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# Lifestyles, Technology Clustering, and the Adoption of Over-the-top Television and Internet Protocol Television in Taiwan

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Adopting Rogers' diffusion of innovation model, we investigated lifestyles and technology clustering to predict the adoption of OTT (over the top) and IPTV (Internet protocol TV) in Taiwan. We used 2 methods to collect data, 1 of which was to do 20 intensive interviews. The second method was to conduct a nationwide telephone survey that obtained 1,015 valid respondents. The data analysis resulted in three conclusions: (1) lifestyles played a more important role in the adoption of OTT than in the adoption of IPTV; (2) the adopters of OTT differed greatly from those of IPTV in that the characteristics of OTT adopters accorded with the prediction of Rogers' model, but the characteristics of IPTV adopters diverged greatly from the model's prediction; and (3) adding the mechanisms of interpersonal communication to entertainment-oriented technologies is the most unique feature of Internet-related media and makes these media fascinating to users.

*Keywords: Rogers' diffusion of innovation model, OTT, IPTV, lifestyles, technology clustering*

The proliferation of Internet technologies has brought new types of program viewing into society, one of which is over-the-top (OTT) television services. According to the Federal Communication Commission of the U.S., OTT services are video programs offered through the Internet (Kim, Kim, & Nam, 2016). OTT services have existed in Taiwan for several years, with a majority of the OTT services originating from mainland China. Furthermore, several large media firms, including Netflix and the largest OTT operator in China, iQIYI.com, have started OTT service operations in Taiwan. Scholars estimate that OTT services will become a strong competitor of traditional mass media because OTT services have more flexible schedules and a greater variety of content (Chen, 2018; Hsu, Liu, & Chen, 2015; Park, 2018; Wang, 2016). Although OTT services have existed in Taiwan for several years, many of these services come from mainland China. In particular, dramas and films from South Korea and mainland China are very popular in Taiwan, and many consumers are attracted by OTT services because of these types of programs. Most OTT services use advertising revenues to support their operations and are thus free to consumers (Hsu et al., 2015).

Another new type of television is Internet protocol TV (IPTV). The only IPTV operator in Taiwan is Multimedia on Demand (MOD), which was established by the largest telecommunications company in Taiwan. MOD started its operation in 2003, and its penetration rate has rapidly increased in recent years.

The latest data show that the MOD penetration rate in 2018 was 18% (National Communications Commission, 2018). IPTV is similar to OTT because its structure is based on the Internet's infrastructure. IPTV differs from OTT because it is constructed on its system operator's intranet, and OTT is constructed on public networks. IPTV is also called "a walled garden" that is inaccessible to nonsubscribers (Liu & Chen, 2015). MOD's operator is Chung-Hua Telecom, which has more than 4.5 million ADSL subscribers. Chung-Hua Telecom has promoted its MOD subscription by offering ADSL subscribers special low prices and has thus rapidly increased its MOD subscription (ChungHua Telecom, 2016).

OTT and IPTV are newer types of television, which have become strong competitors of Taiwan's traditional television media. In particular, OTT services are popular in Taiwan and have seized a great deal of advertising revenues from traditional television media (Hsu et al., 2015). According to media industry analysts (Taiwan Institute of Economic Research, 2015), the largest market of OTT services is located in northern America. The fastest growing market of OTT services is in Asia. We examined lifestyles and technology clustering to understand how psychological variables influenced individuals' adoption of OTT and IPTV. These findings will help inform OTT or IPTV operators on how to market their services. Taiwan is part of the great China area that has a population of more than 1.4 billion, and thus these findings are particularly applicable to Chinese populations.

We will adopt Rogers' diffusion of innovation model to examine the effects of lifestyles and technology clustering on the adoption of OTT and IPTV. According to Rogers' model, consumers adopt technologies not only for the functions provided by those technologies but also for the social rewards conferred by them. When people adopt a technology mainly for its social rewards, lifestyle is an important variable for such adoption. Lifestyles that reflect individuals' needs and desires are frequently used by individuals to communicate their social differentiation. Scholars in marketing studies often rely on lifestyles to predict individuals' consumption behaviors and have found that lifestyles are a more effective approach than demographics because the former allows them to understand consumers' psychological preferences and to better predict consumers' consumption patterns (Chan & Leung, 2005; Leung & Chen, 2017; Wei, 2006).

Rogers' model also predicts that individuals adopt a technology because the functions of that technology satisfy their needs; thus, Rogers proposes the concept of technology clustering as a variable that allows scholars to predict technology adoption. Technology clustering assumes that consumers' past experiences with technologies will influence their technology adoption, and thus they are more likely to adopt technologies that have similar functions. That is, individuals adopt technologies because the functions offered by these technologies fulfill their needs, and therefore, examining types of technology ownership permits scholars to predict technology adoption (Rogers, 2003).

Rogers' diffusion of innovation model is widely adopted for examining technology adoption. However, this model's major flaw is its neglect of the examination of psychological factors that drive consumers to adopt technologies. Rogers classifies all individuals into five types of adopters: innovators, early adopters, early majority, late majority, and laggards. Rogers considers that these five types of adopters differ significantly from one another in terms of their demographics and personality traits (Rogers, 2003). Empirical studies have frequently examined the differences of these adopters regarding

their demographics, but have seldom examined adopters' psychological variables (Rogers, 2003). We investigated two psychological variables, lifestyles and technology clustering, to remedy this gap in the existing literature (Atkin, Neuendorf, Jeffres, & Skalski, 2003; Li, 2013; Rogers, 2003).

## Literature Review

Based on Rogers' model, we identified four variables as the predictors that would influence the adoption of OTT and IPTV in Taiwan. This section introduces the concepts of the four variables and relevant empirical studies, including lifestyles, technology clustering, mass media use, and demographics.

### *Lifestyles*

Lifestyles are defined as how individuals conduct their lives in terms of their activities, interests, and opinions (Peter & Olson, 1994). Lifestyles reflect individuals' psychological preferences and are hence considered useful predictors of individuals' consumption behaviors. In addition to their use in marketing studies, lifestyles are often used to understand media-use patterns or the adoption of technologies (Lekakos, 2009; Lorenzo-Dus, 2006; Sun & Guo, 2017; Wei, 2006). Studies on media-use patterns have shown that lifestyles allow scholars to differentiate various use patterns of mass media (Becker & Connor, 1981; Wei, 2006). For example, Donohew, Palmgreen, and Rayburn (1987) found that individuals who spent more time reading newspapers and magazines and less time viewing television were more likely to have an outgoing lifestyle. Another trend in lifestyle studies is the investigation of the relationship between lifestyles and technology adoption (Hawkins, Best, & Coney, 1998; Lekakos, 2009; Leung & Chen, 2017; Li, 2015; Wei, 2006). For example, Mazzoni, Castaldi, and Addeo (2007) showed that people who adopted mobile phones mainly for entertainment tended to have a connected lifestyle, but that people who used cell phones mainly to maintain relationships tended to have a traditional lifestyle.

We used a scale of lifestyles that has been applied several times to Chinese populations. The first type of lifestyle is being fashionable. People with this lifestyle are predisposed to attend to trends in fashion and to carry objects that can be used to exhibit their unique personal styles. Furthermore, people with this lifestyle like to dress well to demonstrate their social differentiation. Past research has shown that consumers associated with a fashionable lifestyle like to have technologies that allow them to show their distinctive styles (Leung & Chen, 2017; Li, 2015). For example, Li (2015) found that individuals having a fashionable lifestyle had a significant relationship with the adoption of digital videos (DV), notebooks, and netbooks because these technologies allowed individuals to carry them around to show their social differentiation. OTT is, a new type of television, popular in Taiwan. However, OTT cannot be carried around because Taiwan is a small island with short commuting distances, making it unsuitable for the use of OTT when on the move. Similarly, MOD builds its own intranet to connect with subscribers and is thus inconvenient for use while on the move. Therefore, we predict that the adoption of OTT and MOD will not be related to a fashionable lifestyle. Based on this reasoning, we advance the following hypothesis:

*H1a: Having a fashionable lifestyle is unrelated to the adoption of OTT and MOD.*

People with the second lifestyle, life expansionists, are predisposed to be concerned with achievement. Individuals associated with this lifestyle work hard and like to take on challenges because they have high expectations for themselves. Studies have shown that consumers associated with this lifestyle like technologies that allow them to improve their jobs (Leung, 1998; Li, 2015). For example, Li (2015) found that individuals with a life expansionist lifestyle had a significantly higher probability to adopt Kinect, digital video, and tablet PCs in Taiwan because these technologies required effort and allowed the respondents to make personal achievements. OTT and MOD are new types of television that both have a strong interactivity mechanism. OTT and MOD services provide people with various types of video programs, most of which are entertainment oriented. In particular, most of the people who are attracted by OTT and MOD are interested in their dramas, films, sporting programs, and variety shows. A survey conducted in 2017 showed that the three most popular types of OTT programs viewed by the respondents were dramas (53.6%), variety shows (43.8%), and films (41.5%) ("Who Will Be," 2017). Another study compared OTT, MOD, and digital cable in Taiwan and showed that MOD subscribers were most satisfied with sporting programs and films provided by MOD (Hsu & Liu, 2015; Hsu et al., 2015). Therefore, OTT and MOD should be classified as entertainment-oriented and interpersonal communication media. As a result, we predict that this lifestyle will be unrelated to the adoption of OTT and MOD. This reasoning leads to the development of the following hypothesis:

*H1b: Having a life expansionism lifestyle is unrelated to the adoption of OTT and MOD.*

People following the third type of lifestyle, pleasure seeking, are predisposed to take it easy in their lives. Research has shown that individuals associated with this lifestyle dislike technologies that require too much effort, and they prefer to use traditional entertainment-oriented media (Leung, 1998; Li & Huang, 2016). For example, Leung (1998) examined the relationship between new media adoption and lifestyles in China, finding that the adoption of VCRs and cable television was significantly associated with a pleasure-seeking lifestyle. Li (2013) investigated the effects of lifestyles on media adoption and found that individuals with a pleasure-seeking lifestyle had a significantly higher probability to adopt digital cable. Both OTT and MOD are entertainment-oriented media. In particular, MOD is a strong competitor of digital cable, and people in Taiwan have regarded MOD as a good substitute for it (Hsu et al., 2015). Hence, we predict that a pleasure-seeking lifestyle will be a positive predictor for the adoption of OTT and MOD. This reasoning leads us to develop the following hypothesis:

*H1c: A pleasure-seeking lifestyle will be significantly related to the adoption of OTT and MOD.*

People following the fourth type of lifestyle, preference for foreign products, are predisposed to prefer technologies from foreign countries because they believe these technologies to have higher quality and are more satisfactory. Prior research has shown that when there are choices between domestic and foreign-country brands, people with this lifestyle prefer to select the foreign-country-brands technologies (Leung & Chen, 2017; Li, 2015). The products offered by OTT and MOD are video programs that differ from other technologies because video programs are greatly affected by cultural orientations that include languages and cultural values. According to the cultural proximity perspective (Lee, 2006; Straubhaar, 1991, 2007), individuals prefer to consume programs that have a similar cultural orientation to their own so that they can easily understand and enjoy the content of these programs. In particular, the most

popular types of OTT programs are dramas, films, and variety shows, which are greatly affected by language and cultural orientations. Therefore, this lifestyle is more applicable for the adoption of technologies than for the adoption of OTT and MOD. We thus advance the following hypothesis:

*H1d: The lifestyle of preference for foreign products is unrelated to the adoption of OTT and MOD.*

People with the last type of lifestyle, media nonskepticism, are predisposed to trust in mass media. Individuals with this lifestyle tend to believe that messages in news media are reliable, and they prefer to purchase products that have been advertised. Research has shown that individuals associated with this lifestyle are less likely to adopt information technologies (Leung, 1998; Li, 2015). That is, studies have found that individuals who are suspicious of news media or advertising tend to adopt information technologies. For example, Li (2013) showed that people with a lifestyle of media skeptics tended to adopt notebooks and scanners. OTT and MOD are mainly entertainment-oriented media, and consumers' attitudes toward news media or advertising are therefore less relevant. Hence, we predict that a media nonskepticism lifestyle has nothing to do with the adoption of OTT and MOD.

*H1e: The lifestyle of media nonskeptics is unassociated with the adoption of OTT and MOD.*

### ***Technology Clustering***

Rogers defines a technology cluster as "consisting of one or more distinguishable elements of technology that are perceived as being closely interrelated" (Rogers, 2003, p. 14). The basic notion of technology clustering is that the functions offered by technologies vary from one technology to another and that individuals adopt a given technology because the functions provided by that technology satisfy their needs. Therefore, people tend to adopt functionally similar technologies in that the functions offered by these technologies satisfy their needs. Based on the functions offered by technologies, Atkin (1995) classified communication technologies into entertainment-oriented, information-oriented, and interpersonal technologies. Atkin's study verified the phenomenon of technology clustering in that he found that respondents' use of entertainment-oriented technologies was related more to the adoption of the 1-900 service that was entertainment oriented than to the use of information-oriented technologies. Furthermore, Hunt, Lin, and Atkin (2014) investigated college students' photo messaging behavior in the U.S. Their study found that technology clusters were able to positively predict students' perceived usefulness and ease of use of photo messaging and their intention to adopt this service.

With the rapid development of interactive technologies, exercise-oriented technologies such as Kinect or Wii are a new type of popular entertainment-oriented technology in Taiwan (Li, 2015). Hence, we include this type of technology and classify all communication technologies into four types: entertainment oriented, entertainment for exercise, information oriented, and interpersonal technologies. OTT services and MOD are similar to cable television services because they all offer video programs to audiences. However, OTT services are built within the Internet infrastructure, and thus interaction with systems or with other viewers is one of the strong points of these services. For example, users are able to see other users' comments or the rankings of certain programs before or during the viewing of these programs (Hsu et al., 2015). Similarly, MOD has been digitalized from its inception, and many programs

offered by MOD are characterized by interactive functions, such as pay-per-view or the ability to interact with other viewers during program viewing. Therefore, we predict that although OTTs and MOD belong to entertainment-oriented media, they are also related to interpersonal technologies due to their strong interactive functions. The phenomenon of technology clustering predicts that individuals tend to adopt technologies with similar functions, and thus we developed the following hypotheses:

*H2a: The adoption of OTT services is positively related to the ownership of entertainment-oriented and interpersonal technologies.*

*H2b: The adoption of MOD is positively related to the ownership of entertainment-oriented and interpersonal technologies.*

### *Mass Media Use and Demographics*

Rogers' diffusion of innovation model conceives of the diffusion process as a communication process in which mass media and person-to-person communication perform the functions of informing and persuading, respectively. Specifically, Rogers' model considers mass media to be useful in terms of raising public awareness of an innovation, and thus, early adopters tend to be heavier users of various types of mass media than are late adopters. Therefore, as the diffusion of an innovation is still in its early stages, mass media use exerts a significant effect in differentiating adopters from nonadopters. As diffusion enters its late stages, mass media use no longer plays an important role in adoption (Jung, Chan-Olmsted, Park, & Kim, 2012; Rogers, 2003). Empirical research also finds a significant impact of mass media use in the early stages of an innovation's diffusion (Chan-Olmsted & Chang, 2006; Li & Huang, 2016; Jung et al., 2012). For example, Li (2013) investigated the adoption of nine Internet-related technologies in Taiwan and found that magazine reading and Internet use positively predicted adoption. Atkin et al. (2003) examined digital television adoption in the U.S. when this technology was still in its early stages of diffusion and discovered that magazine and newspaper use had significant effects on adoption. On the other hand, Garitaonandia and Garmendia (2009) explored e-commerce adoption in Spain and showed that no mass media use except Internet use had a significant effect on adoption. Likewise, the study by Jung and colleagues (2012) discovered that the only medium that was able to predict e-book adoption in South Korea was Internet use.

OTT has existed in Taiwan for more than 10 years, and more than 50% of Taiwan's population has adopted this new type of television service (Hsu et al., 2015). Hence, the diffusion of OTT should have passed the critical mass point. More specifically, Rogers' (2003) model identifies the critical mass point after which the diffusion of a given innovation will accelerate. Many innovations fail to be accepted because they are unable to pass the critical mass points at their early stages of diffusion. For most innovations, the critical mass points are between 25% and 40%, and thus, when the penetration rate of a given technology has been more than 50%, its diffusion has certainly passed its critical point. We predict that mass media use no longer has a significant impact on the adoption of OTT. Similarly, MOD started its operation in 2003, and its penetration rate has rapidly increased in recent years; thus, its diffusion should have passed into its late stages. Based on the literature review, we advance the following hypotheses:

*H3a: The use of mass media is not associated with the adoption of OTT.*

*H3b: The use of mass media is not associated with the adoption of MOD.*

Based on how early an individual adopts an innovation, Rogers' model divides all consumers into five types of adopters: innovators (the first 2.5%), early adopters (the next 13.5%), early majority (the next 34%), late majority (the next 34%), and laggards (the last 16%). Empirical studies have shown that the five types of adopters differ significantly in their demographic variables (Atkin et al., 2003; Li & Huang, 2016; T. T. Lin, Chiu, & Lim, 2011). Furthermore, Rogers' model suggests that demographics are important variables in the early stages of an innovation's diffusion and are capable of differentiating adopters from nonadopters. As the diffusion of an innovation comes into its late stages, demographics will no longer exert a significant effect on adoption. Empirical research shows that early adopters are more likely to be male, younger, and better educated and to have higher incomes than are nonadopters (Atkin et al., 2003; Jung et al., 2012; Leung & Chen, 2017; Lin et al., 2011; Zhu & He, 2002). This literature review leads us to predict that demographics will not play a significant role in the adoption of either OTT or MOD because both technologies are in the late stages of diffusion in Taiwan. Therefore, we developed the following hypotheses:

*H4a: Demographics, including age, gender, education, and personal income, will not exert significant effects on the adoption of OTT.*

*H4b: Demographics, including age, gender, education, and personal income, will not exert significant effects on the adoption of MOD.*

## Research Methodology

We adopted two research methods to collect data—conducting 20 intensive interviews and a telephone survey. The two methods were complementary because the intensive interviews allowed us to gain a deep understanding about the strengths and weaknesses of OTT and MOD perceived by the respondents, and the telephone survey allowed us to obtain a representative sample.

### *Intensive Interviews on Technology Clusters*

We employed the following steps to obtain a list of technologies available in Taiwan: first, we reviewed relevant studies (Hsu & Liu, 2015; Hsu et al., 2015; Li, 2013, 2015), and second, we conducted 20 intensive interviews to identify which technologies the interviewees considered popular in Taiwan. The objectives of the intensive interviews were (1) to identify the most popular new technologies in Taiwan and (2) to understand the strengths and weaknesses of OTT and MOD perceived by people in Taiwan. The 20 intensive interviews were conducted before the telephone survey. This procedure allowed us to identify 10 technologies that were popular in Taiwan: Facebook, Line, Skype, e-mail, wearable devices, Wii, Kinect, notebooks, tablet computers, and e-books. We classified Facebook, Line, e-mail, and Skype as interpersonal communication technologies; Wii, Kinect, and wearable devices as entertainment technologies for exercise; and notebooks, tablet computers, and e-books as information-oriented technologies. The interviewees indicated that the most popular entertainment-oriented technology was OTT services and that the next most popular technology was IPTV. Therefore, there were no entertainment-oriented technologies among the top 10 technologies that interviewees identified as most popular in this study.

In addition to identifying 10 popular technologies in Taiwan, we asked the interviewees to compare the strengths and weaknesses of OTT and MOD to better understand the two media in the interviews. We purposely invited individuals with different residential areas, genders, educational backgrounds, and ages for interviews to make the responses more representative. The most important criterion for the selection of interviewees was that they must have experiences using both OTT and MOD. We employed snowballing to interview 10 females and 10 males whose education levels ranged from college to graduate levels. The 20 interviewees' ages also varied greatly from 18 to 46 years. Additionally, the interviewees' residential areas were evenly distributed in different parts of Taiwan. We recorded and transcribed the interview responses for later analysis. We used content analysis to identify the themes (strengths and weaknesses) of OTT and MOD. The interviews were conducted either by telephone or face-to-face interviews.

### *Telephone Survey*

There were five sections in the telephone survey questionnaire, the first of which contained six questions that measured the adoption of OTT and MOD. Specifically, the telephone interviewers first asked the respondents whether they had used OTT or MOD. If they answered yes, then the interviewers would further ask the respondents to rate on a scale (from 1 = *less than half a year* to 7 = *more than 10 years*) how long they had used OTT or MOD. If they answered no, then the interviewers would briefly explain what OTT and MOD were and asked the respondents to indicate on a scale (from 1 = *very unlikely* to 7 = *very likely*) how likely they were to adopt OTT or MOD in the near future. The second section contained 20 items that assessed people's lifestyles. The activity, interest, and opinion method is the most widely used approach for investigating lifestyles, which classifies individuals into different lifestyles by measuring their activities, interests, and opinions (Hawkins et al., 1998; Lekakos, 2009; Leung, 1998; Li, 2015). This study employed a scale of lifestyles that was specifically designed for Chinese populations. This 20-item scale has been applied several times to Chinese populations, and five types of lifestyles have repeatedly emerged, suggesting that this scale is relatively reliable and applicable to Chinese populations (Leung, 1998; Li, 2015; Wei, 2006). The third section contained questions that measured five types of media use: television viewing, newspaper reading, magazine reading, movie going, and Internet use. The fourth section contained items that measured the ownership of three types of technologies. The fifth section contained questions that measured the respondents' age, sex, education, and personal income.

A nationwide telephone survey using a computer-assisted telephone interview system and a proportionate stratified random sampling method were conducted in July 2015. More than 20 telephone interviewers were intensively trained and passed a qualification test before administering the telephone interviews that were conducted in a central location and supervised by the research team. This study made 1,890 telephone calls; 1,015 valid questionnaires were obtained, yielding a response rate of 54.7%. Among the sample, 786 respondents (77.44%) indicated that they were adopters of OTT, and 510 respondents (50.25%) indicated that they were adopters of MOD.

### *Factor Analysis on Lifestyles*

This study performed an exploratory factor analysis on the responses to the 20 items on lifestyles using the method of principal component and a varimax rotation from the SPSS package. Five factors were

extracted, and the percentage explained by the five factors was approximately 58%. The reliability analyses demonstrated that the Cronbach's alpha for four factors was at .70 or above, and the remaining factor's Cronbach's alpha was approximately at .60, which is acceptable.

***Table 1. Factor Analysis on Lifestyles.***

| | Style | | | | | |
|---|---|---|---|---|---|---|
| Variables | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 | $h^2$ |
| Factor 1: Being fashionable | | | | | | |
| 1 Fashionable in the eyes of others | .771 | .100 | .061 | .040 | .091 | .617 |
| 2 Enjoy owning new & fashionable things | .773 | .173 | .093 | .017 | .076 | .642 |
| 3 Attending to trends in fashion | .764 | .188 | .064 | .085 | .078 | .636 |
| 4 Like a fancy and distinctive lifestyle | .711 | .201 | .155 | .050 | .037 | .574 |
| 5 Dress up to express my personality | .676 | .236 | .052 | .115 | .082 | .535 |
| 6 Enjoy a romantic lifestyle | .608 | .111 | .117 | .007 | .052 | .399 |
| 7 Like to wear dresses of reputed brands | .424 | .014 | .145 | .013 | .117 | .215 |
| Factor 2: Life expansionism | | | | | | |
| 8 Taking on challenges and risk in life | .208 | .700 | .012 | −.046 | .153 | .559 |
| 9 Take classes to brighten my future | .173 | .804 | .005 | .036 | .105 | .688 |
| 10 Like to learn new knowledge and technology | .174 | .758 | −.040 | .110 | .113 | .632 |
| 11 Don't like to be idle in life | .114 | .582 | .172 | .133 | −.258 | .466 |
| 12 Have high expectations about what I can achieve | .196 | .709 | .095 | −.003 | .103 | .561 |
| Factor 3: Media nonskepticism | | | | | | |
| 13 Trust in advertising | .172 | .092 | .633 | −.020 | .288 | .522 |
| 14 Trust what newspapers say | .164 | .044 | .807 | .058 | .077 | .690 |
| 15 Advertised products are more reliable | .190 | .045 | .742 | .127 | .111 | .617 |
| Factor 4: Pleasure seeking | | | | | | |
| 16 Like to do nothing but relax during holidays | .099 | −.126 | .027 | .620 | .283 | .492 |
| 17 Happy if I can live a leisurely life | .079 | .086 | .015 | .832 | .052 | .708 |
| 18 Like to have my own living space | .029 | .322 | .008 | .683 | −.033 | .573 |
| Factor 5: Preference for foreign products | | | | | | |
| 19 Although expensive, I prefer foreign products | .248 | .156 | .264 | .045 | .784 | .772 |
| 20 Foreign products make me feel more satisfied | .187 | .128 | .201 | .092 | .827 | .785 |
| Eigenvalue | 5.622 | 2.075 | 1.790 | 1.475 | 1.130 | |
| % of variance explained | 26.770 | 9.879 | 8.522 | 7.023 | 5.380 | |
| Cronbach α | .803 | .791 | .690 | .597 | .852 | |

Note: The factor loadings that are bolded are the highest across the five factors
$\alpha$ = Cronbach's alpha for the items loading on the factor.

The first factor, being fashionable, had seven items that all concerned how to be fashionable. The second factor, life expansionism, had five items that were concerned with achievements. The third factor,

media nonskepticism, had three items that were about the trustworthiness of news media or advertising. The fourth factor, pleasure seeking, had three items that were concerned with how to enjoy life. The last factor, preference for foreign products, included two items that were about satisfaction with products that were manufactured in foreign countries.

### *The Sample Profile*

Among the 1,015 respondents, 44.2% were males. Regarding education, 44.7% of the sample reported that they had completed senior high school, 37.5% had completed college, 10.4% had completed graduate school, 5.7% had completed junior high school, and 1.3% had completed elementary school. Regarding age, 13% of the sample were younger than 20 years, 17.2% were 20–30 years, 19.9% were 31–40 years, 21.9% were 41–50, and the remaining 28% were older than 50 years of age. This sample profile was comparable with Taiwan's population in 2015, except that (1) females were overrepresented, and (2) individuals who were older than 50 years were inadequately represented (Executive Yuan of Taiwan, 2015).

## Research Findings

This study combined two items (how long the respondents had used OTT or MOD and how likely they were to adopt OTT or MOD) to predict the adoption of OTT or MOD. Therefore, respondents who rated the question of how long he or she had used OTT as 2 would score 9 in the adoption of OTT. This study conducted two hierarchical regression analyses using the adoption of OTT and MOD as dependent variables and using lifestyles, three types of technology ownership, mass media use, and demographics as independent variables. Table 2 summarizes the results.

As indicated in Table 2, the adoption of OTT was positively associated with two lifestyles, life expansionism ($B$ = .074, $p$ < .05) and pleasure seeking ($B$ = .057, $p$ < .05). Furthermore, Table 2 shows that only one lifestyle, being fashionable, had an approaching significance relationship with the adoption of MOD ($B$ = .072, $p$ = .058). Therefore, H1a and H1b were not supported, H1c was partially supported, and H1d and H1e were supported by the findings. For technology clustering, Table 2 shows that the adoption of OTT was positively correlated with the ownership of interpersonal technologies ($B$ = .128, $p$ < .000), but was not associated with information technology ownership and the ownership of entertainment technologies for exercise. Therefore, the findings partially supported H2a. For H2b, the data show that the ownership of interpersonal technologies had a significant impact on the adoption of MOD ($B$ = .114, $p$ < .000), whereas the other two types of technology ownership did not exert a significant impact on the adoption. Hence, H1b was partially supported.

For mass media use, Table 2 shows that no mass media use except Internet use ($B$ = .174, $p$ < .000) exerted a significantly positive effect on the adoption of OTT. Regarding the adoption of MOD, none of the five types of mass media use showed a significant effect. Therefore, H3a was partially supported, and H3b was supported. For demographics, the data show that education ($B$ = .112, $p$ < .000) and personal income ($B$ = .067, $p$ < .05) were positively related to the adoption of OTT, but that age ($B$ = −.220, $p$ < .000) was negatively related to the adoption of OTT, showing that the early

adopters of OTT were younger, better educated, and more affluent than late adopters or nonadopters. Hence, H4a was not supported. Regarding the adoption of MOD, this study discovered that age ($B$ = .106, $p$ < .01) was positively related to adoption, but that education ($B$ = −.095, $p$ < .01) was negatively related to adoption, indicating that the early adopters of MOD were older and less educated than late adopters or nonadopters. Hence, H4b was not supported.

***Table 2. Regression Analyses on the Adoption of OTT and MOD.***

| | OTT | MOD |
|---|---|---|
| Demographics | | |
| Age | −.220*** | .106** |
| Edu | .112*** | −.095** |
| Gender | −.018 | −.036 |
| Personal income | .067* | .034 |
| $R$ | .406*** | 126** |
| Adjusted $R^2$ | .162 | .012 |
| Media use | | |
| TV | −.017 | −.031 |
| Newspaper | −.048 | −.008 |
| Magazine | −.009 | .051 |
| Movie | .048 | .027 |
| Internet | .174*** | −.056 |
| $R$ | .458*** | .154 |
| Adjusted $R^2$ | .203 | .015 |
| $R^2$ change | .038 | .003 |
| Lifestyle | | |
| Being fashionable | −.005 | .072$^{+}$ (.058) |
| Life expansionism | .074* | −.005 |
| Pleasure seeking | .057* | −.057 |
| Preference for foreign products | .031 | .021 |
| Media nonskepticism | −.016 | −.013 |
| $R$ | .473** | .179 |
| Adjusted $R^2$ | .213 | .018 |
| $R^2$ change | .010 | .003 |
| Technology ownerships | | |
| Interpersonal tech | .128*** | .114*** |
| Information tech | −.017 | .041 |
| Entertainment tech for exercise | .008 | .009 |
| $R$ | .486*** | .216** |
| Adjusted $R^2$ | .224 | .031 |
| $R^2$ change | .011 | .013 |
| Sample size | 1014 | 1014 |

*$p$ < .05, **$p$ <.01, ***$p$ <.001, $^{+}$ approach a significant level.

## Discussion

### *Lifestyles and Adoption*

As expected, we showed that the adoption of OTT was not associated with a fashionable lifestyle because OTT users were unable to carry the technology around with them. However, this study unexpectedly found that this lifestyle was a positive predictor for the adoption of MOD, which is incongruent with this study's prediction. A possible explanation for this finding is that the broadcast of the most updated sporting events and films in MOD allowed the respondents to capture trends in fashion, and thus the respondents felt that the adoption of MOD allowed them to keep up with the most fashionable trends. MOD is operated by Taiwan's largest telecommunication company, which cable operators regard as a strong competitor. As MOD started its operation, major multiple cable system operators (MSOs) banded together to boycott MOD. One of their strategies was to ask the 50 most popular cable channel operators to refuse to provide their programs to MOD, otherwise these MSOs would stop carrying these programs. With a penetration rate of approximately 60%, MSOs have many more subscribers than MOD does, which makes MSOs successfully able to prevent MOD from carrying the 50 most popular channels in its system. To compensate for this deficit, MOD tries to broadcast the most updated sporting events, such as the Olympic Games, or to simultaneously broadcast films that are still showing in theaters to attract consumers (Hsu et al., 2015; Hsu & Liu, 2015). This explanation was also verified in the intensive interviews. Ten interviewees indicated that although MOD did not have those popular and familiar channels in its system, the sporting events and films provided by MOD were what most satisfied them in terms of the MOD service. This finding is in accord with those of past studies. The latest sporting events or the newest films allowed respondents to keep up with trends in fashion, which is congruent with the nature of a fashionable lifestyle (Leung & Chen, 2017; Li, 2015).

As predicted, a life expansionism lifestyle had no significant effects on the adoption of MOD. However, this lifestyle had a significantly positive relationship with the adoption of OTT. Past research has shown that individuals with a life expansionism lifestyle are achievement oriented and tend to adopt technologies that allow them to improve their work performance (Leung, 1998; Li, 2015). A possible explanation for this finding is that some video programs available in the OTT service may be information oriented, which would allow individuals to improve their work performance. For example, YouTube was rated as the most popular site in Taiwan, with 88% of the surveyed respondents indicating that they were regular users of the site (Chuang, 2016). This explanation was also reflected in the interview responses. Some interviewees were graduate students who indicated that they frequently used information obtained from YouTube to help them with their studies. For example, one interviewee said she had to use a structural equation model (SEM) to conduct statistical analyses for her thesis, and she participated in a three-hour workshop to learn SEM. However, when she actually performed statistical analyses using SEM, she encountered many difficulties. By searching for information from YouTube, she found several video clips teaching users how to do SEM step by step. By following the procedure demonstrated in these video clips, she was able to successfully complete all of the statistical analyses for her thesis. Therefore, we found that a life expansionism lifestyle had a positive effect on the adoption of OTT, but had no significant effects on the adoption of MOD.

As expected, a pleasure-seeking lifestyle was found to be positively correlated with the adoption of OTT. However, this lifestyle was unexpectedly found to have no significant relationship with the adoption of MOD, which is incongruent with our prediction. One possible explanation for this unexpected finding is that when viewing video programs, OTT is easier to operate, but it is difficult to operate MOD. More than 84% of Taiwan's people are Internet users; thus, most people in Taiwan are accustomed to integrating the Internet into their daily activities (TWNIC, 2016). OTT is built on public networks, and hence it is easy for the respondents to view programs on the Internet. In contrast, MOD is constructed on an intranet, built by its operator, and it thus might be more difficult to operate for viewing programs in MOD. The pleasure-seeking lifestyle is marked by the tendency for people to take it easy in their lives, and research has shown that individuals with this lifestyle dislike adopting technologies that require too much effort. For example, people with this lifestyle are less likely to adopt entertainment technologies for exercise, such as Wii or Kinect (Li, 2015). Thus, our findings here showed that a pleasure-seeking lifestyle was positively related to the adoption of OTT, but not associated with the adoption of MOD. This explanation was also reflected in the interview responses. For example, 16 of the 20 interviewees indicated that MOD provided some functions that allowed for user interaction—such as video recording that allowed users to stop, advance, rewind, or record a video program, or the function that enabled users to make bank transfers at home. However, the interviewees indicated that these interactive functions were not user friendly because they often froze up and would not return to the original screen.

As predicted by H1d, the preference for foreign products lifestyle had no significant effects on the adoption of OTT or MOD, which concurs with past studies' findings (Lee, 2006; Straubhaar, 1991, 2007). As stated previously, the three most popular types of programs consumers viewed in Taiwan's OTT services were dramas, films, and variety shows ("Who Will Be," 2017). Furthermore, consumers were most satisfied with MOD's sporting events and films (Hsu & Liu, 2015; Hsu et al., 2015). All of these types of programs are influenced by language and cultural orientations; thus, when the quality of video programs is relatively equal, people prefer programs that are close to their own values, customs, and languages (Lee, 2006; Straubhaar, 2007). For H1e, we found that the lifestyle of media nonskepticism did not have a significant impact on the adoption of OTT and MOD, which concurs with our prediction. The lifestyle of media nonskepticism is related to individuals' attitudes toward news media or advertising, which have little relevance for the adoption of OTT and MOD.

### *Technology Clustering and Adoption*

As predicted by H2a, the adoption of OTT was closely related to the ownership of interpersonal technologies. OTT is built based on the infrastructure of the Internet and has a powerful interactivity functionality. In addition to the mechanism of interactivity with the system, OTT has established several mechanisms that allow users to interact with friends or other users. For example, some video programs in OTT establish chat rooms to allow viewers to comment, give scores, or discuss a scenario from a given program. Other users can then use these comments or rankings to determine whether to view a given program. Another example is that OTT allows users to share certain video programs with friends or through social media, including Facebook, Line, WeChat, or blogs. These examples were also reflected in the interview responses. Six interviewees indicated that they often looked at other viewers' comments and recommendations to decide which video programs to watch. Some interviewees mentioned the efficiency

of using keywords to search the program lists from which they selected their preferred programs in OTT. The interviewees further stated that video programs in OTT often contained relatively organized information so that they could find the main characters, highlighted scenarios, and number of people who had viewed a given program, which made the viewing efficient and enjoyable.

For H2b, we found that the adoption of MOD was also positively associated with the ownership of interpersonal technologies, which is congruent with our prediction. Unlike OTT, MOD is constructed on a closed-system intranet; hence, its function of interpersonal communication is not as convenient and efficient as that of OTT, which is built on public networks (Hsu et al., 2015). For example, MOD has no mechanisms to allow users to interact with friends or other users, nor does it have the mechanisms that allow users to share video programs with friends or through social media. Nevertheless, we found that the adoption of MOD was positively related to the ownership of interpersonal technologies. One possible explanation for this finding is that although MOD lacks mechanisms that allow viewers to interact with or share video programs with friends, other viewers, and social media, MOD has a strong pay-per-view system in which sporting events, dramas, and films are available for subscribers. When using this pay-per-view system, subscribers are able to use keywords to search for their preferred programs, to see the rankings of these programs, and to obtain sufficient information about a given program. Furthermore, users can interact with the pay-per-view system to record, advance, or rewind programs. This explanation is also reflected in the intensive interviews. For example, some interviewees indicated that they liked to view Korean dramas in MOD because (1) many choices were available and (2) they could decide how quickly they wanted to finish viewing them.

### *Media Use, Demographics, and Adoption*

We found that the use of traditional media, including television, newspapers, magazines, radio, and movies, had no significant effects on the adoption of OTT or MOD, which concurs with our prediction and with prior studies' findings. Past research has shown that the adoption of Internet-related technologies is irrelevant to traditional mass media use because individuals' time is limited, and thus when they allocate more time for Internet-related technologies, less time is available for the use of traditional mass media (Garitaonandia & Garmendia, 2009; C. A. Lin, 2001). For example, Jung and associates (2012) found that no mass media use but Internet use was able to predict the adoption of e-books in South Korea. Furthermore, this study found that the adoption of both OTT and MOD had passed critical mass because approximately 77% and 50% of the respondents were OTT adopters and MOD adopters, respectively. According to Rogers (2003), when an innovation has reached its critical mass, mass media use no longer plays an important role in differentiating adopters from nonadopters.

In terms of demographics, we found that early adopters of OTT were younger, better educated, and more affluent than late adopters or nonadopters, which is incongruent with the prediction of this study because the adoption of OTT has passed its critical mass, and thus demographics should no longer play a significant part in adoption. In particular, demographics played an important role in the adoption of OTT because demographics accounted for 16.2% of the variance in adoption; demographics were the most powerful predictor compared with the other three variables—mass media use, lifestyles, and technology ownership. One possible explanation for this incongruent finding is that OTT services include various types

of services and are still evolving. Therefore, even though OTT services have existed in Taiwan for more than 10 years and approximately 77% of the respondents had used at least one type of OTT service, most respondents still considered OTT services as being new. Hence, this study found that demographics played a significant role in differentiating OTT adopters from nonadopters. However, early adopters of MOD were unexpectedly shown to be older and less educated than late adopters or nonadopters, which is contrary to the prediction of this study. One possible explanation for this finding is that the respondents regarded MOD as an old medium instead of a new medium because MOD competes directly with cable television, which is an old and traditional medium, and the viewing experience of MOD is similar to that of cable television (Hsu et al., 2015). Furthermore, demographics only accounted for 1.2% of the variance in the adoption of MOD, which concurs with the prediction of Rogers' model.

## Conclusions

This study adopted Rogers' diffusion of innovation model to examine the factors that have influenced the adoption of OTT and MOD in Taiwan. The data analysis resulted in three conclusions: (1) Lifestyles played a more important role in the adoption of OTT than in the adoption of MOD. In particular, a life expansionism lifestyle was positively associated with the adoption of OTT, indicating that the programs offered by OTT not only allowed the respondents to be entertained but also helped them better perform their jobs. (2) The adopters of OTT differed greatly from those of MOD in that the characteristics of OTT adopters accorded with the prediction of Rogers' model, whereas the characteristics of MOD adopters diverged greatly from the model's prediction. (3) Adding the mechanisms of interpersonal communication to entertainment-oriented technologies is the most unique feature of Internet-related media and makes these media fascinating to users.

This study is not without limitations, one of which was the decision not to differentiate various types of OTT services from one another. For example, one major type of OTT service is user-generated content (UGC), which includes YouTube, Dailymotion (from France), and locally produced UGC. Therefore, future studies should classify OTT services as UGC services or non-UGC services to examine the factors that affect the adoption of these two types of services. Another limitation is that the telephone survey was conducted in 2015. The adoption of new technologies usually happens rapidly, and the data collected in 2015 might not currently apply. However, a close review on the data showed that the penetration rates of OTT and MOD services in 2015 were 69.2% and 15%, respectively (Hsu et al., 2015; Tseng & Chen, 2015; TWNIC, 2016), and a 2018 survey showed that the penetration rates of OTT and MOD were 77% and 18%, respectively ("Has Taiwan OTT," 2018; National Communications Commission, 2018). These data indicate that the adoption of OTT and MOD in 2015 has reached a point of saturation, and thus the penetration rates increased slowly from 2015 to 2018. Therefore, this study's findings should be applicable to Taiwan's current situation.

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