce-centric branded apps. For instance, Wang et al. (2019) found out that uni-dimensional perceived value, which refers to product and service values for money, had a positive impact on Taiwanese consumers' intention to reuse mobile catering apps. In addition, Shukla and Sharma (2018) pointed out that perceived usefulness had a significant effect on Indian consumers' intention to use grocery shopping apps. A study on the US consumers (Tseng & Lee, 2018) also confirmed that the perceived usefulness of mobile commerce-centric branded apps had a positive effect on the behavioral intentions for app loyalty, including in-app purchase intention, continuous use intention, and word-of-mouth intention. Therefore, based on the evidence from past literature and the S-O-R model, the following hypotheses were proposed:

Hypothesis 4. The perceived utilitarian value will have a positive effect on Chinese female consumers' intention to reuse fashion shopping apps.

Hypothesis 5. The perceived hedonic value will have a positive effect on Chinese female consumers' intention to reuse fashion shopping apps.

5) Conceptual framework for this study

Based on the review of the S-O-R model and past literature, the author believes that the S-O-R framework provides an appropriate theoretical foundation for analyzing the effects of app attributes on perceived value (stimuli-organism link), and the effects of perceived value on consumers' behavioral intention (organism-response link). Thus, a conceptual model for this study was developed by interlinking the attributes, perceived values, and reuse intention of mobile shopping apps under the S-O-R framework. Figure 1 shows the conceptual framework for this study.

In order to identify what attributes of fashion shopping apps influence consumers' perception of fashion shopping apps, attributes related to system, service, and marketing mix- were introduced as independent variables (stimuli) based on the findings of previous studies. The utilitarian and hedonic values experienced from fashion shopping apps were introduced as factors explaining shoppers' internal states (organism: cognitive and affective states) based on the S-O-R model. The reuse intention of fashion shopping apps (response) was seated with shoppers' reactions that, which ultimately show up depending on stimulation from of the fashion shopping apps, and shoppers' internal state, on the basis of the S-O-R model and literature review. The conceptual model, including the five hypotheses shown in Fig. 1, show how app attributes (stimulus) directly or indirectly influence shopper' intent to reuse fashion shopping apps (response) through perceived utilitarian and hedonist values (organism).
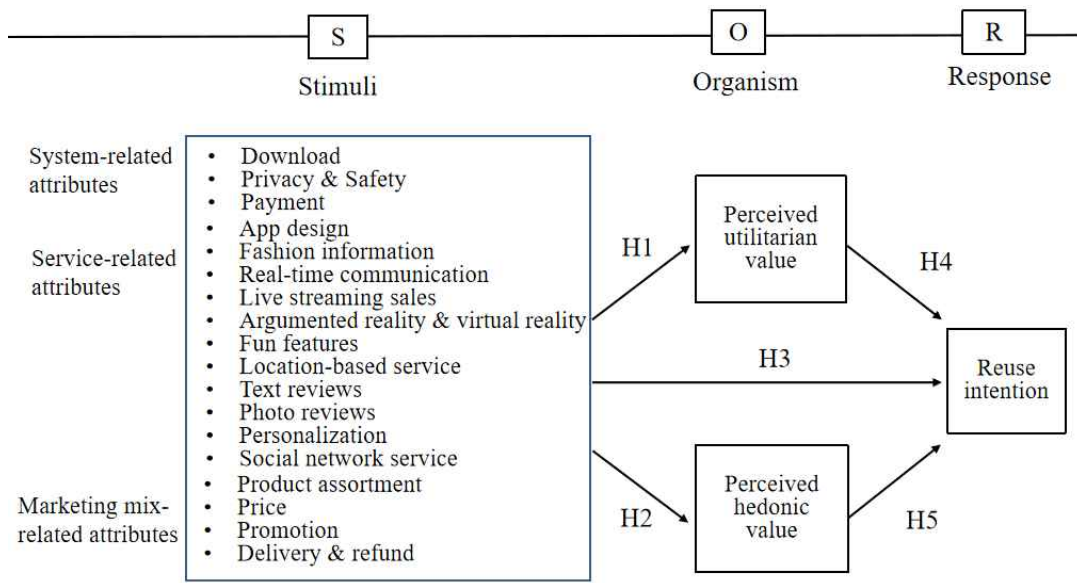
Figure 1. The conceptual model and hypotheses

Ⅲ. Research Method

Before testing the hypotheses, the contents analysis of fashion apps available in China and focus group interviews for Chinese students were conducted. In this part, the results of the content analysis of fashion apps, focus group interviews, questionnaire development, research variable measurement, data collection, and demographic characteristics of respondents were presented.

1. Investigation of Attributes of Fashion Shopping Apps Available in China

Prior to the questionnaire development, in order to select the type of fashion apps for this study and examine app attributes of fashion apps in China, the apps were searched using the keywords of "fashion apps" on a site (360 Shou Ji Zhu Shou), which provides a list of popular apps in China. The top 50 fashion brand apps and top 50 fashion retail apps in China were selected based on the number of downloads. In Table 7 and Table 8, the name and stats of the selected apps were presented, which included the number of downloads, the number of customer reviews and consumer rating scores. By content analysis method, the attributes of the 100 selected fashion apps were determined based on app contents and characteristics suggested by previous studies (e.g., Choi & Kim, 2011; Kim, 2012; Jang, 2012; Ju et al., 2013). Eventually, the app attributes were classified into fourteen attributes: text and visual information, homepage, purchase function, location-based service (LBS), customer text reviews and photo reviews, entertainment, social network service (SNS), code identification system(CIS), live streaming sales (LSS), photo identification system (PIS), virtual reality (VR), augmented

제주대학교 중앙도서관
JEJU NATIONAL UNIVERSITY LIBRARY

reality (AR), and real-time communication (RC).

Table 7. The name of selected 50 retail apps

Ranking of download	Launching	App Name	Download	Score (10 point)	Reviews
1	2003	Tao bao	914,800,000	9.2	150,959
2	2013	Jing dong	182,270,000	7.7	4,157
3	2012	Tmall	154,380,000	6	2,172
4	2008	Wei pin hui	106,930,000	9.1	10,783
5	2011	Su ning yi gou	63,790,000	8.1	2,976
6	2015	Pin duo duo	56,880,000	9.1	18,851
7	2013	Mogu street	42,770,000	8.5	7,698
8	2010	Ju mei you pin	36,570,000	9.3	3,924
9	2009	Mei li shuo	28,650,000	8.8	5,063
10	2013	Wei dian	21,140,000	9.6	26,651
11	2016	Feng chao	20,700,000	9.9	7,523
12	2012	Hichao	13,650,000	9.2	870
13	2008	Le feng	10,480,000	7.9	2,232
14	2015	Kou dai gou wu	10,250,000	7.5	352
15	2015	Bao bei ge zi	10,100,000	9.7	2,587
16	2012	I chuan yi	10,000,000	9.5	3,957
17	2013	Red	5,190,000	9.1	1,315
18	2015	Ban tang	4,650,000	9.8	4,692
19	2014	Higo	4,290,000	9.6	625
20	2014	Xin kuan	3,690,000	9.9	12,453
21	2014	Li wu shuo	3,390,000	9.3	2,286
22	2010	Shang pin	2,330,000	9.7	882
23	2014	Da ling	2,300,000	9.7	1,019
24	2014	Chu chu jie	2,150,000	9.4	630
25	2016	See	1,760,000	9.0	313
26	2014	Mei li yi chu	1,690,000	9.0	239
27	2009	Yoho!buy	1,340,000	8.7	272
28	2016	Si mi da	1,080,000	9.8	1,173
29	2016	Hong dou jiao	820,000	9.9	749
30	2015	JStyle	660,000	9.7	118
31	2016	MFD	640,000	9.6	69
32	2011	D2C	580,000	9.4	419
33	2016	Mei xi	550,000	9.9	1,032
33	2015	Meng ba sha	550,000	6.8	21
35	2010	Dui tang	410,000	8.9	136
36	2015	Xiao hong chun	400,000	8.9	183
37	2014	Lu kou	380,000	9.6	625
38	2014	Chao liu nv zhuang	170,000	9.1	69
38	2015	You diao	170,000	7.3	15

Table 7. (continued)

Ranking of download	Launching	App Name	Download	Score (10 point)	Reviews
40	2012	Zaker chu chuang	160,000	6.9	4
41	2015	Xiu pin	140,000	9.7	285
42	2015	Guechi	110,000	8.0	35
43	2014	Chao bai da	70,000	5.6	17
44	2016	Yi ding shi shang	50,000	9.8	162
44	2013	Model+	50,000	6.3	91
44	2015	Mei tian	50,000	9.7	103
47	2015	Yi lian shi shang	30,000	8.3	166
47	2000	Sa sa	30,000	7.1	17
47	2015	Outfit	30,000	7.0	13
50	2017	Hao da	10,000	8.2	55

Table 8. The name of selected 50 fashion brand apps

Ranking of download	Launching	App Name	Download	Score (10 point)	Reviews
1	2015	Fanke	4,930,000	4.1	392
2	2013	Uniqlo	410,000	6.4	11
3	2015	H&M	270,000	6.4	35
4	2014	Zara	150,000	8.0	31
5	2014	Gap	50,000	6.5	6
6	2015	Muji	40,000	5.0	6
7	2012	Li ning	30,000	6.8	7
7	2014	Yin man	30,000	5.9	8
9	2013	Metersbonwe	20,000	7.1	5
9	2015	Shophop	20,000	7.2	8
9	2013	Hla	20,000	8.9	35
12	2013	Tebu	9708	4.5	24
13	2014	Nike	9644	6.3	2
14	2013	Jack Jones	9177	7.1	4
15	2013	Adidas	8803	6.2	2
16	2013	Forever21	8075	6.0	3
17	2013	Tommy hilfiger	7449	6.0	3
18	2014	Semir	5285	5.9	4
19	2011	Yishion	3615	6.0	15
20	2013	Zuo dan nu	3477	6.3	15
21	2015	Topshop	3179	6.8	1
22	2013	Camel	2690	7.5	2
23	2015	New balance	2426	6.6	1
24	2014	Erke	2159	6.0	1
25	2015	Belle	2101	6.0	0

Table 8. (continued)

Ranking of download	Launching	App Name	Download	Score (10 point)	Reviews
26	2013	Peace bird	2018	6.1	4
27	2013	Only	1719	7.2	1
28	2012	Septwolves	1411	6.3	1
29	2014	Eanswest	1173	6.0	12
30	2013	Puma	1105	6.0	5
31	2014	Duo yi	791	7.0	6
32	2013	GXG	756	7.5	3
33	2012	Kappa	725	6.5	5
34	2012	361°	714	6.0	3
35	2012	Etam	689	7.0	2
36	2016	Mango	651	7.2	1
37	2016	Esprit	568	7.2	1
38	2016	Elf sack	522	6.0	0
39	2014	Qiu shui yi ren	452	6	0
40	2015	Baleno	431	6	0
41	2015	Tonlion	359	7.0	6
42	2012	Qi pai	343	6.0	5
43	2012	Reebok	278	7.0	4
44	2013	Goelia	267	7.2	1
45	2017	Old navy	240	6.0	3
46	2014	Ochirly	234	6.0	0
47	2014	Girdear	229	6.0	0
48	2014	Levi's	199	7.0	6
49	2015	Lee	175	6.0	3
50	2014	Jin ba	40	6.0	0

The results of the comparison of properties of branded apps and shopping apps are shown in Table 9. Four attributes, namely entertainment, VR, live streaming sales, and AR were not found in the brand applications, while two attributes, i.e. code identification system and photo identification system, were not found in the shopping applications. In addition, three attributes of SNS, customers' text reviews and photo reviews were more pronounced in shopping apps than brand apps in China. These findings imply that, in China, fashion shopping apps were more prosperous than fashion brand apps. Therefore, it was decided that investigations on the use of fashion shopping

apps among Chinese consumers would be most appropriate for the current study.

Table 9. The comparison of attributes between fashion brand apps and retail apps in China accounts

types / attributes	Shopping apps Freq.(%)	Brand apps Freq.(%)
Information	50 (100%)	50 (100%)
Social network service	48 (96%)	10 (20%)
Location-based service	13 (26%)	8 (16%)
Entertainment	10 (20%)	0 (0%)
Purchase function	50 (100%)	50 (100%)
Code identification system	0 (0%)	8 (16%)
Photo identification system	0 (0%)	8 (16%)
Virtual reality	2 (4%)	0 (0%)
Homepage	2 (4%)	50 (100%)
Real-time customer service	13 (26%)	4 (8%)
Live streaming seller	6 (12%)	0 (0%)
Photo reviews	46 (92%)	8 (16%)
Customers' text reviews and evaluation	50 (100%)	25 (50%)
Augment reality	5 (10%)	0 (0%)

2. Focus Group Interviews with Chinese Consumers

To determine the important or useful attributes of fashion apps in China, focus group interviews were conducted for Chinese students majoring in fashion at a university and living in Korea. The characteristics of Chinese interviewee were presented in Table 10. The use frequencies of fashion apps and shopping apps were evaluated using a 5-point scale. As a result of focus group interview, for each app, the Chinese students were concerned with the download capacity, consumer rating score, payment security, and refund information when selecting fashion apps. In particular, Chinese students considered eleven attributes (ubiquity, post-purchase service, coordination

style suggestion service, media services of live broadcast and video, real-time communication service, product image sharing service through SNS, location-based service, and virtual experience services) as useful or impressive app attributes. In the interviews, respondents frequently described their pleasant and negative feelings about their app experience and a variety of helpful functions perceived when using fashion apps. Furthermore, Chinese students revealed fashion items, such as apparel products (e.g., coat, dress, skirt, sweater, top and top), fashion goods (e.g., bags, shoes), and accessories which they purchased through fashion shopping apps. Then, the information that was acquired from the interviews was incorporated in the questionnaire development, and also it showed that perceived utilitarian and hedonic values and the use intent of mobile apps could be considered as research variables, in a fashion shopping app context.

Table 10. The characteristics and app experience of interviewee

Respondents	A	B	C	D	E	F	G	H	I	J	K	L	M
Age	21	25	24	22	23	21	21	23	23	24	24	21	31
Period of residence in China	18	20	21	19	20	19	19.5	20	21	21	20	17	29
Period of residence in Korea	3	5	3	3	3	2	1.5	3	2	3	4	4	2
The number of fashion apps owned	1	3	2	2	1	2	0	1	2	6	2	8	1
The number of retail apps owned	1	4	4	5	10	3	5	3	1	4	3	2	2
Frequency of fashion app usage	3	5	4	3	3	5	2	3	3	5	3	5	4
Purchase frequency in the Shopping app	3	5	4	4	3	5	3	5	3	5	3	4	3

3. Measurement

1) Fashion shopping apps evaluated by respondents

First of all, respondents were asked to choose a fashion shopping app that they used most recently from the list of provided fashion shopping apps. Then, responses to the perceived value and continuous use intent were also given in relation to the selected app. The names of fashion shopping apps which were presented in the questionnaire were showed in Table 11. A total of forty-four apps were selected from the 50 fashion shopping apps that were included in the prior investigation, excluding six apps with low ratings, low download numbers, and low reviewers.

Table 11. The forty-four apps presented in a questionnaire

Ranking	Launching	App name	The number of download	Score (10-point)	The number of reviewers
1	2003	Tao bao	914,800,000	9.2	150,959
2	2013	Jing dong	182,270,000	7.7	4,157
3	2012	Tmall	154,380,000	6.0	2,172
4	2008	Wei pin hui	106,930,000	9.1	10,783
5	2011	Su ning yi gou	63,790,000	8.1	2,976
6	2015	Pin duo duo	56,880,000	9.1	18,851
7	2013	Mogu street	42,770,000	8.5	7,698
8	2010	Ju mei you pin	36,570,000	9.3	3,924
9	2009	Mei li shuo	28,650,000	8.8	5,063
10	2013	Wei dian	21,140,000	9.6	26,651
11	2016	Feng chao	20,700,000	9.9	7,523
12	2012	Hichao	13,650,000	9.2	870
13	2008	Le feng	10,480,000	7.9	2,232
14	2015	Kou dai gou wu	10,250,000	7.5	352
15	2015	Bao bei ge zi	10,100,000	9.7	2,587
16	2012	I chuan yi	10,000,000	9.5	3,957
17	2013	Red	5,190,000	9.1	1,315
18	2015	Ban tang	4,650,000	9.8	4,692
19	2014	Higo	4,290,000	9.6	625
20	2014	Xin kuan	3,690,000	9.9	12,453
21	2014	Li wu shuo	3,390,000	9.3	2,286
22	2010	Shang pin	2,330,000	9.7	882
23	2014	Da ling	2,300,000	9.7	1,019
24	2014	Chu chu jie	2,150,000	9.4	630
25	2016	See	1,760,000	9.0	313
26	2014	Mei li yi chu	1,690,000	9.0	239
27	2009	Yoho!buy	1,340,000	8.7	272
28	2016	Si mi da	1,080,000	9.8	1,173
29	2016	Hong dou jiao	820,000	9.9	749
30	2015	Jstyle	660,000	9.7	118

Table 11. (continued)

Ranking	Launching	App name	The number of download	Score (10-point)	The number of reviewers
31	2016	MFD	640,000	9.6	69
32	2011	D2C	580,000	9.4	419
33	2016	Mei xi	550,000	9.9	1,032
34	2015	Meng ba sha	550,000	6.8	21
35	2010	Dui tang	410,000	8.9	136
36	2015	Xiao hong chun	400,000	8.9	183
37	2014	Lu kou	380,000	9.6	625
38	2014	Chao liu nv zhuang	170,000	9.1	69
39	2015	You diao	170,000	7.3	15
40	2012	Zaker chu chuang	160,000	6.9	4
41	2015	Guechi	110,000	8.0	35
42	2016	Yi ding shi shang	50,000	9.8	162
43	2015	Yi lian shi shang	30,000	8.3	66
44	2017	Hao da	10,000	8.2	55

As shown Table 11, the number of downloads of all of the 44 fashion shopping apps ranged from 10,000 to 900 million, the consumer rating scores ranged from 6.6 to 9.9, and the number of reviewers ranged from 69 to 150,000. In terms of the number of downloads, the top four apps had more than 100 million. Specifically, Tao bao had more than 900 million. Most apps had rating scores of 8. When asking respondents to choose the most used apps, only a few apps are likely to be selected, and so responses to questions are also likely to be limited to these few apps. Therefore, the current study asked respondents to choose their most recently used fashion shopping app, instead of the most used app. The reason for asking respondents to select their most recently used apps, rather than the most frequently used app, is helpful to is helpful to vary the distribution of consumers' responses about app attributes, perceived value, and reuse intentions. The most recently used apps that were not included in the 44 fashion shopping apps on the survey were three, and three respondents wrote the name of their most recently used fashion shopping app directly in the blank space (Ju hua suan, Yi tiao, Luo tuo). Therefore, this study analyzed data obtained from 47 fashion shopping

apps.

2) The attributes of fashion shopping apps

In this study, fashion shopping apps refer to mobile apps selling fashion products, including retail apps, fashion branded apps, and various kinds of fashion apps. The attributes of the fashion shopping apps which were either selected or filled out by respondents, were measured.

As shown in Table 12, download, privacy, security, payment, and app design were included as system-related attributes. The following service-related attributes were included in the study: augmented reality service, virtual reality service, live streaming sales service, fashion information service, location-based service, personalization service, other customers' text reviews and photo review service, entertainment service, real-time communication service, and photo sharing through social network service. Fashion product assortment, product price, sales promotion, delivery and exchange/refund were categorized as marketing mix-related attributes.

The measurement items were chosen, modified or newly developed based on other existing studies, prior investigations of fashion apps by the content analysis, and focus group interviews with Chinese students. All items were measured on a 5-point Likert scale (1: strongly disagree, 5: strongly agree). The references of measurement items are presented in Table 12.

3) Perceived value of fashion shopping apps

Perceived value of fashion shopping apps refers to consumers' perception of utilitarian and hedonic shopping values from the apps in the current study. As shown in Table 12, perceived utilitarian value of fashion shopping apps was measured by five items concerned with the degree of efficiency in

acquiring fashion information, helpfulness in making a purchase decision, necessity and usefulness in shopping fashion products, and helpfulness in enhancing fashion sense and overall practicality. Perceived hedonic value was measured in terms of fun, pleasure, and amusement, including interesting, exciting, and good feelings that were experienced when browsing, shopping and purchasing items through the fashion apps and after receiving the actual products.

The measurement items were selected and modified in accordance with the context of this study based on existing studies on utilitarian value (Heo et al., 2016; Karjaluoto et al., 2018) and hedonic value (Karjaluoto et al., 2018), and the focus group interviews. All items were measured on a 5-point Likert scale (1: strongly disagree, 5: strongly agree).

Table 12. Measurement items and references

Categories and the number of items			References
System-related attributes	Download	3	FGI
	Privacy	2	Chopdar et al. (2018), FGI
	Security	2	Akinci et al. (2010), Chun and Lim(2012), Parasuraman, Zeithaml and Malhotra (2005), FGI,
	Payment	3	FGI
	App design	3	Chun and Lim(2012), Park (2016)
Service-related attributes	Augmented reality service	2	Dacko (2017), Park (2016), Park and Ko(2014), FGI
	Virtual reality service	1	FGI
	Live streaming sales service	4	FGI
	Social network service	3	FGI
	Fashion information service	6	Choi and Kim (2011),FGI
	Location-based service	3	Choi and Kim (2011), Han (2012), FGI
	Text review service	4	Hong et al. (2015)

Table 12. (continued)

Categories and the number of items			References
Service-related attributes	Photo review service	5	Choi and Kim (2011), Park and Ko (2014), FGI
	Personalization service	4	Kim et al. (2015), Jang and Lee (2014), Wang et al.(2019), FGI
	Entertainment service	4	Park and Ko (2014), FGI
	Real-time communication service	3	FGI
Marketing mix-related attributes	Product assortment	4	Sung (2013), Heo et al. (2016), FGI
	Price	4	Wang et al.(2019), Sung (2013), FGI
	Sales promotion	3	Wang et al. (2019), Park and Ko (2014),FGI
	Delivery	3	FGI
	Exchange/refund	3	FGI
Perceived utilitarian shopping value	Efficiency, Helpfulness, Usefulness, information accessibility, Practicality	5	Heo et al. (2016), Karjaluoto et al.(2018), FGI
Perceived hedonic shopping value	Fun, Pleasure, Amusement	4	Karjaluoto et al. (2018), FGI
Reuse intention of the app	willingness to use continuously, willingness to use first, willingness to use in the near future, willingness to purchase fashion through the app.	4	Wang et al.(2019), FGI
Demographic Characteristics	Age Marital statues Education level Area of residence Occupation Monthly family income	6	Researcher

4) Reuse intention of fashion shopping apps

The reuse intention of fashion shopping apps in this study refers to the willingness of respondents that reuse the fashion shopping apps which they selected or filled out. Reuse intention was measured by the items concerning the willingness to use the app continuously, first, or in the near future, and to purchase fashion through the app. The measurement items were selected from a previous study (Wang et al., 2019), and the selected items were modified to fit the context of this study. All items were measured on a 5-point Likert scale (1: strongly disagree, 5: strongly agree).

5) Demographic Characteristics

The demographic characteristics were measured using six categories, including age, marital status, education level, area of residence, occupation, and monthly family income. Marital status, occupation, and education level were measured by a forced choice scale, while age and area of residence were measured by open-ended questions. All measurement items and questionnaires written in English and Chinese are presented in appendix 1 and 2.

4. Data Collection and Respondent Characteristics

1) Questionnaire development

The questionnaire was originally made in Korean and then translated into Chinese. In order to ensure the reliability of the translation, Chinese translation was commissioned to a Korean-Chinese interpreter specialist. The Chinese questionnaire translated by the Chinese expert was then translated back into Korean and English by two researchers (a Korean professor and a Chinese graduate student), and it was verified that the original Korean questionnaire items were correctly translated into Chinese. Finally, the Chinese interpreter and the two researchers discussed the nuances of the terms of each question and then came up with the fine copy of the questionnaire by applying the most appropriate expressions.

The questionnaire consisted of four parts. In the first part of the questionnaire, the author provided respondents with a list that included 44 fashion shopping app names, and asked respondents to choose only one app that they had recently used from the provided list. If the list did not include the name of the fashion shopping app which respondents had recently used, the respondents were requested to directly write down the name of the app which they had recently used. In the second part, the measurement items were presented to evaluate the 13 attributes of the fashion shopping app that each respondent selected from the list of 44 apps, and the attributes of the app that a respondent filled out in the first question. In the third part, the measurement items were analyzed to evaluate the level of utilitarian and hedonic value perceived from the fashion shopping app that a respondent had selected among the provided list or filled out. The fourth part consisted of items asking about a respondent's intent to reuse the selected fashion shopping app. In the final part, questions asking the demographic

제주대학교 중앙도서관
JEJU NATIONAL UNIVERSITY LIBRARY

characteristics of the respondents were presented.

2) Data collection

Data for this study were collected from Chinese female consumers who were living in China between January 22 and 27 in 2019 by convenience sampling. The mobile version of the Chinese survey questionnaires were commissioned to the China survey agency (WJX.CN). A total of 304 usable questionnaires were analyzed statistically. Survey respondents were paid a reward.

3) Respondent characteristics

Respondent characteristics were presented in Table 13. Among the respondents, Chinese female consumers were in their 20s (36.2%) and 30s (33.9%), married women (75.7%), and employees (85.9%), and college graduates (75.4%) were more than those one of other categories. Metropolitan residents (48.3%) of places such as BeiJing (14.1%), Shanghai (15.8%) and Guangdong (18.4%) accounted for about half of the samples. Overall, many respondents are living in Eastern (36.8%), Central-southern (28%), and Northern (31.6%) areas of China. Approximately 54.3% of respondents in this study reported their household monthly income to be from 5,000 yuan (US$ 723) to less than 10,000 yuan (US$ 1,446).

Table 13. Respondent characteristics   (n=304)

Categories		Frequency	Percent(%)
Age	20-29 years old	110	36.2
	30-39 years old	103	33.9
	40-49 years old	67	22.0
	50-59 years old	24	7.9
Marital status	Single	73	24.0
	Married	230	75.7
	Others	1	0.3
Occupation	Housewife/unemployed	12	3.9
	Employed	261	85.9
	Students	24	7.9
	Others	7	2.3
Monthly family income (RMB)[a]	less than 5,000yuan	71	23.3
	5,000yuan - less than 10,000yuan	165	54.3
	10,000yuan - less than 5,000 yuan	40	13.2
	15,000yuan - less than 20,000yuan	14	4.6
	20,000yuan - less than 25,000yuan	8	2.6
	more than 25,000yuan	6	2.0
Education	Graduated from high school	16	5.3
	Currently college and graduate student	25	8.2
	Graduated from college	229	75.3
	Currently graduate student	5	1.6
	Graduated from graduate school	24	7.9
	Others	5	1.7
Area of residence	North China (n=72)	Bei Jing	43	23.7
		Tian Jin	5	
		Chong Qin	6	
		Nei Meng Gu	3	
		Shan Xi	7	
		He Bei	8	
	Northeast China (n=20)	Ji Lin	1	6.6
		Liao Ning	15	
		Hei Long Jiang	4	
	East China (n=112)	Shang Hai	48	36.8
		Shan Dong	21	
		An Hui	6	
		Jiang Xi	9	
		Jiang Su	14	
		Zhe Jiang	9	
		Fu Jian	5	

Table 13. (continued)   (n=304)

Categories			Frequency	Percent(%)
Area of residence	Central-southern China (n=85)	Guang Xi	4	28
		Guang Dong		
		He Nan		
		Hu Bei		
		Hu Nan		
	Southwest China (n=11)	Si Chuan	9	3.6
		Yun Nan		
	Northwest China (n=4)	Xin Jiang	1	1.3
		Shaan Xi		

a: RMB is China yuan(1 yuan: US$ 0.1446)

4) Data analysis

Exploratory factor analysis (principal components, varimax rotation, extracting factors with eigenvalues above 1.0) was conducted on the measurement items so as to evaluate the attributes, perceived value and reuse intention of fashion shopping apps. To identify what attributes contribute to the perceived values (utilitarian and hedonic values) and consumers' reuse intention of the apps, the effect of attributes on perceived value and reuse intention of the apps were analyzed by regression analysis. The influence of perceived values on the reuse intention of mobile shopping apps was also examined by regression analysis. All the exploratory factor analysis, regression analysis, and frequency and percentage analysis were conducted using SPSS 21.0.

Ⅳ. Research Results

1. Exploratory Factor Analysis and Reliability

All exploratory factor analysis(EFA) were conducted on the measurement items on the basis of the same criteria(principal components, varimax rotation, extracting factors with eigenvalues above 1.0). When conducting EFA, several items were eliminated due to cross-loading and also the items with factor loadings less than 0.5 or low commonality ($<$ 0.5) were removed if the items were not very important core items for this study. Finally, the reliability of each factor was analyzed.

1) The factor analysis of fashion shopping app attributes

The result of EFA were presented in Table 14. The measurement items were categorized into twelve factors: payment system quality, privacy/security, app design, entertainment, real-time communication, fashion information, customer reviews, live streaming sales, product assortment, money-saving price, and delivery. The payment system factor is composed of the items that measure the inferiority of the system whereas the items are coded into the reverse items for the regression analysis. Some of the attributes were not included in the derived factors (e.g., download, AR/VR, photo reviews, personalization, promotion, delivery) in that when conducting EFA, several items were eliminated due to the high cross-loading of measurement items (e.g., photo reviews, personalization). Another reason is that the two attributes are bundled into one factor (e.g., entertainment/AR, entertainment/LBS, AR/VR/LBS, payment/download, price/promotion, or refund/delivery) and putting this as an independent variable can lead mixed

results. In order to clarify the effect of an independent property, one of the two attributes is removed, merely one of which was derived as an independent factor. Twelve factors explained 57.196% of the total variance. The reliability of each factor was shown in Table 14 and the Cronbach's alpha coefficients ranged from 0.580 to 0.835, except for one factor (photo sharing through SNS) which constitutes only two items (α=.472). Most of the Cronbach's alpha coefficients were close to or higher than 0.6 or 0.7, which is a recommended value. Thus, twelve factors were used for regression analysis.

Table 14. The factor analysis of fashion shopping app attributes　　　(n=304)

Factor Name	Items	Factor Loading	Eigen value (variance %)
Entertain-ment	This app provides me with a variety of entertainment games.	.840	7.354 (20.429 %) Cronbach's α=.835
	This app allows me to enjoy my favorite entertainment.	.820	
	This app allows me to enjoy the latest entertainment.	.800	
Payment	The payment process of this app is too complicated.	.734	3.186 (8.849 %) Cronbach's α=.668
	It takes a lot of time to complete a transaction to purchase a product in this app(R).	.708	
	In this app, errors occur frequently when making a payment(R).	.684	
Privacy/ security	This app never leaks personal information.	.715	1.903 (5.286 %) Cronbach's α=.721
	This app is well equipped with a security system to prevent external intrusion.	.712	
	This app never shares personal information with other companies without my consent.	.700	
Product assortment	This app has many fashion styles to suit my taste.	.701	1.830 (5.082 %) Cronbach's α=.657
	The fashion products sold from this app are of high quality	.603	
	This app provides fashion items with a variety of sizes and colors.	.539	
	This app offers a wide variety of fashion items.	.523	

Table 14. (continued)

Factor Name	Items	Factor Loading	Eigen value (variance %)
Money-saving price	Buying fashion products in this app saves my money more than buying them elsewhere.	.861	1.439 (3.996 %) Cronbach's α=.744
	When compared to other apps, the price of fashion products in this app is more inexpensive.	.806	
	The price of fashion items sold in this app is very reasonable.	.582	
Fashion information	This app frequently updates fashion trend information or fashion street information.	.742	1.341 (3.724 %) Cronbach's α=.632
	This app provides a lot of video and photo information that introduces fashion styles or fashion coordination.	.710	
	This app provides a variety of fashion news about brands, designers, models, etc.	.613	
Customer reviews	Text reviews provided by this app are very specific.	.785	1.247 (3.463 %) Cronbach's α=.695
	This app provides plenty of text reviews shared by previous purchasers .	.724	
	The text reviews provided by this app are reliable.	.463	
Real-time communication	This app solves customer complaints quickly through real time customer services.	.738	1.153 (3.204 %) Cronbach's α=.676
	This app solves problem instantly with real-time customer service even after sales.	.706	
	This app implements real-time customer service that responds instantly to customer inquiries.	.669	
Live streaming sales	Live streams in this app provide product information in great detail.	.760	1.141 (3.168 %) Cronbach's α=.653
	Many live streams in this app provide real time communication with users.	.689	
	This app provides live streams which allow me to purchase immediately while listening to the product description.	.555	

Table 14. (continued)

Factor Name	Items	Factor Loading	Eigen value (variance %)
Delivery	This app has a good delivery system.	.716	1.126 (3.127 %) Cronbach's α=.580
	This app solves problem instantly with real-time customer service even after sales.	.705	
	This app makes it easy to see the delivery status of my purchases.	.482	
App design	The colors and color coordination used in this app are very refined.	.703	1.051 (2.920 %) Cronbach's α=.627
	In this app, screen layout and placement of images and text are appropriate.	.560	
	The graphic designs used in this app are excellent.	.520	
Photo sharing through SNS	This app is linked with various SNS such as Weibo, QQ, Wechat etc.	.882	1.007 (2.797 %) Cronbach's α=.472
	This app allows me to share product images with others using Weibo, QQ, Wechat, and more.	.633	

2) The factor analysis of dependent variables

The exploratory factor analysis (principal components, varimax rotation, extracting factors with eigenvalues above 1.0) was conducted on the items measuring the perceived value and the reuse intention of fashion shopping apps. Three factors were classified and then labeled as an utilitarian shopping value, a hedonic shopping value, and reuse intention, respectively. As shown in Table 15, the total explained variance was 52.871%. Cronbach's alpha coefficients of utilitarian and hedonic values were respectively 0.614 and 0.670. and Cronbach's alpha coefficients of the app reuse intention was 0.636. Thus, the three dependent variables were statistically confirmed as different factors and had relatively good reliabilities, which were closed to the recommendation

value(α=0.7).

Table 15. The factor analysis of dependent variables   (n=304)

Factor Name	Item	Factor Loading	Eigen value (variance %)
Utilitarian shopping value	This app is very useful for getting the fashion information I want.	.752	3.630 (33.002%) Cronbach's α=.670
	This app is very helpful to improve my fashion sense.	.712	
	This app is a very efficient for purchasing fashion products	.653	
	This app is very convenient to shop fashion items.	.482	
Reuse intention	I will reuse this app soon to buy fashion products.	.752	1.136 (10.326%) Cronbach's α=.636
	When I buy fashion products, I will use this app first.	.719	
	I will definitely buy fashion products using this app.	.647	
Hedonic shopping value	For fashion shopping, I feel better while browsing this app.	.764	1.050 (9.543%) Cronbach's α=.614
	Shopping for fashion products in this app is very exciting.	.726	
	It's enjoyable to use this app to buy fashion items.	.554	
	Just browsing this app is very fun.	.444	

2. Hypothesis Testing

Previous to a regression analysis, the multi-collinearity of twelve independent variables was analyzed. As a result, the VIF(variance inflation factor) values of twelve attributes were between 1.116 and 1.685 (VIF<10), tolerance values of twelve attributes were between .593 and .896 (Tolerance>0.1), and than no multi-collinearity problem was confirmed. Hypotheses were tested by regression analysis. The results of regression

analysis (enter-method) are as follows.

1) The effects of app attributes on the perceived value of fashion shopping apps

The result of regression analysis was presented in Table 16. Among twelve attributes of fashion shopping apps, the app design(t=2.547, p=.011) fashion information (t=3.712, p=.000), and product assortment (t=6.471, p=.000) significantly influenced perceived utilitarian value of the app. In addition, five attributes such as payment (t=2.600, p=.010), customer reviews (t=2.078, p=.039) entertainment (t=3.407, p=.001), product assortment (t=3.840, p=.000), and money-saving price (t=2.776, p=.006) had significantly positive effects on perceived hedonic value. In other words, one system attribute, three service attributes, and two marketing mix attributes significantly influenced the perceived hedonic values of fashion shopping apps. In particular, product assortment had a significant effect on both utilitarian and hedonic values. However, four attributes such as privacy/safety, real-time communication service, live-streaming sales and delivery were not significantly related to both utilitarian and hedonic values. Therefore, hypothesis 1 and hypothesis 2 were partially supported.

Table 16. The effects of app attributes on perceived values (n=304)

Dependent variable	Independent Variable	B	Standardized beta	t-value	p-value	F-value	R^2 (Adjust R^2)
Utilitarian value	Payment	.004	.005	.099	.921	23.260***	.490 (.469)
	Privacy/ security	.052	.073	1.446	.149		
	App design	.131	.136	2.547*	.011		
	Fashion information	.147	.188	3.712***	.000		
	Customer reviews	.037	.046	.887	.376		
	Real-time communication	.025	.030	.602	.547		
	Live streaming sales	.012	.016	.314	.754		
	Entertainment	-.005	-.008	-.170	.865		
	Photo sharing through SNS	.054	.073	1.657	.099		
	Product assortment	.368	.352	6.471***	.000		
	Money-saving price	.043	.057	1.197	.232		
	Delivery	.054	.056	1.126	.261		
Hedonic value	Payment	.117	.136	2.600**	.010	16.068***	.399 (.374)
	Privacy/ security	.033	.046	.853	.395		
	Fashion information	.056	.072	1.305	.193		
	Customer reviews	.093	.117	2.078*	.039		
	Real-time communication	.075	.092	1.678	.094		
	Live streaming sales	-.015	-.020	-.367	.714		
	Entertainment	.102	.177	3.407***	.001		
	App design	.028	.029	.504	.615		
	Photo sharing through SNS	.007	.010	.209**	.835		
	Product assortment	.237	.227	3.840***	.000		
	Money-saving price	.107	.143	2.776**	.006		
	Delivery	.046	.048	.882	.379		

*p <.05   **p <.01   ***p <.001

In addition, when comparing the effect strength of attributes on perceived utilitarian value using the value of standardized beta, the impact of fashion product assortment on perceived utilitarian value was the greatest(β=.352). The effect size of fashion information (β=.188) was larger than the effect size of app design (β=.136). The effect of the product assortment (β=.227) on the hedonic value was the largest, followed by the effect of the payment (β=.136). The influence size of money-saving price (β=.143) and entertainment (β=.177) on hedonic value were bigger than the influence size of customer reviews (β=.117).

2) The effects of app attributes on the reuse intention of fashion shopping apps

As shown in Table 17, the effect of payment on the reuse intention of the fashion shopping apps was significant. In addition, three service attributes such as real-time communication service, live streaming sales, and photo sharing through SNS significantly influenced the reuse of the apps. In particular, photo sharing through SNS was significant in the marginal level(t-value=2.005, p=.046). Money-saving price among marketing mix attributes had a significant effect on the reuse of the apps(t-value=2.268, p=.024). Therefore, hypothesis 3 was partially supported.

Notably, the impact of payment on the reuse intention of fashion shopping apps was the greatest (β=.228), followed by real-time communication impact (β=.202). The impact of live streaming sales (β=.151) on the reuse intention of the apps was larger than the impacts of price (β=.126) and phot sharing through SNS (β=.103) on the reuse intention of the apps. However, the other seven attributes were not related to the reuse intention of the apps. Fashion information was significant only within significant level of 10% (t=1.826,p=.064).

3) The effects of perceived values on the reuse intention of fashion shopping apps

The effects of perceived values on the reuse intention of the apps were analyzed and the result of regression analysis were presented in Table 18. Both perceived values, the utilitarian value and the hedonic one, positively influenced the reuse intention of the apps. The impact size of perceived utilitarian value on the reuse intent of fashion shopping apps(β = .324) was greater than those of perceived hedonic value(β=.280). Therefore, hypothesis 4 and 5 were supported.

Table 17. The direct effects of the attributes on the reuse intent of the apps
(n=304)

Independent variable	B	Standardized beta	t- value	p- value	F- value	R^2 (Adjust R^2)
Payment	.212	.228	4.074***	.000		
Privacy/security	.021	.027	.467	.641		
Fashion information	.092	.110	1.861	.064		
Customer reviews	−.010	−.012	−.190	.849		
Real-time communication	.177	.202	3.453***	.001		
Live streaming sales	.119	.151	2.551*	.011	10.840***	.309
Entertainment	−.003	−.005	−.092	.927		(.280)
App design	−.083	−.081	−1.293	.197		
Photo sharing through SNS	.081	.103	2.005*	.046		
Product assortment	.038	.033	.528	.598		
Money-saving price	.101	.126	2.268*	.024		
Delivery	.072	.070	1.203	.230		

*p <.05   **p <.01   ***p <.001

Table 18. The effects of perceived values on the reuse intention of the apps

(n=304)

Independent Variable	B	Standardized beta	t-value	F-value	R^2 (Adjust R^2)
Utilitarian value	.347	.324	5.754***	56.003***	.271 (.266)
Hedonic value	.301	.280	4.983***		

***$p < .001$

4) The indirect effects of app attributes on the reuse intention of fashion shopping apps

The significant effects of app attributes on three dependent variables were summarized in Figure 2. The attribute of payment and money-saving price were both significant predictors of the perceived hedonic value and reuse intention of the apps. In case of product assortment, it had a significant effect on both the utilitarian value and the hedonic one, but had no effect on consumers' intention to reuse the apps. In addition, five attributes such as app design, fashion information, customer reviews, entertainment, and price for saving money were significant predictors of one of perceived utilitarian and hedonic values, suggesting that these app attributes can indirectly affect the reuse intention of the apps through one of two perceived values. The results of analyzing the indirect effects of these attributes on consumers' intention to reuse fashion shopping apps were presented in Table 19.

As a result, the significance of the indirect effects of the app attributes on the reuse intention of the apps, app design, fashion information, and product assortment indirectly influenced the reuse intention of the apps through perceived utilitarian value, the three attributes respectively had no direct effect on the reuse intention of the APPs, though. Likewise, four attributes,

payment, entertainment, product assortment, and money-saving price, also indirectly influenced the reuse intention of the apps through perceived hedonic values. However, the indirect effect of customer reviews on the reuse intention of fashion shopping apps was not significant as shown Table 19. On the contrary, two attributes, privacy/security and delivery had no direct and indirect effects on the reuse intent of fashion shopping apps.

In addition, payment and money-saving price, both directly and indirectly (through hedonic value), influenced customers' intention to reuse fashion shopping apps. Unlike such app attributes, real-time communication, live-streaming sales, and photo through SNS directly influenced the reuse intention of the apps. Therefore, it was confirmed that app attributes directly or indirectly (through utilitarian value, hedonic value, or both values) influence consumers' intention to reuse fashion shopping apps.

Table 19. The indirect effects of app attributes on the reuse intent of apps
(n=304)

Indirect effects	Estimate	Standardized error	t-value
App design → utilitarian value → reuse intent	.046	.019	2.35*
Fashion information → utilitarian value → reuse intent	.051	.016	3.10**
Product assortment → utilitarian value → reuse intent	.128	.030	4.31***
Payment → hedonic value → reuse intent	.035	.015	2.31*
Customer reviews → hedonic value → reuse intent	.028	.015	1.91
Entertainment → hedonic value → reuse intent	.031	.011	2.82**
Product assortment → hedonic value → reuse intent	.071	.024	3.04**
Money-saving price → hedonic value → reuse intent	.032	.013	2.41**

$^*p$ <.05 $^{**}p$ <.01 $^{***}p$ <.001
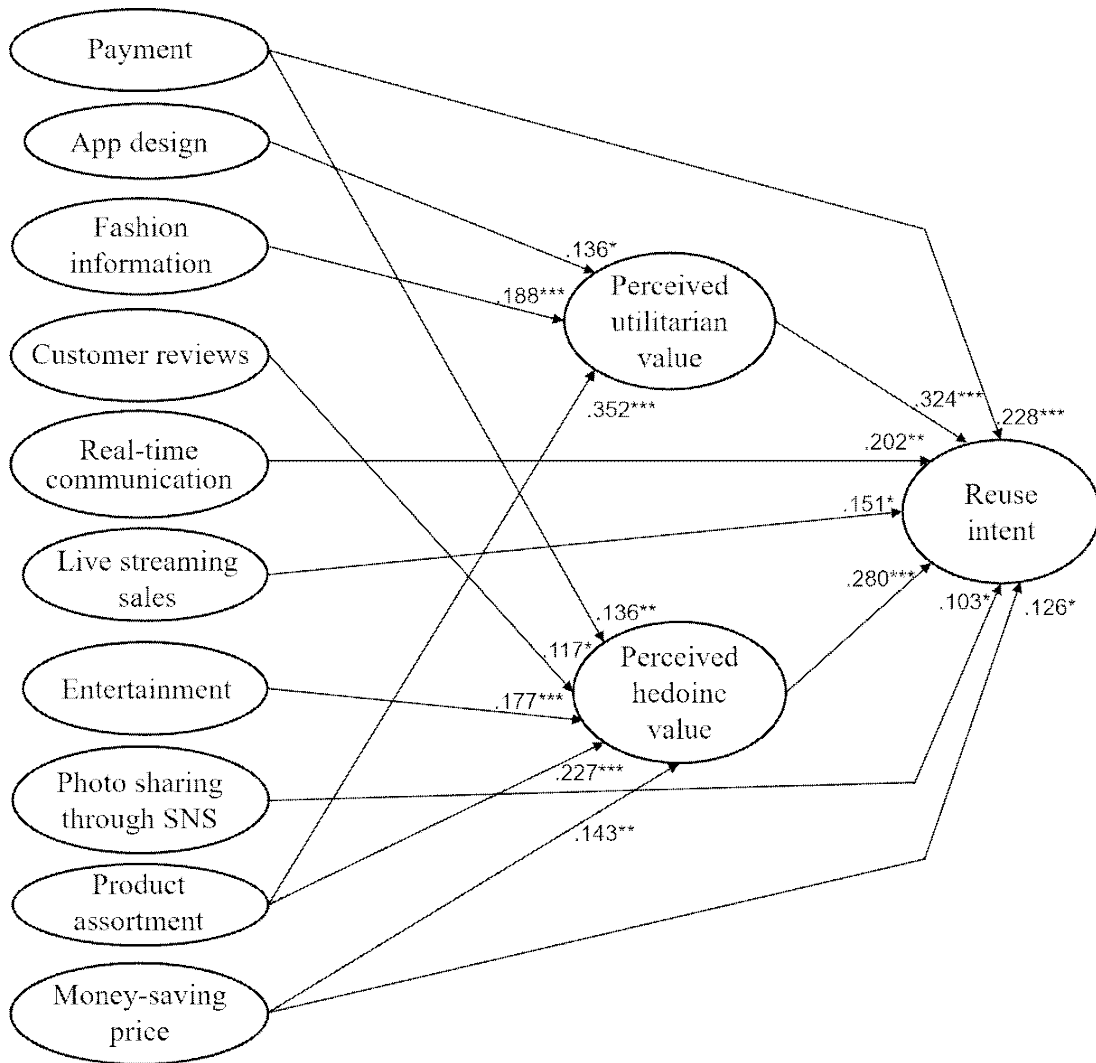
Figure 2. The significant relationship among research variables

Ⅴ. Conclusion and Implication

1. Research Result and Discussion

This study aimed to identify what app attributes significantly influence Chinese female consumers' perception of utilitarian and hedonic value of fashion shopping apps, and their intention to reuse the apps. Another purpose of this study is to clarify how app attributes influence the reuse intention of the apps, using the S-O-R model. Major findings are discussed below.

The significant effects of app attributes on two types of perceived values (H1 and H2) and the reuse intention of the apps (H3) were partially supported. In other words, it has been found out that some systems, service, and marketing mix‐related attributes were significantly involved in Chinese female consumers' perception of the values and the reuse intention of the apps. Interestingly, the attribute of payment was directly related to two outcome variables (hedonic value and reuse intention), and a product assortment directly increased both perceived utilitarian and hedonic values of the apps. These results are considered to reflect the both characteristics of mobile commerce and fashion shopping. For example, when using an app for shopping, too complicated process and frequent errors in making a payment can causes annoyance or unpleasant feeling to the users as well as decrease it's utilitarian value. In particular, it has been confirmed that the inferior payment can be a direct cause of interference with the reuse intention of the app in the shopping app where the actual purchase takes place. In addition, due to the nature of fashion products, many app images are provided to an app. Product assortment is hereby involved in shopping pleasure as well as shopping efficiency in that the photo images of various fashion products play a role as app stimuli attracting shoppers' eyes and pleasure.

Except for the two attributes, the attributes involved in each perceived

value and reuse intention of the apps were different. More specifically, two attributes of app design and fashion information provided from the apps, contributed to only the perception of apps' utilitarian value. This result is consistent with previous study (Liu & Lu, 2017) suggesting that app design is especially important for the efficient display of information owing to the limitation of smart-phone screen size. The result that various fashion information from the app is very helpful in styling or coordinating user own fashion, was consistent with previous studies (Kang & Sung, 2014; Kho & Lee, 2015).

In addition, the two attributes (financially saving price and entertainment, consumers' reviews) were found to contribute only to the perception of apps' hedonic value. It confirms in a shopping app context that low prices, discounted prices, and various promotions for saving money can be related to the delight of shoppers, supporting the previous studies(Jin, 1998) which found a similar result in offline shopping environment. The effect of features as online games on hedonic value supports previous study (Liu & Lu, 2017)'s suggestion that the recreational performance of shopping apps can arouse consumers' pleasure.

The significant effect of customer reviews on the perceived usefulness of online shopping mall was mentioned in several studies (e.g., Kim & Hong, 2001). However, study reporting it's significant effect on the hedonic value is relatively rare. Perhaps reading customer reviews in fashion shopping apps leads to shopping enjoyment in that review reading itself is a kind of joyful task and it makes app users see the visual image of the product with reviews.

Apart from two attributes (payment system and financially saving price), the attributes of real-time communication, live-streaming sales, and photo sharing through SNS also directly influenced the reuse intention of the apps. According to the results of this study, the real-time communication with the

manager at the time of purchase, at the point of inquiry or the presence of several live-streaming sellers can increase the reuse intention of fashion shopping apps, which results from leaving shoppers easily or correctly make a purchase decision. The sharing of the photo image of the fashion product provided by the shopping app with reference group members (family, friends) through the SNS enables to refer to their opinions of the shared products and than facilitate app users' purchase decision on the app. This can be interpreted as leading to reuse the shopping app, in that it can play an important role in making the right choices. To our knowledge, this is the first attempt to empirically and directly explore these effects, and in existing studies, little has been known about the significant effects of real-time communication and live-streaming sales on it. Therefore, current study fills the critical gap concerning app-shopping and mobile-commerce literature.

However, attributes such as privacy/safety and delivery were not related to any of the three dependent variables. These unpredictable results seem due to the current state of mobile app usage in China, and cumulative experience with mobile and online shopping. For instance, in China, mobile payments are reported to be more popular in both online and offline environments than in any other country ("China mobile app user insights 2018", 2018). In particular, this study investigates the willingness to reuse the app that was already experienced, so it is judged that exposure or security of personal information does not seem like a significant factor in determining reuse intention of the app. In other words, it is also considered that the prior shopping experience in an app commerce, mobile commerce or/and online commerce environment seem to prevent some degree of anxiety due to personal information disclosure or security in payment process.

The impact of a delivery attribute is not statistically significant. The reason is that app users have already experienced both delivery-related advantages and disadvantages in both online and mobile shopping, so the

problem or advantage of this attribute is not new for users. In particular, because the levels of such attributes are also somewhat similar across shopping apps and such attributes are not regarded as a discriminatory property of shopping apps, it is interpreted that such attributes did not play a significant role in users' perception of utilitarian and hedonic values of the apps, as well shoppers' intention to reuse them.

The direct and indirect effect analysis on shoppers' intention to reuse fashion shopping apps showed how app attributes affect the reuse intention of fashion shopping apps. The app attributes of real-time communication, live streaming sales, and photo sharing through SNS directly affect the reuse intention of the shopping apps, but the attributes of app design and fashion information indirectly affect the reuse intention of the apps through the consumers' perception of the utilitarian value of the shopping app. Entertainment and customer reviews have indirect impact on the reuse intention of the apps through consumers' perception of hedonic value of the shopping app. In addition, product assortment indirectly influence the reuse intention of the apps through consumers' perception of both utilitarian value and hedonic value of the shopping app. Particularly, it was confirmed that app attributes such as payment system and low product price both directly and indirectly (through hedonic value) influenced consumers' intention to reuse fashion shopping apps. The direct and indirect relationships among app attribute, perceived utilitarian and hedonic values, and app reuse intention identified in this study can provide academic and practical implications in various aspects.

2. Academic Contributions and Academic Implications

This study has contributed to understanding of consumers' shopping app choice behavior by finding out what attributes of mobile apps are related to

consumers' reuse intention of the apps, and how app attributes influenced the reuse intention of the apps.

First of all, current research systematically studied the app attributes which increase the perceived utilitarian value (app design, fashion information, product assortment) and hedonic values (payment, customer reviews, entertainment, product assortment, and low price) of the fashion shopping apps and the reuse intention of the apps (payment, real-time communication, live streaming sales, photo sharing through SNS, and low price). To our knowledge, this is the first study to quantitatively report the influence of specific app attributes in a fashion app context and a mobile shopping app context, using a large sample of consumers. This study expands the existing literatures on app commerce as well as the app shopping literature of fashion products in terms of confirming that real time-communication, live streaming sales and photo sharing through SNS serve as important attributes leading shoppers' app reuse, but are not explored by existing studies. In addition, all the systems, service, and marketing mix-related attributes, which were considered to be important through the focus group interview, were analyzed with a set of independent variables at the same time in this study. It is meaningful to identify influential attributes among many attributes of various types and to compare the relative strengths of the effects in an initial study on app attributes.

Second, current studies have applied the S-O-R Model to an app shopping context emphasizing fashion products in order to explain how app attributes influence the reuse intention of the apps. Some of app attributes directly influenced the reuse intention of the apps (payment, real-time communication, live streaming sales, photo sharing through SNS, and low price) and some of app attributes indirectly influenced the reuse intention of the apps through perceived either utilitarian or hedonic values (app design, fashion information, product assortment, payment, customer reviews, and entertainment). In

addition, some of app attributes (payment and low price) directly and indirectly influenced the reuse intention of the apps. In particular, product assortment influence the reuse intention of the apps through both perceived values of two types. Current study is the first step to apply two types of perceived values in predicting consumers' reuse intention of the apps focusing on fashion shopping. It is especially the first attempt to introduce perceived values (Organism) as mediating factors with in the S-O-R framework, together with the various attributes (Stimuli) and the reuse intention of the apps (Response). This study could deepen understanding of the mechanism about consumers' app choice or app usage behavior in an fashion shopping context, by identifying the relationship among stimuli (app attributes), organism (perceived values), and response (reuse intention).

Third, it is meaningful to clarify the above-mentioned series of results for the Chinese consumers who use mobile apps the most in the world and the fashion products which have the highest percentage of app shopping in China. In particular, considering that a few study investigated only consumers from South Korea, in a fashion shopping app context, the current study makes up for the lack of consumer research on app shopping.

Finally, the items measuring each app attribute in this study can be used for future research evaluating the characteristics of shopping apps or developing items for evaluating the quality of shopping apps (e.g., system quality, service quality and marketing mix quality).

3. Practical Contributions and Practical Implications

The research results offer several practical implications to app retailers and app managers. In addition, the research results can serve as a guidance for companies planning app-marketing or app-commerce for Chinese consumers who have not yet used app shopping for fashion shopping. For

instance, app retailers and app managers should exert every effort to increase consumers' perception of highly utilitarian and hedonic values from their own apps. In particular, the management of app attributes could be very helpful to increase consumers' fashion purchase in the apps by shoppers' reusing the apps, as well as to increase consumers' perception of utilitarian and hedonic values for shopping apps. Such efforts are also helpful for fashion retail apps and fashion brand apps with sales business to maintain a potential long term relationship with consumers. Therefore, app managers need to acquire the app attributes have an effect on the reuse intent of the app and the perception of utilitarian and hedonic value of their apps, thereby establishing mechanisms to enhance shoppers' perception of utilitarian and hedonic values from shopping apps.

4. Limitation and Future Research

This study is of several limitations but also provides multiple opportunities for future research. First, each of the factors, in the exploratory factor analysis, was not derived as one independent factor. Future research will need to improve the measurement items of such variables by adding additional items or more sophisticating the items.

Second, although this study included several regions of China, the proportion of consumers living in metropolitan was relatively high. According to previous studies, cultural values are different across regions according to the level of urbanization (large cities, small cities, rural areas) and geographical location in China. It is necessary for further research to examine whether the results of this study reproduce or a regional difference has been found out by investigating consumers in other regions that are not included in this study or whose coverage rate is low.

Third, this study investigated Chinese female consumers in their 20s and

50s who have experience in fashion shopping apps using the convenience sampling method, but the proportion of respondents in their 50s was low. Therefore, it is necessary to be careful about the generalization of the research results, and in the future, it is necessary to study on app shopping for Chinese male consumers or adolescents.

Eventually, app shopping is a recent retail format, and consumers' perceptions of app shopping and intention of app shopping may differ when it comes to age. In future studies, it is necessary to verify the differences between age groups in app attributes affecting the perceived value of app shopping and the reuse intention of shopping apps. Future research also need to investigate the difference between age groups in the impact size of perceived value on the reuse intention of shopping apps.

References

Ahuja, V., & Khazanchi, D. (2016). Creation of a conceptual model for adoption of mobile apps for shopping from e-commerce sites–an Indian context. *Procedia Computer Science, 91*, 609-616.

Akinci, S., Atilgan-Inan, E., & Aksoy, S. (2010). Re-assessment of ES-Qual and E-RecS-Qual in a pure service setting. *Journal of Business Research, 63*(3), 232-240.

Alba, J., Lynch, J., Weitz, B., Janiszewski, C., Lutz, R., Sawyer, A., & Wood, S. (1997). Interactive home shopping: consumer, retailer, and manufacturer incentives to participate in electronic marketplaces. *Journal of marketing, 61*(3), 38-53.

Ao, M. (2018, March 20). China's app store market is fragmented, but business is still booming. *Applovin.* Retrieved April 26, 2019, from https://blog.applovin.com/china-android-app-store-fragmentation/

"App Annie 2017 retrospective." (2018). Retrieved April 26, 2019, from https://www.coursehero.com/file/29219349/1801-Report-2017-Retrospective-ENpdf/

Asia Distribution and Retail. (2018, August). Understanding Chinese Millennial's Apparel Shopping Behavior and Attitudes. *Fung Business Intelligence.* Retrieved May 12, 2019, from https://www.fbicgroup.com/sites/default/files/ChineseMillennial_2018.pdf

Assarut, R., & Eiamkanchanalai, S. (2015). Consumption values, personal characteristics and behavioral intentions in mobile shopping adoption. *Market-Tržište, 27*(1), 21-41.

Azuma, R. T. (1997). A survey of augmented reality. *Presence: Teleoperators & Virtual Environments, 6*(4), 355-385.

Babin, B. J., Darden, W. R., & Griffin, M. (1994). Work and/or fun: measuring

hedonic and utilitarian shopping value. *Journal of consumer research*, *20*(4), 644-656.

Babin, B. J., Hardesty, D. M., & Suter, T. A. (2003). Color and shopping intentions: The intervening effect of price fairness and perceived affect. *Journal of business research*, *56*(7), 541-551.

Bae, E. K. (2010). *A study on perceived value and user satisfaction and intention to reuse corresponding to characteristic factors in mobile fashion application: Focusing on consumer innovation and smart phone lifestyle.* Unpublished master's thesis, Yonsei University, Seoul.

Bellenger, D. N., Steinberg, E., & Stanton, W. W. (1976). Congruence of store image and self image-as it relates to store loyalty. *Journal of Retailing*, *52*(1), 17-32.

Bellman, S., Potter, R. F., Treleaven-Hassard, S., Robinson, J. A., & Varan, D. (2011). The effectiveness of branded mobile phone apps. *Journal of interactive Marketing, 25*(4), 191-200.

Bernard, Z. (2018, August 24). It's a recipe for dominance that should drive fear into Silicon Valley': Here's why experts say China has an edge over the US when it comes to making money from smartphone users. *Business Insider*. Retrieved March 12, 2019, from https://www.businessinsider.com/why-china-mobile-apps-market-is-ahead-of-us-experts-2018-8

Biggs, C., Chande, A., Matthews, E., Mercier, P., Wang, A., & Zou, L. (2017, May 4). What China reveals about the future of shopping. *BCG*. Retried September 21, 2018, from https://www.bcg.com/publications/2017/retail-globalization-china-reveals-future-shopping.aspx

Bolton, R. N., & Drew, J. H. (1991). A multistage model of customers' assessments of service quality and value. *Journal of consumer research*,

17(4), 375-384.

Bowerman, K., & DeLorme, D. E. (2014). Boaters' perceptions of a mobile app for a marine conservation social marketing campaign. *Social Marketing Quarterly, 20*(1), 47-65.

Brakus, J. J., Schmitt, B. H., &Zarantonello, L. (2009). Brand experience: what is it? How is it measured? Does it affect loyalty?. *Journal of marketing, 73*(3), 52-68.

Cha, S. S., & Park, C. (2017). Consumption value effects on shopping mall attributes: Moderating role of on/off-line channel type. *Journal of distribution science, 15*, 5-12.

Chang, A. (2019). The Ultimate Guide to Succeeding in the Chinese App Market. *App In China.* Retrieved April 26, 2019, from https://www.appinchina.co/blog/the-ultimate-guide-to-succeeding-in-the-chinese-app-market/

Chang, E. C., & Tseng, Y. F. (2013). Research note: E-store image, perceived value and perceived risk. *Journal of business research, 66*(7), 864-870.

Chang, H. H., & Chen, S. W. (2008). The impact of customer interface quality, satisfaction and switching costs on e-loyalty: Internet experience as a moderator. *Computers in Human Behavior, 24*(6), 2927-2944.

Charland, A., & Leroux, B. (2011). Mobile application development: web vs. native. *Communications of the ACM, 54*(5), 49-53.

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of retailing, 77*(4), 511-535.

"China mobile app user insights 2018". (2018, April 25). *Business of Apps.* Retrieved March 12, 2019, from https://www.chinainternetwatch.com/23952/mobile-app-user-insights-2018/

'China Was the Largest App Market in the World for Time Spent in Apps in 2017' (2018, February 5). *App Annie.* Retrieved March 12, 2019, from https://www.appannie.com/en/insights/market-data/china-app-economy-20 17/

Chiu, C. M., Wang, E. T., Fang, Y. H., & Huang, H. Y. (2014). Understanding customers' repeat purchase intentions in B2C e commerce: the roles of utilitarian value, hedonic value and perceived risk. *Information Systems Journal, 24*(1), 85-114.

Cho, J. K. (2011). A Study of App Marketing on the Mobile Media-'4R' Branded Application Using Case Study. *A Journal of Brand Design Association of Korea, 9*(2), 317-326.

Choedon, T., & Lee, Y. C. (2018). Classification and Evaluation of Service Requirements in Mobile Tourism Application Using Kano Model and AHP. *Korea Association of Information Systems, 27*(1), 43-65.

Choi, G. H., & Lee, S. H. (2012). A study on information-seeking benefits of fashion applications of users and their effects on loyalty and satisfaction – focused on iPhone fashion applications –. *Journal of Fashion Business, 16*(2), 27-43.

Choi, G. H. (2012). *A Study on information-seeking Benefits of Fashions Applications and their Effects on Satisfaction and Loyalty.* Published master's thesis, Sookmyung Women's University, Seoul.

Choi, Y. S., & Kim, M. Y. (2011). An analysis of the fashion brand application. *Journal of Fashion Business, 15*(5), 129-143.

Chopdar, P. K., & Sivakumar, V. J. (2018). Understanding psychological contract violation and its consequences on mobile shopping applications use in a developing country context. *Journal of Indian Business Research, 10*(2), 208-231.

Chopdar, P. K., Korfiatis, N., Sivakumar, V. J., & Lytras, M. D. (2018). Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the Unified Theory of Acceptance and Use of Technology. *Computers in Human Behavior*, *86*, 109-128.

Chun, J. H., & Lim, Y. W. (2012). e-Service Quality and Behavioral Intention in the App Shopping Mall. *Korea Academy Industrial Cooperation Society, 13*(4), 1609-1618.

Chung, N., Song, H. G., & Koo, C. (2015). Effects of Shopping Value and Social Commerce Satisfaction on Purchase Intention: The Moderating Role of Impulsiveness and Innovativeness. *The Korea Society of Management Information System*, 74-80.

Dacko, D. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting & Social Change, 124,* 243-256.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information systems research, 3*(1), 60-95.

Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems, 19*(4), 9-30.

Dodds, W. B., Monroe, K. B., & Grewal, D. (1991). Effects of price, brand, and store information on buyers' product evaluations. *Journal of marketing research, 28*(3), 307-319.

Donovan, R. J., Rossiter, J. R., Marcoolyn, G., & Nesdale, A. (1994). Store atmosphere and purchasing behavior. *Journal of retailing, 70*(3), 283-294.

Donovan, Robert J., & Rossiter, Hohn R. (1982). Store Atmosphere: An environmental psychology approach. *Journal of Retailing, 58*(1),34-57.

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2001). Atmospheric qualities of online retailing: A conceptual model and implications. *Journal of Business research, 54*(2), 177-184.

Eroglu, S. A., Machleit, K. A., & Davis, L. M. (2003). Empirical testing of a model of online store atmospherics and shopper responses. *Psychology & marketing, 20*(2), 139-150.

Ettis, S. A. (2017). Examining the relationships between online store atmospheric color, flow experience and consumer behavior. *Journal of Retailing and Consumer Services, 37*, 43-55.

Evans, P. B., & Wurster, T. S. (1997). *Strategy and the new economics of information*. New York, NY: Harvard Business Review.

Fang, Y. H. (2019). An app a day keeps a customer connected: Explicating loyalty to brands and branded applications through the lens of affordance and service-dominant logic. *Information & Management, 56*(3), 377-391.

Food, U., & Administration, D. (2013). Draft Guidance for Industry and Food and Drug Administration Staff: Mobile Medical Applications, *U.S. Department of Health and Human Services, Center for Biologics Evaluation and Research*. 1741.

Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J., & Bryant, B. E. (1996). The American customer satisfaction index: nature, purpose, and findings. *Journal of marketing, 60*(4), 7-18.

Fritschle, M. J. (2017, October 6). Mobile Marketing Statistics to Help You Plan for 2018. *AUM.* Retried May 21, 2019, from https://www.aumcore.com/blog/2017/10/06/mobile-marketing-statistics-for

-2018/

Gentile, C., Spiller, N., & Noci, G. (2007). How to sustain the customer experience: An overview of experience components that co-create value with the customer. *European management journal, 25*(5), 395-410.

Gove, J.,v & Mirza, I. (2016, March). Mobile retail apps and Sites: Introduction. *Think with Google.* Retried May 21, 2019, from https://www.thinkwithgoogle.com/marketing-resources/experience-design/mobile-retail-apps-sites-introduction/

Grewal, D., Levy, M., & Kumar, V. (2009). Customer experience management in retailing: an organizing framework. *Journal of retailing, 85*(1), 1-14.

Griffin, M., Babin, B. J., & Modianos, D. (2000). Shopping values of Russian consumers: the impact of habituation in a developing economy. *Journal of Retailing, 76*(1), 33-52.

Gutman, J. (1982). A means-end chain model based on consumer categorization processes. *Journal of marketing, 46*(2), 60-72.

Ha, Y., & Im, H. (2012). Role of web site design quality in satisfaction and word of mouth generation. *Journal of Service Management, 23*(1), 79-96.

Ha, Y., & Lennon, S. J. (2010). Online visual merchandising (VMD) cues and consumer pleasure and arousal: purchasing versus browsing situation. *Psychology &Marketing, 27*(2), 141-165.

Han, J. S. (2012). Social marketing utilizing location based social network service (LBSNS) applications: Focusing on the cases of fashion brands. *Journal of Korea Design Forum, 34,* 17-26.

Han, M. K., Yang, Y., & Sung, Y. H. (2015).The Effect of Smartphone's Reward Application Types on Recommendation Intention. *A Journal of Brand Design Association of Korea, 13*(1).109-120.

Harris, L. C., & Goode, M. M. (2010). Online services capes, trust, and

purchase intentions. *Journal of Services Marketing, 24*(3), 230-243.

Heo, Y. J., Bae, Y. Y., Gang, J. H., U, S. H., Han, S. J., & Kim, E. Y. (2016). Effects of search motives and content usage of mobile fashion applications on purchase intention. *Journal of Human Ecology, 20*(1), 97-106.

Hirschman, E. C. (1983). Aesthetics, ideologies and the limits of the marketing concept. *Journal of marketing, 47*(3), 45-55.

Hirschman, E. C., & Holbrook, M. B. (1982). Hedonic consumption: emerging concepts, methods and propositions. *Journal of marketing, 46*(3), 92-101.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.

Hong, H., & Kim, H. S. (2016). Impact of review characteristics on female consumer perceptions of review usefulness and patronage intent of online stores hosting the reviews. *Journal of the Korean Society of Clothing and Textiles, 40*(6), 994-1009.

Hong, H., & Lee, S. G. (2005). Effect of apparel merchandise on experienced emotion for apparel shopping and attitude toward the internet store. *Journal of the Korean Society of clothing and Textiles, 29*(3/4), 478-490.

"How many mobile apps in China? Over 4 million…" (2018, July 5). *China Internet Watch*. Retrieved March 12, 2019, from https://www.chinainternetwatch.com/25530/mobile-apps-apr-2018/

Hsiao, K., Chuan-Chuan Lin, J., Wang, X., Lu, H., & Yu, H. (2010). Antecedents and consequences of trust in online product recommendations. *Online Information Review, 34*(6), 935‐953.

Im, S., Bhat, S., & Lee, Y. (2015). Consumer perceptions of product creativity, coolness, value and attitude. *Journal of Business Research, 68*(1),

166-172.

Jang, N. K. (2012). The use of application as a mobile fashion tool. *Journal of the Korean Society of Fashion Design, 12*(4), 29-43.

Jang, S. H. (2011). *A study on the process of advertising acceptance and the advertising strategies of fashion brand applications according to the characteristics of smartphone users.* Published doctoral dissertation, Sookmyung Women's University, Seoul.

Jang, S., & Lee, J. (2014). An investigation of factors affecting consumer intention to use branded app: focused on Technology Acceptance Model(TAM). *Journal of Information Technology Services,13*(3), 51-76.

Jin, B. H. (1998). Consumer's Perception of Clothing Price (Part I) - Testing the Validity of Dimensions of Clothing Price -.*Journal of the Korean Society of Clothing and Textiles. 22*(3), 417-427.

Johnson, G. J., Bruner, G. C., & Kumar, A. (2006). Interactivity and its facets revisited. *Journal of Advertising, 35*(4), 35‐52.

Ju, N. A., Lee, D., Jeon, H. M., & Lee, K. H. (2013). An exploratory analysis and usability evaluation of fashion mobile applications - Focus on Korea and U.S. App stores - . *The Research Journal of the Costume Culture, 21*(2).

Jung, S. (2017, June 9). *Jung-gug-in-i gajang manh-i sayonghaneun mobail aeb TOP 20* [TOP 20 mobile apps that Chinese people use mostly[. *Platum.* Retried May 21, 2019, from https://platum.kr/archives/82534

Kang, B., & Sung, H. (2014). An Analysis of Group Characteristics according to Technological Innovativeness and Clothing Involvement: Focused on the Usage Status of Smart Phone Fashion Information Application. *Journal of Fashion Business, 18*(5), 25-41.

Kang, D., Kim, J., & Lee, K. M. (2017). Implementation of user-specific virtual coordinator apps. *Journal of Digital Contents Society, 18*(5), 821–829.

Kang, K.Y., & Jin, H. J.(2007). A study on consumers' clothing buying intention adopted by the technology acceptance model. *Journal of the Korean Society. 31*(8), 1211–1221.

Karjaluoto, H., Shaikh, A. A., Saarijärvi, H., & Saraniemi, S. (2018). How perceived value drives the use of mobile financial services apps. *International Journal of Information Management.*

Kho, J. M. & Lee, J. H. (2015). Information architecture design for fashion coordination app based on the men's needs of fashion information. *Society of Korea Design Trend. 47,17–30.*

Kim, B., & Han, I. (2011). The role of utilitarian and hedonic values and their antecedents in a mobile data service environment. *Expert Systems with Applications, 38*(3), 2311–2318.

Kim, C., Hwang, J. S., & Cho, J. (2015). Relationships among mobile fashion shopping characteristics, perceived usefulness, perceived enjoyment, and purchase intention-Mediating effect of ease of use. *Journal of the Korean Society of Clothing and Textiles, 39*(2), 161–174.

Kim, E. Y. (2015). Effects of mobile browsing motives on using fashion app contents. *Proceedings of the Korean Association of Human Ecology, Korea,*192.

Kim, E., Lin, J. S., & Sung, Y. (2013). To app or not to app: Engaging consumers via branded mobile apps. *Journal of Interactive Advertising, 13*(1), 53–65.

Kim, H. S., & Hong, H. (2011). Fashion leadership and hedonic shopping motivations of female consumers. *Journal of Clothing and Textiles*

Research, 29(4), 314-330.

Kim, H. W., Chan, H. C., & Gupta, S. (2007). Value-based adoption of mobile internet: an empirical investigation. *Decision Support Systems, 43*(1), 111-126.

Kim, H., & Lennon, S. J. (2010). E-atmosphere, emotional, cognitive, and behavioral responses. *Journal of Fashion Marketing and Management: An International Journal, 14*(3), 412-428.

Kim, J. H., & Yoo, E. A.(2011). Smart media's advertisement effect in the integrated communication era, *Kobaco.*

Kim, J. H., Kim, M., & Lennon, S. J. (2009). Effects of web site atmospherics on consumer responses: music and product presentation. *Direct Marketing: An International Journal, 3*(1), 4-19.

Kim, J. H., Park, K. E., & Jeon, Y. Y.(2016). The Effect of the Brand App Location Based Service on Engagement, Attitude and Intentions: Focused on Food and Beverage Brand Apps. *Global e-Business Association.17*(4), 251-267.

Kim, S. (2012). *A model study of fashion application "Style By Me".* Published doctoral dissertation, Sungshin University,Seoul.

Kim, S. H. (2010). A study on the mobile application of fashion brands. *Journal of fashion business, 14*(6), 134-145.

Kim, S. S. (2011). *An empirical study on users' intention to use mobile applications.* Published doctoral dissertation, Soongsil University Korea.

Kim, S. Y. (2011, August 29). Kim Seung-yeon brand app site. *Chosun.com.* Retried May 21, 2019, from http://app.chosun.com/

Kim, S., & Baek, T. H. (2018). Examining the antecedents and consequences of mobile app engagement. *Telematics and Informatics, 35*(1), 148-158.

Kim, Y. (2015). *A Study on development of application focused personalized*

fashion coordination. Published master's thesis, Kookmin University, Seoul.

Kim, Y. C. (2011). *A study on factor of acceptance for mobile fashion application.* Published doctoral dissertation, Kookmin University, Seoul.

Koo, D. M., & Ju, S. H. (2010). The interactional effects of atmospherics and perceptual curiosity on emotions and online shopping intention. *Computers in Human Behavior, 26*(3), 377-388.

Korea Internet & Security Agency. (2013). A survey of mobile internet usage status in 2013. *KISA.* Retrieved May 23, 2018, from http://www.kisa.or.kr

Kumar, A. (2019, March 3). Why Need Mobile Apps? *Techvify.* Retrieved March 26, 2019, from https://techvify.com/why-need-mobile-apps/

Kwak, D. S., Yim, K. H., & Kwon, J. H. (2014). A study on the effect of mobile shopping application characteristics on customer preference: Focusing on price sensitivity. *Journal of Digital Convergence, 12*(6), 171-180.

Lai, I. K. (2015). Traveler acceptance of an app-based mobile tour guide. *Journal of Hospitality & Tourism Research, 39*(3), 401-432.

Lee, E. J. (2012). Social cues, E-social ambience, and emotions in web-based fashion retailing: A case of US shoppers. *Journal of the Korean Society of Clothing and Textiles, 36*(12), 1318-1329.

Lee, G. G., & Lin, H. F. (2005). Customer perceptions of e-service quality in online shopping. *International Journal of Retail & Distribution Management, 33*(2), 161-176.

Lee, M. J., & Lee, K. H. (2013). Mobile shopping motives and fashion application acceptance. *Journal of Digital Convergence, 11*(1), 153-163.

Lee, Y., & Kim, H. Y. (2018). Consumer need for mobile app atmospherics and its relationships to shopper responses. *Journal of Retailing and Consumer Services*.

Li, M., & Mao, J. (2015). Hedonic or utilitarian? Exploring the impact of communication style alignment on user's perception of virtual health advisory services. *International Journal of Information Management*, *35*(2), 229-243.

Liu, F., Zhao, X., Chau, P. Y., & Tang, Q. (2015). Roles of perceived value and individual differences in the acceptance of mobile coupon applications. *Internet Research*, *25*(3), 471-495.

Liu, Y., & Shrum, L. J. (2002). What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness. *Journal of advertising*, *31*(4), 53-64.

Liu, Z., & Lu, Z. (2017). Research on Influence of Shopping APP's Characteristic on Consumer's Impulse Buying. *Modern Economy*, *8*(12), 1484.

Lockwood, S. (2018, July 2). 8 Reasons Why Mobile Apps Are Better Than Mobile Websites In 2019. *Digital Agency Network*. Retrieved June 12, 2019, from
https://digitalagencynetwork.com/8-reasons-why-mobile-apps-are-better-than-mobile-websites/

Lu, Q., Wong, C. C. Y., Gallagher, M. W., Tou, R. Y., Young, L., & Loh, A. (2017). Expressive writing among Chinese American breast cancer survivors: A randomized controlled trial. *Health Psychology*, *36*(4), 370.

MacInnis, D. J., & Price, L. L. (1987). The role of imagery in information processing: Review and extensions. *Journal of consumer research*, *13*(4), 473-491.

Magrath, V., & McCormick, H. (2013). Branding design elements of mobile fashion retail apps. *Journal of Fashion Marketing and Management: An International Journal, 17*(1), 98-114.

Maguire, R. L. (2013). Is there a role for Apps in the future of Safety Management?. *Proceedings of the institution of engineering and technology, 8th IET International System Safety Conference incorporating the Cyber Security Conference, UK.*

Markin, R. J., Lillis, C. M., & Narayana, C. L. (1976). Social-psychological significance of store space. *Journal of Retailing, 52*(1), 43.

Martin, J., Mortimer, G., & Andrews, L. (2015). Re-examining online customer experience to include purchase frequency and perceived risk. *Journal of retailing and consumer services, 25*, 81-95.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology.* the MIT Press.

"Mobile app spend soars with China a top market: report." (2019, January 16). *Phys.org.* Retried May 21, 2019, from
https://phys.org/news/2019-01-mobile-app-soars-china.html

Monroe, A. D. (1979). Consistency between public preferences and national policy decisions. *American Politics Quarterly, 7*(1), 3-19.

Morar, D. D. (2013). An overview of the consumer value literature - perceived value, desired value. *Marketing From Information to Decision,* (6), 169-186.

Morrison, A. M. (1989). *Hospitality and tourism marketing.* Albany N.Y.: Delmar.

Mota, J. M., Ruiz-Rube, I., Dodero, J. M., &Arnedillo-Sánchez, I. (2018). Augmented reality mobile app development for all. *Computers &Electrical Engineering, 65*, 250-260.

Nayebi, M., Adams, B., & Ruhe, G. (2016). Mobile app releases - a survey

research on developers and users perception. In *IEEE 23rd International Conference on Software Analysis, Evolution and Reengineering (SANER'16). IEEE.*

Oh, J. M., Kim, H. H., &Moon, N. M. (2010). A study on the preference of the smart phone application by country using analysis of the propensity to consume. *Proceedings of the Korean Society of Broadcast Engineers Conference.* The Korean Institute of Broadcast and Media Engineers.

Oponiti. (2012, February 2). *Maegkinjiga balpyohan beulaendeuaeb seong-gong-ui jogeon.* [Transforming branded apps into category killers]. Retried May 21, 2019, from https://blog.naver.com/oponiti/140151191481

Ozturk, A. B., Bilgihan, A., Nusair, K., & Okumus, F. (2016). What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience. *International Journal of Information Management, 36*(6), 1350-1359.

Palomba, F., Linares-Vásquez, M., Bavota, G., Oliveto, R., Di Penta, M., Poshyvanyk, D., & De Lucia, A. (2017). Crowdsourcing user reviews to support the evolution of mobile apps. *Journal of Systems and Software, 137,* 143-162.

Papagiannidis, S., Pantano, E., See-To, E. W., &Bourlakis, M. (2013). Modelling the determinants of a simulated experience in a virtual retail store and users' product purchasing intentions. *Journal of Marketing Management, 29*(13-14), 1462-1492.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of marketing, 49*(4), 41-50.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). Servqual: A

multiple-item scale for measuring consumer perc. *Journal of retailing, 64*(1), 12.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). ES-QUAL: a multiple-item scale for assessing electronic service quality. *Journal of service research, 7*(3), 213-233.

Park, E. H. (2016). *The effect of characteristics of mobile fashion application on satisfaction and continuous usage intention.* Published master's thesis, Sungkyunkwan University, Seoul.

Park, E., Jin, G., & Park, S. (2018). Mobile app Loyalty of Cross-over Shoppers: A Comparison of Korean and Chinese. *Fashion & Textile Research Journal, 20*(3), 293-303.

Park, M., & Ko, H. (2014). The analysis of the characteristic types of fashion brand application -concentration on Korean application cases -. *Journal of the Korean Society of Costume, 64*(1), 136-151.

Park, Y. I., Lee, H. I., & Lee, J. H. (2011). Mobile marketing succession case in and outside the country. *KT business management lab.*

Parker, C. J., & Wang, H. (2016). Examining hedonic and utilitarian motivations for m-commerce fashion retail app engagement. *Journal of Fashion Marketing and Management. 20*(4), 487-506.

Petrick, J. F. (2002). Development of a multi-dimensional scale for measuring the perceived value of a service. *Journal of leisure research, 34*(2), 119-134.

Rintamäki, T., Kanto, A., Kuusela, H., & Spence, M. T. (2006). Decomposing the value of department store shopping into utilitarian, hedonic and social dimensions: Evidence from Finland. *International Journal of Retail & Distribution Management, 34*(1), 6-24.

Romo, Z. F. G., Contreras-Espinosa, R., & Medina, I. G. (2016). Branded Apps

in Spain as a Means of Communicating Trends in Fashion. *International Journal of Interactive Mobile Technologies*, *10*(2), 58-63.

Rose, S., Clark, M., Samouel, P., & Hair, N. (2012). Online customer experience in e-retailing: an empirical model of antecedents and outcomes. *Journal of Retailing, 88*(2), 308-322.

Rowley, J. (2004). Just another channel? Marketing communications in e-business. *Marketing Intelligence & Planning, 22*(1), 24-41.

Ryu, H. Y. (2013). *The effects of brand application's attribute on customer satisfaction and product purchasing intention.* Published doctoral dissertation, Jeju University, Korea.

Ryu, M. A., & Shin, S. W. (2013). Brand app service quality of the tourism service industry influencing brand preference and purchase intention: Moderating effect of brand app type. *Journal of Hospitality and Tourism Studies,15*(3).

Sánchez, J., Callarisa, L., Rodriguez, R. M., & Moliner, M. A. (2006). Perceived value of the purchase of a tourism product. *Tourism management, 27*(3), 394-409.

Scarpi, D., Pizzi, G., & Visentin, M. (2014). Shopping for fun or shopping to buy: is it different online and offline?. *Journal of Retailing and Consumer Services, 21*(3), 258-267.

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of business research, 22*(2), 159-170.

Shukla, A., & Sharma, S. K. (2018). Evaluating Consumers' Adoption of Mobile Technology for Grocery Shopping: An Application of Technology Acceptance Model. *Vision, 22*(2), 185-198.

Sinha, I., & DeSarbo, W. S. (1998). An integrated approach toward the spatial modeling of perceived customer value. *Journal of marketing research,*

35(2), 236-249.

Smith, J. B., & Colgate, M. (2007). Customer value creation: a practical framework. *Journal of marketing Theory and Practice, 15*(1), 7-23.

Snoj, B., Pisnik Korda, A., & Mumel, D. (2004). The relationships among perceived quality, perceived risk and perceived product value. *Journal of Product & Brand Management, 13*(3), 156-167.

So, J. I., & Kim, S. H. (2013). The effects of augmented reality fashion application on pleasure, satisfaction and behavioral intention. *The Research Journal of the Costume Culture, 21*(6), 810-826.

Sornapudi, S. D., & Mahesh, G. (2017). Fashion on smartphone: Apps that connect with consumer. *Proceedings of the International Journal of Computer Science, 15th-16th IT Skills Show & International Conference on Advancements in Computing Resources, India, 5*(2).

Stevens, B. F. (1992). Price value perceptions of travelers. *Journal of travel research, 31*(2), 44-48.

Sun, Y. & Hong, H. S. (2018a). The attributes of fashion shopping applications: Focused on Korea and China. *Proceedings of the International Conference on Clothing and Textiles, Fall Conference, Korea.*

Sun, Y., & Hong, H. S. (2018b). The comparison of attributes between the fashion brand applications of Korea and China. *Proceedings of the Costume Culture Association International Conference & Exhibition, Fall Conference, Korea.*

Sung, H. (2012). An Exploratory Study of Smartphone Fashion Application to Promote Mobile Shopping. *Fashion & Textile Research Journal, 14*(6), 941-951.

Sung, H. (2013). A study on the determinants of attitude toward and intention to use mobile shopping through fashion apps - comparisons of gender

and age group differences -. *Journal of the Korean Society of Clothing and Textiles, 37*(7), 1000-1014.

Sweeney, J. C., & Soutar, G. N. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of retailing*, *77*(2), 203-220.

The Oxford English Dictionary. (3rd. ed). (2014). Oxford University Press.

Tseng, T. H., & Lee, C. T. (2018). Facilitation of consumer loyalty toward branded applications: The dual-route perspective. *Telematics and Informatics, 35*(5), 1297-1309.

Turel, O., Serenko, A., & Bontis, N. (2007). User acceptance of wireless short messaging services: Deconstructing perceived value. *Information & Management, 44(1), 63-73.*

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research, 11*(4), 342-365.

Wang, M., & Lee, J. (2015). A Study on Social Shopping Curation App Attributes. *Nineth International Conference,* 81-85.

Wang, Y. S., Tseng, T. H., Wang, W. T., Shih, Y. W., & Chan, P. Y. (2019). Developing and validating a mobile catering app success model. *International Journal of Hospitality Management,* 77, 19-30.

Wo guo da lu 2018 nian mo zong ren kou jie jin 14 yi ['By the end of 2018, the total population of China is close to 1.4 billion']. (2019, January, 21). *XinHuaNet.* Retrieved April 26, 2019, from http://www.gov.cn/shuju/2019-01/21/content_5359797.htm

Won, J. W., & Park, J. W. (2015). Study on application plan of augmented reality APP for brand experience. *Journal of Digital Design, 15*(2),101-110.

Wood, F. G., Robson, M. P., Thompson, M. K., &Johnson, R. L. (2013).

Selecting the Best Type of Mobile Application for Chronic Disease Self-management. *CIN: Computers, Informatics, Nursing, 31*(5), 208-211.

Woodruff, R. B., & Gardial, S. (1996). *Know your customer: New approaches to understanding customer value and satisfaction.* Wiley.

Wu, W. Y., Lee, C. L., Fu, C. S., & Wang, H. C. (2013). How can online store layout design and atmosphere influence consumer shopping intention on a website? *International Journal of Retail & Distribution Management, 42*(1), 4-24.

Xia, M., Zhang, Y., & Zhang, C. (2018). A TAM-based approach to explore the effect of online experience on destination image: A smartphone user's perspective. *Journal of destination marketing & management,* 8, 259-270.

Yang, S. J. (2012). New marketing channel, the key to success of branded app, SERI Management Note. *Samsung Business Lab,* 137.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of marketing, 52*(3), 2-22.

Zeithaml, V. A., Parasuraman, A., &Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. *Journal of the academy of marketing science, 30*(4), 362-375.

Zhang, L., Zhu, J., & Liu, Q. (2012). A meta-analysis of mobile commerce adoption and the moderating effect of culture. *Computers in human behavior, 28*(5), 1902-1911.

Zhao, Z., & Balagué, C. (2015). Designing branded mobile apps: Fundamentals and recommendations. *Business Horizons, 58*(3), 305-315.

Appendix 1. The questionnaire and measurement items (English)

Study on the Chinese Female Consumers' Usage Behavior of Fashion Shopping Apps

Hello,

This questionnaire is designed to collect data from Chinese female consumers' use of fashion shopping apps. All responses will be anonymously analyzed and will not used for other purposes. It takes about 15 minutes to respond to the questionnaire.

Please answer to the questions frankly because of no correct or incorrect answers. However, if your answers are repetitive or untrust, you can not receive reward because such responses can not be used as research data. Please access the survey system only once and frankly answer all questions included in this questionnaire. Thank you.

January 22nd, 2019

Yu Sun, Graduate students, Jeju National University

yusun@jejunu.ac.kr

Heesook Hong, Professor, Jeju National University

heesookh@jejunu.ac.kr

A. Fashion shopping app means all retail apps that sell fashion goods (clothing, cosmetics, bags, shoes, accessories, etc.). Please answer the following questions.

A-1. Please choose a fashion shopping app that you have recently used from the list presented below. (In the following options, if you don't have the app you recently used, please fill out the name of the app directly)

① iChuanYi ② BanTang ③ BaoBeiGeZi ④ ChaoLiuNvZhuang
⑤ ChuChuJie ⑥ DaLing ⑦ DuiTang ⑧ EYEE
⑨ GUECHI ⑩ HaoDa ⑪ HIGO ⑫ HongDouJiao
⑬ JingDong ⑭ JuMei ⑮ KouDaiGouWu ⑯ LeFeng
⑰ LiWuShuo ⑱ LuKou ⑲ MeiLiShuo ⑳ MeiLiYiChu
㉑ MeiXi ㉒ MengBaSha ㉓ HiChao ㉔ MoGuStreet
㉕ PinDuoDuo ㉖ ShangPin ㉗ SiMiDa ㉘ SuNingYiGou
㉙ TaoBao ㉚ T-mall ㉛ WeiDian ㉜ WeiPinHui
㉝ XiaoHongChun ㉞ Red ㉟ XinKuan ㊱ YiLianShiShang
㊲ YiDingShiShang ㊳ YoHo!Buy ㊴ YouDiao ㊵ D2C
㊶ JSTYLE ㊷ MFD ㊸ See ㊹ ZAKERChuChuang

Other(Please fill in only one app)_____

A-2. How long do you use the fashion shopping app which you selected or filled out in the first question(A-1)?

_____Year   _____Month

A-3. How often do you use the fashion shopping app that you selected or filled out in the first question (A-1)?
① Almost not use
② Not very use
③ Occasionally use
④ Frequently use
⑤ Very frequently use

A-4. What is the purpose (reason) of using the fashion shopping app you selected or entered in the first question (A-1)? Please mark all that apply.

① In order to buy fashion products

② In order to search fashion information

③ In order to search fashion style or coordination styling

④ In order to shop fashion products without the purpose of purchase

⑤ In order to spend a free time or spare time

⑥ Others (Please write down your purpose directly)

B. The following are items describing the service related attributes of the fashion shopping app that you selected or filled out in the first question (A-1). Please choose the degree to which you agree with the content of each item presented (1 to 5 points)

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
1	This app allows me to try out virtual fitting or virtual coordination using AR technology	Park and Koh(2014), FGI
2	This app allows me to browse cyber stores applied with VR technology.	FGI
3	This app allows me to watch live streams as if I were listening to the explanation right in front of me.	FGI
4	This app is linked with various SNS such as Weibo, QQ, Wechat etc.	FGI
5	This app allows me to easily find and watch videos and photos related to fashion collections or fashion week.	Choi and Kim(2011), FGI
6	This app provides a location-based service (LBS) that informs me the fashion stores near my location.	Choi and Kim(2011), FGI
7	The text reviews provided by this app are reliable.	Hong et al. (2015)

B. (continued)

No.	① Strongly disagree　　　② Disagree　　　③ So so ④ Agree　　　　　　　⑤ Strongly agree	References
8	This app allows me to order personalized products to suit my taste.	Kim et al.(2015), FGI
9	In addition to shopping and purchasing, this app allows me to enjoy entertainment.	Park and Ko (2014), FGI
10	This app provides a lot of photo reviews uploaded by previous purchasers.	Choi and Kim(2011), FGI
11	This app allows me to use innovative features using AR technology.	Park and Koh(2014), FGI
12	Live streams in this app provide me product information in great detail.	FGI
13	This app allows me to share product images with others using Weibo, QQ, Wechat, and more.	FGI
14	This app provides a lot of video and photo information that introduces fashion styles or fashion coordination.	Choi and Kim(2011), FGI
15	This app provides location-based services (LBS) and allows me to find information about hotels, restaurants, and various facilities around a place where I am located.	FGI
16	Text reviews provided by this app are very specific.	Hong et al. (2015)
17	This app allows me to choose a customized service that reflects my needs.	Kim et al.(2015), FGI
18	This app provides me with a variety of entertainment games.	Park and Ko (2014), FGI
19	The photo reviews shared in this app provide high resolution images.	FGI
20	Many live streams in this app provide real time communication with users.	FGI
21	In this app, SNS is actively used for message and photo delivery.	FGI
22	This app quickly delivers new product information through lookbooks, pictorials, catalogs, and online magazines.	Park and Koh(2014), FGI
23	This app provides location-based services which provides me with weather and map information based on my current location.	Han (2012)

B. (continued)

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
24	This app provides plenty of text reviews shared by previous purchasers .	Hong et al. (2015)
25	This app offers personalized product service based on customer interests.	Kim et al.(2015), FGI
26	This app allows me to enjoy the latest entertainment.	Park and Ko(2014),FGI
27	This app has a number of detailed photo reviews which prepurchasers took a picture by zooming in on a portion of purchased product.	Choi and Kim(2014), Park and Ko (2014),FGI
28	This app provides live streams which allow me to purchase immediately while listening to the product description.	FGI
29	This app frequently updates fashion trend information or fashion street information.	Choi and Kim(2011), FGI
30	The reviews hosted on this app seem to be a bit exaggerated (R).	Hong et al.(2015)
31	This app provides personalized promotions to customers based on their interest.	Jang and Lee(2014)
32	This app allows me to enjoy my favorite entertainment.	Park and Ko (2014), FGI
33	This app has many photo reviews taken from various angles.	FGI
34	This app provides a variety of fashion news about brands, designers, models, etc.	Choi and Kim(2011), FGI
35	The photo reviews on this app allow me to better understand how the products were worn.	FGI
36	This app provides all the fashion information I want.	Choi and Kim(2011), FGI

C. The following are items describing the system related attributes of the fashion shopping APP that you selected or filled out in the first question (A-1). Please choose the degree to which you agree with the content of each item presented (1 to 5 points).

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
1	This app is well equipped with a security system to prevent external intrusion.	Akinci et al.(2010), Parasuraman et al.(2005), FGI
2	This app never shares personal information with other companies without my consent.	Chopdar et al. (2018), FGI
3	It takes a lot of time to complete a transaction to purchase a product in this app.	FGI
4	The graphic designs used in this app are excellent.	Chun and Lim(2012), FGI
5	It takes a long time to download apps.	FGI
6	Payment is secure in this app.	FGI
7	This app never leaks personal information.	Chopdar et al. (2018), FGI
8	The payment process of this app is too complicated.	FGI
9	In this app, screen layout and placement of images and text are appropriate	Chun and Lim(2012), Park(2016)
10	This app requires a lot of space to download.	FGI
11	In this app, errors occur frequently when making a payment.	FGI
12	The colors and color coordination used in this app are very refined.	Chun and Lim(2012), Park(2016)
13	Frequent update is necessary to use this app.	FGI

D. The following are items describing the marketing activity related attributes of the fashion shopping app that you selected or filled out in the first question (A-1). Please choose the degree to which you agree with the content of each item presented (1 to 5 points).

No.	① Strongly disagree　　② Disagree　　③ So so ④ Agree　　　　⑤ Strongly agree	References
1	This app offers a wide variety of fashion items.	Sung(2013), Heo et al.(2016), FGI
2	The price of fashion items sold in this app is very reasonable.	Sung(2013), Wang et al. (2019), FGI
3	This app frequently offers mobile coupons with various discount rates.	Park and Ko (2014), FGI
4	This app quickly and accurately delivers products to purchasers.	FGI
5	In this app, the exchange and refund of products purchased are quick.	FGI
6	This app solves customer complaints quickly through real time customer services.	FGI
7	This app provides fashion items with a variety of sizes and colors.	Sung(2013), FGI
8	The fashion products sold in this app are affordable to me.	Sung(2013), Wang et al. (2019), FGI
9	Mobile coupons and free gifts offered by this app are valuable to me.	Park and Ko (2014), FGI
10	This app makes it easy to see the delivery status of my purchases.	FGI
11	In this app, the exchange and refund of product sold is reliable.	FGI
12	This app implements real-time customer service that responds instantly to customer inquiries.	FGI
13	The fashion products sold from this app are of high quality.	Sung(2013), FGI

D. (continued)

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
14	When compared to other apps, the price of fashion products in this app is more inexpensive.	Sung(2013), FGI
15	This app provides various promotion activities offering rewards, points, sweepstakes, etc.	Park and Ko (2014), FGI
16	This app has a good delivery system.	FGI
17	In this app, the exchange and refund process of products purchased is complicated (R).	FGI
18	This app solves problem instantly with real-time customer service even after sales.	FGI
19	This app has many fashion styles to suit my taste.	Sung(2013), FGI
20	Buying fashion products in this app saves my money more than buying them elsewhere.	Sung(2013), FGI,

E. The following are items evaluating the fashion shopping app that you selected or filled out in the first question (A-1). Please choose the degree to which you agree with the content of each item presented (1 to 5 points).

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
1	This app is very useful for getting the fashion information I want.	Karjaluoto et al. (2018)
2	Just browsing this app is very fun.	Karjaluoto et al. (2018)
3	This app is very effective to buy fashion products.	Karjaluoto et al. (2018)
4	Shopping for fashion products in this app is very exciting.	Karjaluoto et al. (2018)
5	This app is a very efficient for purchasing fashion products.	Karjaluoto et al. (2018)
6	It's enjoyable to use this app to buy fashion items.	Karjaluoto et al. (2018)

E. (continued)

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
7	This app is very useful to buy fashion products.	Karjaluoto et al. (2018)
8	For fashion shopping, I feel better while browsing this app.	Karjaluoto et al. (2018)
9	This app is very helpful in improving my fashion sense.	Karjaluoto et al. (2018)
10	This app is very convenient to shop fashion items.	FGI, Heo et al.(2018)

F. The following are items evaluating your intention to use the fashion shopping app that you selected or filled out in the first question (A-1). Please choose the degree to which you agree with the content of each item presented (1 to 5 points).

No.	① Strongly disagree ② Disagree ③ So so ④ Agree ⑤ Strongly agree	References
1	I will continue to use this app for fashion shopping in the future.	Wang et al. (2019)
2	When I buy fashion products, I will use this app first.	Wang et al. (2019)
3	I will definitely buy fashion products using this app.	Wang et al. (2019)
4	I will reuse this app soon to buy fashion products.	Wang et al. (2019)

G. The following are questions about the demographic and social characteristics of respondents. The data are only used for statistical analysis, so please respond frankly.

1. Please select your gender
   ① Male
   ② Female

2. Please write down your age. _____

3. Please select your marital status

    ① Unmarried
    ② Married
    ③ Other(Please write down)

4. Please select your occupation.

    ① Housewife
    ② Office Worker
    ③ Student
    ④ Other(Please write down)

5. Please write down your monthly income.

(If you have no income, please write down your monthly pocket money)

    _____ (yuan)

6. Please select your educational background.

    ① High-school graduation
    ② Attending university
    ③ University graduation
    ④ Attending Graduate School
    ⑤ Graduate-school graduation
    ⑥ Other(Please write down)_____

7. Please write down your place of residence (the name of city).

    _____

8. Please write down all of the names of fashion apps you use.

    _____

Appendix 2: Mobile vision questionnaire (Chinese)

关于中国女性使用时尚购物APP的研究

您好

本调查问卷旨在收集有关中国女性使用时尚购物APP的数据. 我们将匿名处理所有回答, 并且绝不会用于其他目的. 回答调查问卷大约需要15分钟. 由于调查问卷中没有正确或错误的答案, 请坦率地回答所有问题. 但是, 重复或不恰当的回答不能用作研究数据, 因此如果您被本系统证明是重复或不受信任的回答者, 您将无法获得酬谢金, 您只能访问此系统一次, 并且您必须坦率地回答问题.谢谢.

2019年1月22日
济州大学 硕士课程 孙宇
yusun@jejunu.ac.kr
指导教授: 济州大学 洪嘉淑
heesookh@jejunu.ac.kr

A. 时尚购物APP指的是销售时尚商品(服装，化妆品，包，鞋子，饰品等)的所有零售APP. 请回答以下问题.

*A-1. 请选择您最近使用的一个时尚购物APP. (以下选项中, 如果没有您最近使用的APP, 请直接在其他项中填写APP的名称)

- ① 爱穿衣
- ② 半糖
- ③ 宝贝格子
- ④ 潮流女装
- ⑤ 楚楚街
- ⑥ 达令
- ⑦ 堆糖
- ⑧ 蜂巢
- ⑨ 格知GUECHI
- ⑩ 好搭
- ⑪ 嗨购
- ⑫ 红豆角
- ⑬ 京东商城
- ⑭ 聚美优品
- ⑮ 口袋购物
- ⑯ 乐蜂
- ⑰ 礼物说
- ⑱ 路口
- ⑲ 美丽说
- ⑳ 美丽衣橱
- ㉑ 美西
- ㉒ 梦芭莎
- ㉓ 明星衣橱
- ㉔ 蘑菇街
- ㉕ 拼多多
- ㉖ 尚品
- ㉗ 私蜜搭
- ㉘ 苏宁易购
- ㉙ 淘宝
- ㉚ 天猫
- ㉛ 微店
- ㉜ 唯品会
- ㉝ 小红唇
- ㉞ 小红书
- ㉟ 新款
- ㊱ 衣恋时尚
- ㊲ 宜定时尚
- ㊳ 有货
- ㊴ 有调
- ㊵ D2C
- ㊶ JSTYLE精美
- ㊷ MFD时尚日记
- ㊸ See
- ㊹ ZAKER橱窗
- 其它（请填写一个APP的名称）

*

*A-2. 您使用第一个问题(A-1)中选择或填写的时尚购物APP多久了？

精确到几年几个月

* A-3. 您多久使用一次在<mark>第一个问题</mark>(A-1)中填写的时尚购物APP？

    ○① 几乎不用

    ○② 不怎么使用

    ○③ 偶尔使用

    ○④ 经常使用

    ○⑤ 非常高频率使用

* A-4. 您在<mark>第一个问题</mark>(A-1)中选择或填写的时尚购物APP的使用目的(理由)是什么？请标记所有您的选择. 〔多选题〕

    ☐① 为了购买时尚商品

    ☐② 为了搜索时尚信息

    ☐③ 为了寻找时尚风格或搭配风格

    ☐④ 虽然没有具体的购买目的，只是为了浏览时尚商品

    ☐⑤ 为了度过无聊的时间和空闲时间

    ☐⑥ 其他(请直接填写内容) _____ *

	1分:完全 不认同	2分:不太 认同	3分:一般 (普通)	4分:略有 认同	5分:非常 认同
① 在这个APP中，我可以使用增强现实(AR)技术来进行虚拟试衣或虚拟搭配.	○	○	○	○	○
② 在这个APP中，我可以浏览应用虚拟现实(VR)技术的VR商店.	○	○	○	○	○
③ 在这个APP中，我可以像身临其境一样观看直播(live streaming).	○	○	○	○	○
④ 这个APP与微博，QQ和微信等各种SNS软件相互连接.	○	○	○	○	○
⑤ 在这个APP中，我可以轻松找到与时装系列或时装周相关的视频，影像和照片.	○	○	○	○	○
⑥ 在这个APP中，提供了告诉我附近时尚卖场位置的定位服务(LBS).	○	○	○	○	○
⑦ 这个APP所提供的购买后的文字评价值得信赖.	○	○	○	○	○
⑧ 在这个APP中，顾客可以按照想要的颜色或材质，设计，定制一些商品.	○	○	○	○	○
⑨ 在这个APP中，我除了浏览和购买商品以外，还可以享受娱乐.	○	○	○	○	○
⑩ 这个APP中有很多买家秀(photo review).	○	○	○	○	○
⑪ 在这个APP中，我可以使用增强现实(AR)技术开发的新功能.	○	○	○	○	○
⑫ 在这个APP中，提供了详细介绍商品信息的直播(live streaming).	○	○	○	○	○
⑬ 在这个APP中，我可以通过微博，QQ，微信等，与其他人共享商品信息.	○	○	○	○	○
⑭ 在这个APP中，有很多介绍时尚风格或搭配风格的视频和照片.	○	○	○	○	○
⑮ 在这个APP中，提供了可以查看我所在位置附近的酒店，饭店，各种设施的信息的定位服务(LBS).	○	○	○	○	○
⑯ 这个APP所提供的购买后的文字评价非常详细.	○	○	○	○	○
⑰ 在这个APP中，我可以按照自己的需求，选择定制服务.	○	○	○	○	○
⑱ 这个APP提供了多种多样的娱乐游戏.	○	○	○	○	○
⑲ 这个APP中买家秀(photo review)都是高清的.	○	○	○	○	○
⑳ 在这个APP中，提供了实时交流的直播(live streaming)有很多.	○	○	○	○	○
㉑ 在这个APP中，使用者积极利用SNS传送商品信息和照片.	○	○	○	○	○
㉒ 这个APP通过画报，商品宣传册，期刊杂志等方式快速传达新产品信息.	○	○	○	○	○
㉓ 在这个APP中，提供了可以查看我所在位置的天气，地图的定位服务(LBS).	○	○	○	○	○

㉔ 这个APP所提供的购买后的文字评价非常全面.	○	○	○	○	○
㉕ 这个APP提供与消费者感兴趣的主题相关的个性化产品的推荐服务.	○	○	○	○	○
㉖ 在这个APP中，我可以玩最近流行的娱乐游戏.	○	○	○	○	○
㉗ 在这个APP中，购买者上传了很多放大商品的细节图(photo review).	○	○	○	○	○
㉘ 在这个APP中，提供了我听到卖家的商品说明就可以立即购买的直播 (live streaming).	○	○	○	○	○
㉙ 这个APP随时更新时尚潮流信息.	○	○	○	○	○
㉚ 这个APP所提供的购买后的文字评价有点夸张.	○	○	○	○	○
㉛ 这个APP基于我个人兴趣提供了个性化广告/促销.	○	○	○	○	○
㉜ 在这个APP中，我可以享受喜欢的娱乐游戏.	○	○	○	○	○
㉝ 这个APP有许多以前的购买者上传的在不同角度拍摄的买家秀(photo review).	○	○	○	○	○
㉞ 这个APP提供了多样的品牌，设计师，模特等相关的时尚新闻.	○	○	○	○	○
㉟ 在这个APP中，提供了我可以更了解商品属性的其他购买者拍摄的买家秀(photo review).	○	○	○	○	○
㊱ 在这个APP中，我可以找到想要的所有时尚信息.	○	○	○	○	○

* C. 这是关于您在<mark>第一个问题(A-1)中选择或填写的时尚购物APP</mark>的系统属性的问题.请选择您同意以下内容的程度(1分至5分)

	1分:完全不认同	2分:不太认同	3分:一般(普通)	4分:略有认同	5分:非常认同
① 这个APP具备防止外部侵入的安全系统.	○	○	○	○	○
② 这个APP绝不会与其他机构共享我的个人信息.	○	○	○	○	○
③ 在这个APP中,支付时消耗很长的时间.	○	○	○	○	○
④ 这个APP的美工设计非常美观.	○	○	○	○	○
⑤ 下载这个APP需要很长时间.	○	○	○	○	○
⑥ 这个APP支付方式是安全的.	○	○	○	○	○
⑦ 这个APP绝对不会有个人信息泄露的事情发生.	○	○	○	○	○
⑧ 这个APP支付的步骤很复杂.	○	○	○	○	○
⑨ 这个APP画面构成,布局,图片和文字的配置等很恰当.	○	○	○	○	○
⑩ 下载这个APP需要占用很大的手机内存.	○	○	○	○	○
⑪ 在这个APP中,付款时经常发生系统错误.	○	○	○	○	○
⑫ 这个APP使用的颜色和配色非常简洁.	○	○	○	○	○
⑬ 这个APP需要随时更新.	○	○	○	○	○

* D. 这是关于您在第一个问题(A-1)中选择或填写的时尚购物APP的市场活动的问题.请选择您同意以下内容的程度(1分至5分)

	1分:完全不认同	2分:不太认同	3分:一般(普通)	4分:略有认同	5分:非常认同
① 这个APP提供的时尚品种非常多样.	○	○	○	○	○
② 这个APP销售的时尚商品价格很合理.	○	○	○	○	○
③ 在这个APP中,随时提供现金折扣券和不同折扣率的优惠券.	○	○	○	○	○
④ 在这个APP中,我所购买商品的配送非常迅速准确.	○	○	○	○	○
⑤ 这个APP销售商品的交换和退款很迅速.	○	○	○	○	○
⑥ 这个APP通过实时(real time)客户服务,快速解决客户不便(不满).	○	○	○	○	○
⑦ 在这个APP中,销售的时尚商品,尺寸和颜色多种多样.	○	○	○	○	○
⑧ 我能接受这个APP销售的时尚商品的价格.	○	○	○	○	○
⑨ 在这个APP中,提供的优惠券或者赠品等对我的利用价值高.	○	○	○	○	○
⑩ 在这个APP中,我可以实时查看订购商品的配送状态.	○	○	○	○	○
⑪ 这个APP销售商品的交换和退款值得信赖.	○	○	○	○	○
⑫ 这个APP提供的实时(real time)客户服务,便于立即回答客户的问题.	○	○	○	○	○
⑬ 在这个APP中,销售的时尚商品质量优良.	○	○	○	○	○
⑭ 在这个APP中,我购买的时尚商品的价格比其他地方便宜.	○	○	○	○	○
⑮ 这个APP中实施的促进销售(储金,积分,抽奖,完成任务等)非常多样.	○	○	○	○	○
⑯ 这个APP配送系统很完善.	○	○	○	○	○
⑰ 这个APP销售商品的交换和退款程序复杂.	○	○	○	○	○
⑱ 这个APP通过实时(real time)客户服务,立即解决售后问题.	○	○	○	○	○
⑲ 在这个APP中,有很多适合我的时尚风格.	○	○	○	○	○
⑳ 在这个APP中,我可以比在其他地方购买时省钱.	○	○	○	○	○

* E. 这是关于您在第一个问题(A-1)中选择或填写的时尚购物APP的评价的问题.请选择您同意以下内容的程度(1分至5分)

	1分:完全不认同	2分:不太认同	3分:一般(普通)	4分:略有认同	5分:非常认同
① 这个APP对于获取我想要的时尚信息非常有用.	○	○	○	○	○
② 在这个APP中,我只进行浏览也非常有趣.	○	○	○	○	○
③ 在这个APP中,我可以非常高效地购物.	○	○	○	○	○
④ 在这个APP中时尚购物, 使我感到兴致勃勃.	○	○	○	○	○
⑤ 这个APP购买时尚商品非常有用.	○	○	○	○	○
⑥ 为了购买时尚商品,我每次使用这个APP都非常的愉悦.	○	○	○	○	○
⑦ 这个APP购买时尚商品非常实用.	○	○	○	○	○
⑧ 为了时尚购物,我浏览这个APP的过程中心情会变好.	○	○	○	○	○
⑨ 这个APP非常有助于增强我的时尚感.	○	○	○	○	○
⑩ 在这个APP中,我可以非常方便地购买时尚商品.	○	○	○	○	○

* F. 这是关于您在第一个问题(A-1)中选择或填写的时尚购物APP的行动意图的问题.请选择您同意以下内容的程度(1分至5分)

	1分:完全不认同	2分:不太认同	3分:一般(普通)	4分:略有认同	5分:非常认同
① 为了时尚购物,我以后也会继续使用这个APP.	○	○	○	○	○
② 购买时尚商品时,我会优先使用这个APP.	○	○	○	○	○
③ 我下次一定会在这个APP中购买时尚商品.	○	○	○	○	○
④ 我将很快再次使用这个APP购买时尚商品.	○	○	○	○	○

G. 这是有关受访者特性的问题.答复仅用于统计分析,因此请坦率回答.

* 1. 请选择您的性别.

○ ① 男性

○ ② 女性

* 2.请写下您的年龄.

[   ]

* 3. 请选择您的婚姻状况

○ ① 未婚

○ ② 已婚

○ ③ 其他(请写下内容) _____

---

* 4. 请选择您的职业.

○ ① 全职主妇

○ ② 职场人

○ ③ 学生

○ ④ 其他(请写下内容) _____

---

* 5. 请写下您的月收入(若无收入,请写下每月的零用钱)

单位: 元

_____

* 6. 请选择您的学历.

○ ① 高中毕业

○ ② 大学在学

○ ③ 大学毕业

○ ④ 研究生在学

○ ⑤ 研究生毕业

○ ⑥ 其他 (请写下内容) _____

---

* 7. 请您写下您的现居地（市）

_____

* 8. 请写下所有您使用过的时尚APP的名称.

_____