

International Journal of Innovation in Management

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We cordially invite you to consider submitting your research work to IJiM. Please send your manuscript to IJiM@siim.org.tw for submission.

Don't Forget Consumer Value – Investigating Consumer Attitudes toward QR-codes

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Abstract

In a transforming retail sector, digitization has boosted innovation and new self-service technologies within stores all over the world. However, innovations within retailing are seldom successful if they are not built on true consumer value. This paper investigates consumer attitudes toward using mobile devices in a retail setting, with specific focus on QR-codes and how they might deliver customer value. The data consists of 150 in-store surveys conducted at two different Swedish retailers. The results of the empirical material show significant differences between age groups with regard to how they value QR-codes but also indicates what would make consumers actually use one. While the consumer group of 40-years old and upward stated they would pick up their mobile phone and scan the QR-code if given a discount, the younger group (up to 40 years old) did not place value on a discount but would scan a QR-code if there was entertainment value in doing so. Except for these differences, the material also reveals low consumer knowledge of QR-codes and that the actual use of them is low. These results, in light of the increased attention from retailers in using mobile devices to communicate with consumers, as well as investment in other digital aids to increase profits, show discrepancies in the perceived value of digital aids on the part of the retailer and the value experienced by the consumer. It is of outmost importance, therefore, to remember consumer value when managing innovations within the retail context.

Keywords: QR-codes, consumer value, innovation, digitization

1. Introduction

Shifts in technology and consumer behavior often compel retailers to increase the innovation stakes. As the retail sector is currently undergoing a transformation in terms of digitalization, retail executives are adapting their brick-and-mortar stores to introduce technology, and together with service performance, deliver better customer value. The use of mobile devices to communicate with consumers has become a strategy to, for example, support consumer relationships and it is important, not only to view the retail aspects, for instance investment decisions regarding mobile communication, but also the value of this

to the consumer. The smart phone era characterizes the contemporary retail sector and consumer behavior and mobile devices offer retailers a great opportunity to develop new innovations. Information communication technologies (ICT) used in retail settings are beginning to focus on services that help shoppers plan their shopping trip, often in terms of mobile apps and interactive dialogue services (Retail Week, 2014; Ström, Vendel & Bredican, 2014). However, given that technology investments can exceed millions of dollars, and that the margins and inventory productivity of many retailers' have been eroded over the last ten years, the stakes for information technology decisions have grown exponen-

tially. Therefore, care must be taken when making these decisions in order to avoid so-called profit destroying innovation (Chopra & Baldegger, 2014).

There are many battles to be won within the retail sector and how to manage innovations is one of them. Sometimes, “old technology” with potential might be an alternative to incremental new operations and might trigger innovation and efficiency. An easy and affordable alternative for organisations might be to implement the technology of Quick Response Codes (QR codes). QR codes have been widely employed in many industries around the world (Choi & Sethi, 2010), but are less commonly used in the interface between retail firms and consumers. In many countries, consumers do not take an interest in scanning QR codes, thus, leaving the retail industry uninterested in developing this particular communication technology. This could be a mistake as we believe there is a great potential in developing consumer interfaces with the help of QR codes. The use of mobile devices and mobile applications for communication with consumers has become a strategy. However, QR codes might be an alternative as they are low cost and offer high value. Retail companies using QR codes today sometimes use them as smart tools i.e. sustainable consumption (Atkinson, 2013), but mostly use them for marketing promotions, such as discounts, and advertisements in a “push” format to those individuals who have the ability to read the codes. (Lorenzi et al., 2014). Some retailers, such as Uniqlo, Topshop, Ralph Lauren, and Calvin Klein, use QR codes as a tool to inform consumers about their communication strategies in order to create both good customer relationships and engagement with the brand. The traditional way of using QR codes is by placing them in media outside the fixed store, i.e. in adverts, newsletters and print campaigns. However, there are further potential opportunities to develop the use of QR codes in-store. A retail firm can give consumers instant in-

formation in-store, such as product information, sourcing and carbon footprint (Choi, 2013), entertainment (Fino et al., 2013), and decision support (Higgins, Wolf & Wolf, 2014). Retail firms can also offer consumer value with QR codes in providing the opportunity to scan the code, pay for the product and then leave the store without having to pass the cashier. Opportunities are endless but we know too little about consumer attitudes towards the use of QR codes in-store and what kind of value sought that might lead to a change in behavior and more consumers wanting to scan QR codes. The purpose of this paper is to investigate consumer attitudes and perceived value in using digital aids in store.

This paper reports from a study on Swedish consumer attitudes toward using mobile devices in a retail setting, with specific focus on QR-codes. The reason for studying Swedish consumers is that Sweden is a market highly penetrated by mobile use (Westlund & Bohlin, 2008; Kalba, 2008; Sharma, Li, & Govindraj, 2014). The aim was to gain an insight into how consumers value QR codes in-store, and what would make them actually scan one in the store. This paper identifies potential consumer value in using QR codes and suggests a strategy for educating consumers so as to achieve increased profits within the retail sector. The contribution lies in adding to our understanding of perceived consumer value as well as providing the sector with valuable information on business and innovation opportunities. It is suggested by this study that the newest technology is not always necessarily the most innovative. It is thus proposed that retailers, by comparison, with small means and “old” technology can provide consumers with value in an innovative and consumer-driven way.

2. Methodology

The data sample consists of 150 in-store surveys conducted at two different

Swedish¹ retailers: one speciality store (1) and one home-textile store (2). Both of the retailers are retail chains and their target groups are women within the age range of 25-65+. The surveys were conducted after an in-store field experiment that customers were asked to attend, and the data collections were made on two Saturdays in November-December 2013. In order to inform all customers about the field experiment, information was given in the stores when customers arrived. The design of the experiment included a big sign on a specific product with the message “Scan the QR code and get more information about this product”. Each customer that passed the product were asked if they knew what a QR code was, and if they had a scanner on their cell phone. If they did not have a scanner, the interviewers lent them a cell phone and asked them to scan the code and read the product information provided in a web based format on the phone's display.

When the respondent had scanned the QR code and obtained extra information about the chosen product, they were asked to take part in a survey. The questions were constructed so as to measure the potential reasons for wanting to scan a QR code in-store, plus open questions on what kind of value the respondent might perceive when using the technology. The survey also wanted to know the perceived reasons and barriers for not wanting to scan a code in-store.

3. Literature Review

Technologies developed over the past 20 years have changed the way consumers shop with advancements in various technologies; faster transmission of data results in the ability of customers to immediately react to inventory and pricing issues (Fiore et al., 2010). The QR code was designed to allow its contents to be decoded at high speed and was originally introduced to the retail industry as an inventory management tool to cut lead times in the supply

chain (Iyer & Bergen, 1997). Its purpose was to track vehicles during manufacture and it was designed to allow high-speed component scanning (Furth, 2011). There has been little research undertaken on QR codes and the reasons for consumer use. However, studies on the importance of awareness and familiarity towards QR codes conducted by Okazaki, Hirose, and Li (2011), and Okazaki, Navarro & Lopez-Nicholas (2011), indicated that consumers prefer to access QR code information from home. Another result from the above mentioned studies is that the main motive for scanning a QR code is when the consumer is given a promotional offer, such as a discount. Other research on motives for using new technology support these findings and over time there have been numerous “new products and services”, proving the concept that push-strategies work when innovation comes from the recognition of technological feasibility and the opportunities for commercialization (Cotterman et al., 2009). Examples of new products pushed to the consumer market are supermarkets enabling self-service instead of service over the counter, the microwave-oven, self-scanning in-store etc. On the other hand, new technologies might successfully be introduced to the market if there is a market pull (or consumer demand). One important variable for such a success is that the user perceives the innovation as valuable. Often, new technology is introduced to a market by both pull- and push strategies. In terms of the latter, education might be an effective tool in adaptation and gaining market shares (Dabija & Pop, 2013; Risley, 2012).

Retailers innovate in a different way compared to traditional innovation intense sectors (Sundström & Radon, 2014). Retailers are often left with the “feeling” of why something works and why something else does not. The nature of retailing innovation is, according to several studies, insufficiently researched (Reynolds & Hristov, 2009; Tether, 2005; Miles, 2000).

¹ Sweden has a population of 9.7 million people (<http://www.scb.se/be0101/>)

Innovation is mainly focused on technology, leaving retail innovation aside. As Reynolds et al (2007) state “*in measuring innovation, we tend to fall back upon easily derived metrics – such as number of patents, or levels of R&D spending*” (p. 649). Hence, there is a need for new perspectives on what consumers’ value, and to identify what the most important benefit is when using service-technology as the basis for innovation.

3.1 Contemporary Knowledge of QR Codes and Consumer Use

A survey taken of 46,000 Swedes and their knowledge and use of QR-codes showed that 10.8% of Swedish consumers had scanned a QR-code in the previous three months (Orvesto Konsument, 2012). In the same survey, it was also evident that a minority of users are younger and more educated than average, and are curious about new technology and high-tech products. These results fit well with earlier research studies on adoption in terms of self-service, and gender (Elliott & Hall, 2005). We know that younger consumers are more interested in experimenting with new technologies, such as electronic banking (Kolodinsky, Hogarth & Hilgert, 2004), and wireless Internet (Lu et al., 2003; Pagani, 2004). We also know that the majority of users tend to adapt to new technology if the technology itself provides superior customer value and obvious benefits to the user (Sundström, 2007; Rogers, 1962; Rogers & Shoemaker, 1971). Thus, one explanation for the lack of interest by Swedish consumers in using QR-codes can be attributed to, on the part of the retailer, not having succeeded in providing tangible value for the user. However, in other countries we see a somewhat different development, where North American consumers, scan QR-codes in-store (Atkinson, 2013; Brynjolfsson, Hu, & Rahman, 2013).

One explanation for this is that QR-codes are more often used to offer the consumer a discount or otherwise beneficial offer.

From a theoretical stand-point, this is an interesting phenomenon since a classical push strategy builds on the premise that someone (often the marketer) sends out a convincing message to someone else (often consumers). However, the use of QR-codes does not seem to follow this theory, even if this is believed by many. QR-codes require actual action from the receiver in order to receive (or in this case retrieve) the message. For this reason, the use of QR-codes is actually seen as a pull strategy and are often seen by the receiver as relevant and meaningful (Atkinson, 2013).

Regardless of whether QR-codes in-store can be classified as a push or pull strategy, Swedes knowledge of them is low. It has, however, become more common that Swedes download specific apps to their cellphones in order to find a particular store or one that offers help with shared purchasing lists etc.

4. Results

In total, 172 customers were asked to participate in this study and 150 respondents chose to attend. The respondents were aged 19 – 59 years with an average age of 39 and with a skewness of -0,281. The sample was distributed as in the table below. The size of the sample, however, does not provide us with enough data to generalize according to age, although the analysis is interesting within the sample.

There were 20 male and 130 female respondents within the sample, representing the target groups for both retail stores. All of the participating consumers stated that they owned a smartphone. The majority of the respondents claimed they knew what a QR code was when they were presented with one (83 respondents), with 67 people stating they did not know what it was. There was a widespread assumption that if one scanned a QR code, one would then receive a lot of unwanted e-mails. This can be illustrated by the following: “It seems unnecessary to scan a code, because I don’t want a lot of junk mail”. Other comments were “it seems unnecessary, it

gives me no value”, and “it takes time”. All of these comments illustrate the barriers for scanning QR codes in-store. Of the respondents, only 15 customers claimed that they had scanned a QR code before. Comments received from respondents who claimed they had scanned a code were as follows in the table below:

Table 1: Why They Had Scanned a QR Code Before

I was curious	10 respondents
I wanted some entertainment	2 respondents
I expected something fun	1 respondent

Analyzing the sample by age indicates that respondents from the age of 41 to 59 might consider scanning a QR code in-store provided they would receive some form of gratification or promotional activity. The respondents aged 19 to 41 might consider scanning a QR code in-store for different reasons. However, only two of the respondents claimed that they would use a QR code if they were given a gratuity. The reasons for scanning QR codes are presented in the table below and cross tabled with the age of the respondents:

Table 2: Reasons for Scanning

Variable	Scale	All sample count
Reasons for scanning QR codes in-store	When I see no one to ask	20 (13.4 %)
	When I am in a hurry	12 (8.0 %)
	When I may receive a gratuity or there is a promotional activity	56 (37.6 %)
	When I want to know more about a product	61 (40.9 %)
	Total	149 (100 %)

Table 3: Reason for Scanning by Age-group

Scale	19-40	41-59
When I see no one to ask	20 (26.7 %)	0 (0 %)
When I am in a hurry	12 (16.0 %)	0 (0 %)
When I may receive a gratuity or there is a promotional activity	0 (0%)	56 (75.7 %)
When I want to know more about a product	43 (57.3 %)	18 (24.3 %)
Total:	75 (100 %)	74 (100 %)

Using age as a tool for analysis also show that, of the respondents aged 19-40, 14 out of 15 claimed that they had scanned a QR code before. However, when asked why, hypothetically, they might consider scanning a QR code outside of the retail store context, we did not obtain the same pattern of answers according to age. In this situation, the majority of the respondents claimed that a motive for scanning would be a gratuity of some kind. At the end of the interview, we also asked the respondents what they would most likely do if they were in a retail store and needed product information but all the store employees were occupied. This was an open question where the respondents could express their intentions. One of the most common answers is illustrated by the following comment: “Then I would pick up my cellphone and google”, regardless of what age the respondents were. However, among respondents aged 44 to 56, the majority of them also said that they would call a friend or peer, wait for help if they had the time, or leave the store. This indicates that younger respondents would try to find the information they needed on their own, but older respondents would not.

When faced with the experiment of scanning a QR code and receiving product information on their cellphone, all of the respondents found the information valuable. The use of pictures of the products was valuable. However, the most important value was from describing the product in text. When the respondents were asked to give suggestions on how to add extra value

to the product information, we received a lot of suggestions regarding presenting the products as a film. Respondents wanted to know how to use the product (a slow-feeding net for horses) and how to arrange products (curtains). They also suggested that information could be given on complementary products and suggestions based on “what other customers also bought”. Results from this field study indicate that consumers might find added value when scanning QR codes if the information they receive is related to the product or the consumption of products. There were also strong preferences for information formats that, at the same time, could add entertainment value.

4.1 Reasons for scanning QR codes

When asked about the reasons for scanning QR codes in the specific stores there were four options: (1) When I see no one to ask, (2) When I am in a hurry, (3) When I may receive a gratuity or there is a promotional activity and, (4) When I want to know more about a product. The answers were distributed as follows:

Table 4: Reasons by Gender

Scale	All sample count	Women	Men
When I see no one to ask	20 (13.4 %)	16 (12.4%)	4 (20%)
When I am in a hurry	12 (8.1%)	12 (9.3%)	0 (0%)
When I may receive a gratuity or there is a promotional activity	56 (37.6%)	51 (39.5%)	5 (25%)
When I want to know more about a product	61 (40.9%)	50 (38.8%)	11 (55%)
Total	149 (100%)	129 (100%)	20 (100%)

One respondent chose not to answer the question. The respondents were, as mentioned earlier, mostly women (129 or 86%) and it is therefore difficult to draw

any conclusions regarding gender differences. Due to the small number of observations from the male group it is not possible to significantly test the groups. However, as can be seen above, there are no major visible differences in the limited material available.

Considering the difference in technology usage between younger and older generations (Pagani, 2004; Lu et al., 2003), it was interesting to test for differences regarding age. By splitting the material into respondents below and above 40 years of age, a significant difference between the groups was detected². The results indicate that older respondents are more likely to scan a QR code when they receive a gratuity or there is a promotional activity. The younger respondents have stated all the other reasons except when receiving a gratuity or there is a promotional activity. The main reason for younger respondents to scan a QR code is to find out more about a product, but they also stated when they saw no one to ask and when they were in a hurry, although to a lesser extent.

Since the study was conducted in two different stores, there was a need to confirm that the results were not based on age differences between the respondents from the stores. The age difference between the stores was not large enough to be significant, although there were slightly more respondents in the 40+ category from store 1, and the opposite applies to store 2.

Table 5: Age Groups by Store

	Age 19-40	Age 40-59	Total
	32	40	72
Store 1	(44,4 %)	(55,6 %)	(100 %)
	43	35	78
Store 2	(55,1 %)	(44,9 %)	(100 %)
	75	75	150
Total	(50 %)	(50 %)	(100 %)

When testing the respondents from each store separately, the sample is not large enough to obtain a satisfactory significance test. Both cases indicate the same

² *p*-value 0.000, df 3, Chi-Square-value of 98.244

results as found for the whole population³ but due to the small population, the expected count is too low in both cases. The indication does, however, not contradict the result for the entire sample.

It is also possible to detect a significant⁴ difference between stores. The difference indicates that respondents from Store 1 use QR codes to know more about a product to a greater extent while respondents from Store 2 use a QR code when they see no one to ask. If we separate the groups, we see a similar result in the younger group⁵. However, no significant result was visible for the older group. It is likely that the reason for the younger groups effect on the overall result was because their results were spread more widely among the reasons, while the majority of the older groups result (56/75) gave the same response alternative (gratuity or promotional activity) and was divided equally between the both stores.

To conclude, the results show that there is a dependence of age when using QR codes. Older respondents used a QR code when there was a gratuity or promotional activity connected to it or when they need information about the product. Younger respondents used a QR code for various reasons, mostly to get information about a product, but also when they couldn't find anyone to ask or were in a hurry. Amongst the younger respondents, a dependence on store was also detected, indicating that QR codes are used for different reasons in different stores.

5. Discussion

The results of the empirical material show significant differences between age groups, not in the actual usage of QR-codes, but with regard to how they value QR-codes and what would make them

actually use one. While the consumer group of 40-years old and upward expressed that they would pick up their mobile phone and scan the QR-code if given a discount, the younger group (up to 40 years old) did not value a discount but would scan a QR-code if there was entertainment value in doing so. Interesting to note is that the store itself (for example the ability to find someone to ask, potentially how good the website is) has an effect on the different main uses of QR codes for younger respondents.

Except for these differences, the material also reveals low levels of knowledge of QR-codes and that the actual usage is also low. These results, in light of the increased attention from retailers in using mobile devices to communicate with consumers, as well as investment in other digital aids so as to increase profits, show discrepancies between the perceived value of digital aids by the retailer and the value experienced by the consumer.

Retailers are using existing, and relatively inexpensive, QR-code technology to communicate with consumers but are not using it to its full potential. Consequently, the innovation aspect is lost and important consumer value that could be provided and that would eventually lead to increased profits is also lost. Given the perceived value experienced by consumers in using a QR-code, there is a great need for retailers to push the innovation aspect of an already existing technology in order to give actual consumer value. This study shows a small sample from two different retailers and does not offer generalizations on consumers' use of QR-codes over a broad spectrum, but it does highlight the discrepancies between consumers and retailers when it comes to the perception of value from this technology. It also pinpoints the possibilities of innovation in existing digital aids for communication with consumers. We do not offer a golden solution for technological advancement in retailing, but stress the great importance of building on existing knowledge through innovation in order to

³ Store 1: p -value 0.000, df 3, Chi-Square-value of 41.863 (50 % cells with expected count under 5)

Store 2: p -value 0.000, df 3, Chi-Square-value of 55.972 (25 % cells with expected count under 5)

⁴ p -value 0.015, df 3, Chi-Square-value of 10.519

⁵ p -value 0.014, df 2, Chi-Square-value of 8.581

provide consumer value that can lead to increased profits for retail firms.

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Effects of Codependency on the Loyalty of Virtual Community Members

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Abstract

Members of virtual communities engage in a multiplicity of relationships. They assume various roles and perform different functions. These roles and functions vary from being a passive browser of the community's pages to being an active contributor or presenter, or from simply updating one's own personal data and satisfying personal reading needs to sharing knowledge, giving others encouragement and affirmation, and answering blog questions. Such virtual activities are vital and create a unique codependency between caregiver and the cared, a kind of relationship described in psychology codependency theory. This study expounds on the concept of codependency and configures the virtual community according to five perspectives: psychological safety (PS), identifiable anonymity (IA), public self-awareness (PSA), group norms (GN), and community engagement (CE). These five perspectives also constitute the latent codependency variables that explain why community members enthusiastically participate in community activities and generously assist one another, thereby boosting community identification (CI) and member loyalty (ML). CI is not only an important prerequisite to ML but also an intermediary variable between virtual community codependency and ML. In actual terms, CI enhances ML. CE has the greatest effect on virtual community codependency, followed by PSA, GN, PS, and IA, in that order. CE highlights member devotion and dedication and is a vital factor in persuading other members to continuously participate in community activities, thereby fostering member codependency. Members value their self-image and the attention they obtain from other members more than they value GN. The safety of the members' community environment and the anonymity of their participation in activities come last in their ranking. We hope this study will assist operators of virtual communities to understand the behavior of their members and enhance the efficiency of community operations.

Keywords: Codependency, virtual community, Internet, community identification, loyalty

1. Introduction

In January 2012, the US network marketing company comScore released its annual community network research report. Their statistics showed that Internet users around the world spend one-fifth of their networking time in virtual communities (Aquino, 2012). In 2013, the top 100 virtual community websites of Taiwan captured a record-setting 30% of the market (Business Next, 2013). Virtual communities have clearly become the center of network

activities and the focus of observation for the network industry.

Kozinets (1999) believed that a virtual community constitutes a social relationship created by its users through application programs on the Internet. Previous research has rarely explored the various relationships formed among community members. Some community members assume the roles of presenter and viewer and interact in a seemingly symbiotic relationship, such as that between flowers and bees. Interaction among community members includes

keeping in contact and caring for others, in which the relationship is similar to that between caregiver and cared in the codependency theory of psychology.

This study uses the concept of codependence to examine the codependent relationship of community members. Previous studies show that the operation of virtual communities is greatly influenced by the affirmation and loyalty of their community members. When affirmation and loyalty decrease, the revisit rate also decreases, with some members even leaving the community. As such, this study uses two variables (an intermediate and a dependent variable) to investigate the codependence of community members so as to hopefully make a contribution to understanding their behavior.

2. Review of Literature

2.1 Virtual Communities

Kozinets (1999) says that a virtual community is the virtual space of those users who have created a social relationship through program interactive exchange. Wachter, Gupta, and Quaddus (2000) conceived a virtual community as a networking community in which users exchange and share opinions, with the computer as the medium of exchange.

Dholakia, Bagozzi, and Pearo (2004) found that community members join virtual communities because of shared interests, trading and social purposes, and other needs related to information, knowledge, learning, leisure, entertainment, and problem solutions. Based on the IS success model of DeLone and McLean (2003), Lin (2008) took virtual community members as the objects of study when exploring the success model of virtual communities. Fang and Chiu (2010) used variables, such as justice, trust, and organizational citizenship behavior, to study the participation intention of community members.

The review above has summarized previous studies on virtual communities and defined a virtual community as the virtual space created by Internet users,

which allows them to browse one another's achievements, participate in discussions, and circulate works or opinions. Such exchanges connect the members and create a social community.

2.2 Codependency

The concept of codependency originates from the treatment given to alcoholic families in the 1940s. Alcoholics depend on the care of their family members and put many pressures on them. On the other hand, family members obtain a sense of self-affirmation when they satisfy the needs of their alcoholic family member. Studies have found that this interaction between family members and alcoholics becomes a codependency, and the dependence of family members on alcoholics is even more significant than the reverse (Arnold, 1990; O'Brien, 1992; Riley, 1991; Wilson & Kneisl, 1992).

Hughes-Hammer, Martsof, and Zeller (1998) claim that codependency is the mutual dependence of people who control their emotions. Therefore, in relationships between people, those who have the tendency of codependency are tied down by their significant others, who affect the former's behavior to devote their efforts to the latter. Henceforth, codependency is the dependence on people or things other than one's self and leads to mutual dependence. Such dependence includes the reduction and neglect of the self. Those who have an obvious codependency tendency force themselves to help others control the occurrence of natural incidents by using the excuse of controlling and giving suggestions. They also continuously sacrifice themselves for others and assist them. Codependency makes them emotionally attached to each other. This tendency exists in every person although the degree of its exhibition varies.

In the field of psychology, the conceptual definition of codependency and its features have been much discussed. The relevant theories are as follows:

1. Social structure and cultural character perspective: Schaef (1987) claimed that

the roles of the various classes and sexes in society are associated with interpersonal relationships that depend on each other. The cultural characteristics of self-repression, self-sacrifice, and devotion to maintaining close interpersonal relationships create codependency.

2. The iceberg model: Friel and Friel (1987) believed that codependency probably results from shame, guilt, and the fear of abandonment, which manifests as an iceberg does, with the tip or only a part of it revealed. It can lead to problems of addictive relationships and compulsive behavior if not taken seriously.
3. The intrapsychic approach: Riley (1991) thinks that the tendency of codependency is created by the love of attention or the fear of being left out and the behavior of deliberately pleasing the significant others.
4. The interpersonal approach: Arnold (1990) says that a child must learn to satisfy its external needs from experience and it assumes the role of caregiver for the purpose of establishing interpersonal relationships.
5. The illness model: Whitfield (1989) claims that codependency is similar to ordinary addiction and, if serious, is likely to evolve into other forms of addiction and compulsive behavior.

In summary, those who show the tendency to be codependent form relationships characterized by various features, such as self-repression, self-sacrifice, dedication, and pleasing others, as a result of their growth environment, family circumstances, social relations, and health status. These features suggest that the tendency to be codependent easily evolves into problematic forms of addictive relationships and compulsive behavior.

2.3 The Formation of Codependency in Virtual Communities

To explore the codependency among virtual community members, this study

referred to five pertinent psychological theories: the social structure and cultural character perspective, intrapsychic approach, iceberg model, illness model, and interpersonal approach. These five theories of codependency are applied to virtual communities depending on the relevant context and information theories on virtual communities.

1. Psychological safety (PS): Two theories relate codependency tendency to PS. O'Brien (1992) proposed the concept of surrendering the self and Hands and Dear (1994) proposed the concept of assuming the responsibility of meeting others' needs to the point of self-neglect. Both theories explain that the codependency tendency of certain individuals may be caused by the lack of PS. To compensate for this lack, such individuals deliberately help their significant others, while neglecting their own needs, by means of controlling or giving proposals to their significant others. Kahn (1990) thinks that PS is a self-image and a mental state, in which an individual feels no impending negative consequences. An individual with high PS has confidence and his behavior is safe and does not cause negative consequences. An individual does not express their behavior but uses words and deeds to satisfy their PS. In a virtual community, many members regularly update their diaries, status, and emotions because they regard other community members as significant others and they can satisfy their PS by satisfying their significant others. Such is the codependency of the virtual community (CVC) when viewed from the perspective of PS.
2. Identifiable anonymity (IA): Hinkin and Kahn (1995) claim that those who have the tendency to be codependent normally repress their self-value so as to hide their self and show their self-dedication and responsibility. This situation is also seen in virtual communities, whereby people who interact

with other community members substitute their self with their own virtual identification. This situation is called IA. According to the definition of Nissenbaum (1999), anonymity consists of the interaction with others while concealing the self. The present study adopts the concept of anonymity as IA (Marx, 1999; Wallace, 1999; Yun, 2006).

3. Public self-awareness (PSA): Individuals who have a codependency tendency care about the opinions of others to the point of repressing their own feelings and hiding their own negative emotions. Whitfield (1989) says that such repression leads to a false self, referred to as the hidden self. In virtual communities, members often deliberately neglect and even repress their own sentiments and needs to fulfill the expectations of others. This behavior is similar to PSA. Self-awareness means making the self become the focus of attention (Aronson, Wilson, & Akert, 2001), which is a state and degree of attention related to self-expression (Duval & Wicklund, 1972). However, when we focus our attention on the self, we may focus only on certain aspects (Weber, 1992). If our attention is limited to our public self and our self in the eyes of others, this self-awareness is referred to as PSA. Given this definition, we can understand how this perspective is applicable to the study of codependency in virtual communities.
4. Group norms (GN): Individuals with a codependency tendency often measure themselves against the expectations and standards of others. It is an invisible restriction similar to the GN of virtual communities. Brown (1988) points out that norms refer to explicit and implicit rules that guide the conduct of community members and they may be regarded as an explicit description of the actions and responses expected from the members. The present study also uses this

concept to understand codependency in virtual communities.

5. Community engagement: (CE): Favorini (1995) claims that a family environment characterized by strong parental control and caring tendency results in the codependency of children. This circumstance is similar to the environment and situations mentioned in the social cognitive theory of Bandura (1986). An individual exhibits special behavior when they believe that they have some responsibility or commitment or are engaged in some incident. Many virtual community members are influenced by the community environment and believe that they are given the responsibility of taking care of others, which similarly results in codependency. To satisfy other members, they try to publish topics and articles that will attract the attention of other members. Those members who are stimulated also participate in the activities. As such, CE is also an appropriate perspective for examining CVC.

Previous studies have not applied the theory of codependency to virtual communities. The present study transposes the relationship between caregiver and cared as described in the codependency theory of psychology into the close ties and mutual dependence of virtual community members. The study considers the members' interactive behavior as the overt behavior of virtual communities to explore the CVC.

In this study, CVC consists of PS, IA, PSA, GN, and CE and refers to the mutual dependence and reliance of community members on virtual community activities. To maintain this relationship, members participate in virtual community activities. The participation behavior of the members appears to be simple, but is actually the expression of their interactive and codependency in the virtual world.. Bloggers publish articles to maintain their popularity or to attract visitors and satisfy the demands of readers who support them. On

online dating sites, members who wish to frequently interact with their beloved friends continually to update their websites or systems.

2.4 Variables Relevant to Virtual Communities

In addition to codependency, two other variables pertinent to the study of virtual communities include the following:

1. Community identification (CI): Algesheimer, Dholakia, and Herrmann (2005) categorize this perspective into emotion and cognition. Emotion refers to the characteristics of an emotional commitment when cognition is merged into the community's emotions. Cognition emphasizes the recognition of the common feelings shared by the other members.
2. Member loyalty (ML): Lin (2008) claimed that the degree of participation in virtual communities can be used as a criterion to measure their success. When a virtual community garners high loyalty from its members, it is considered successful. The present study adopts the definition of Oliver (1999) and translates it into the satisfaction of community members. Such a virtual community will, in the future, continue to win high revisit rates from its members. It will also persuade non-members to join and will discourage transference behavior.

3. Research Methods

This study follows the adaptation conditions of the models discussed above through an analysis of verifying factors and their effects. The purpose is to examine community dependency in general and to understand the influence of the variables in particular.

3.1 Research Framework and Hypothesis

To understand the influence of codependency of the virtual community on its operations, the literature related to virtual communities has been reviewed above. The

review shows that the success of a virtual community is clearly related to member loyalty (ML). Community identification (CI) is the probable cause of ML. As such, the present study takes CI as the intermediary variable and ML as the final result. It describes the relationship between virtual community codependency and the variables. The review of the related literature has shown the relationship from various perspectives and has identified models that can be appropriated when proposing the concept of virtual community codependency, which has not yet been nominated in past studies. This study also proposes that virtual community codependency is a potential variable that can influence psychological safety (PS), identifiable anonymity (IA), public self-awareness (PSA), group norms (GN), and community engagement (CE). The research framework is illustrated in Figure 1.

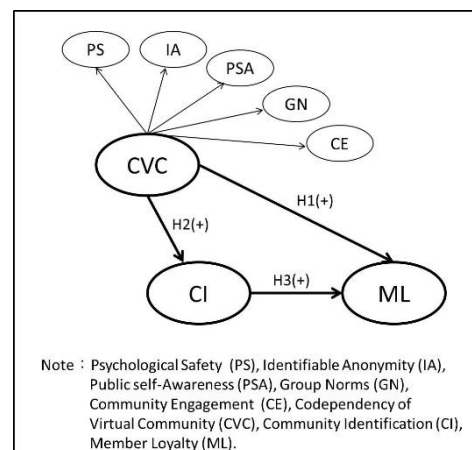


Figure 1: Research Framework

Lin (2008) claims that ML is influenced by system characteristics, social factors, and the sense of belonging that is fostered in the virtual community. Additionally, social factors that result in trust have a significant effect and show that certain factors of the inner world of the members have not yet been explored. Therefore, this study proposes codependency of the virtual community (CVC) as the potential variable that causes ML, following the ideas ex-

pounded by codependency theories, including the social structure and cultural character perspective, intrapsychic approach, iceberg model, illness model, and interpersonal approach. These theories are translated for the purpose of this study into psychological safety (PS), identifiable anonymity (IA), public self-awareness (PSA), group norms (GN), and community engagement (CE). If the potential factors of CVC are formed from the perspective of PS, the degree of CVC and ML both increase. To verify this conclusion, this study hypothesizes the following:

H1. Codependency of the Virtual Community (CVC) positively influences Member Loyalty (ML).

Algesheimer et al. (2005) claim that CI emotionally engages the community members and has the features of an emotional commitment. If the individual emotions of the members are strengthened, the CI is also strengthened. Of the five factors of CVC, GN directs the behavior of the members. In addition, CE consists of the motives of emotional commitment and the increased virtual community codependency enhances cognition and emotional commitment and increases CI.

H2. CVC positively influences CI.

Algesheimer et al. (2005) claim that CI can positively influence brand emotion, with an increase in CI resulting in a corresponding increase in brand connection and loyalty. Lin (2008) says that the success of a virtual community is closely related to ML, because ML is influenced by various psychological factors and its cause is similar to that of social structure theory. Therefore, the higher the degree of codependency, the closer the relationship of the members. An increase in CI leads to a corresponding increase in ML.

H3. Community Identification (CI) positively influences Member Loyalty (ML).

3.2 Measurement and Data Collection

This study adopts a seven-point Likert Scale to measure the variables from 1 to 7 points ("strongly disagree" to "strongly agree"). The study measures the items according to the variables of the various perspectives in order to conduct a first-order factor analysis, divided into the variables of CVC, CI, and ML. The higher the score of a perspective, the more strongly it is expressed. CVC is derived from the second-order factor analysis of the five perspectives above and the model scores are obtained from the estimation program. The higher the score, the higher the degree of codependency.

The subject of this research includes the users of virtual communities in Taiwan. For the data collection, the Google Doc function was used to produce an online questionnaire. The users of well-known forums, blogs, micro-blogs, community websites, dating websites, video and audio websites, and online games were asked to complete the questionnaire. The investigation period was between December 4th and December 28th 2014 and this study recovered 669 effective questionnaires using the convenience sampling method. According to the proposition of Bagozzi and Youjae (1988), the number of samples should be five times larger than the test variables and greater than 50.

4. Analysis and Result

4.1 Sample Statement

The respondents of the 669 questionnaires all habitually use community websites or have had experience in similar virtual communities. The statistics of the population variables are described in Table 1.

Table 1: Statistics of Population Variables

Population variables	Item	Number	Rate
Sex	Female	343	51.3%
	Male	326	48.7%
Education	Below high school	14	2.1%
	High school	103	15.4%
	College / university	420	62.8%
	Post-graduate and above	132	19.7%
Age	Below 19 years	74	11.1%
	20 to 29 years	267	39.9%
	30 to 39 years	218	32.6%
	40 to 49 years	87	13.0%
	Above 50	23	3.4%
Occupation	Civil service	13	1.9%
	Culture and education	18	2.7%
	Freelance	12	1.8%
	Medical service	14	2.1%
	Service industry	99	14.8%
	Finance	46	6.9%
	Military	43	6.4%
	Housewife	24	3.6%
	Designing	6	0.9%
	Electronics	36	5.4%
	Manufacturing industry	44	6.6%
	Advertising and communication industry	2	0.3%
	Student	266	39.8%
	Other	46	6.9%
Length of participation in this virtual community	Below 1 year	57	8.5%
	1 year and below 2 years	93	13.9%
	2 years and below 3 years	213	31.8%
	3 years and below 4 years	177	26.5%
	4 years and above	129	19.3%
The number of releases, responses, messages, or comments made per day	1 to 3 times	285	42.6%
	4 to 6 times	144	21.5%
	7 to 9 times	140	20.9%
	10 times and above	100	14.9%

4.2 Reliability and Validity Analysis

Reliability refers to the stability of the quantity of the questionnaires. This study adopted Cronbach's α coefficient to determine the internal consistency of the questionnaires. According to the proposition of Nunnally (1978), when the Cronbach's α

coefficient value is larger than 0.7, its reliability is acceptable. The Cronbach's α coefficient values of all the items in this research are higher than 0.936, which suggests acceptable reliability. The reliability of all the items are shown in Table 2.

Table 2: Reliability of All Items

Perspective	Item	Average	Standard difference	Perspective α value
PS	PS1	4.22	1.71	0.950
	PS2	3.89	1.61	
	PS3	4.61	1.98	
IA	IA1	5.10	1.50	0.890
	IA2	4.81	1.40	
	IA3	5.49	1.51	
PSA	PSA1	5.10	1.35	0.716
	PSA2	4.70	1.34	
	PSA3	4.80	1.40	
GN	GN1	4.32	1.20	0.924
	GN2	4.68	1.51	
	GN3	4.64	1.46	
CE	CE1	3.71	1.66	0.865
	CE2	3.57	1.49	
	CE3	4.31	1.37	
CI	CI1	4.56	1.34	0.925
	CI2	4.62	1.40	
	CI3	4.42	1.50	
	CI4	4.22	1.50	
ML	ML1	4.63	1.29	0.892
	ML2	4.70	1.35	
	ML3	4.89	1.29	
	ML4	4.63	1.29	

The questionnaire items in this research were based on the existing literature and theories from Taiwan and abroad. They underwent test decoration and the validity of their surface meaning was evaluated and finely tuned by two university teachers from the fields of information management and psychology. Following the standards of Andersson and Nilsson (1964) and Ronan and Latham (1974), the items have a high face validity and expert validity.

A confirmatory factor analysis was also used to test the model estimation and guarantee the single perspective characteristics of the measurement scale. Composite reliability (structural reliability) tests every potential variable and checks the inconsistency of those variables. After conducting the analyses above, the average extrac-

tion variations of the variables in the quantitative table of this study (excluding PSA) reached 0.5 and above. Their composite reliability reached 0.7 and above, which indicates that the variables have good composite and structural reliability (Bagozzi et al., 1988). The relationship among the perspectives of most potential exogenous variables is smaller than the relationship within the perspectives, which is the square root value of the average variance extracted. Aside from PSA and ML, the variables are larger than the relevant coefficients under several other perspectives, which shows that the quantitative table has a distinguishing validity (Hair et al., 1998). The correlation, variance matrix, and composite reliability are described in Table 3.

Table 3: Correlation, Variance Matrix, and Composite Reliability

	PS	IA	PSA	GN	CE	CI	ML
PS	0.922	0.222	0.353	0.425	0.505	0.541	0.545
IA	0.140	0.866	0.271	0.326	0.388	0.416	0.418
PSA	0.293	0.297	0.696	0.520	0.617	0.661	0.665
GN	0.249	0.252	0.529	0.897	0.745	0.798	0.803
CE	0.288	0.293	0.614	0.521	0.789	0.948	0.954
CI	0.319	0.324	0.680	0.578	0.670	0.874	1.188
ML	0.337	0.343	0.719	0.61	0.708	0.912	0.870
AVE	0.850	0.751	0.485	0.805	0.622	0.764	0.757
C.R.	0.944	0.899	0.735	0.925	0.830	0.928	0.925

Note: The italicized figures in bold represent the square root of AVE and the triangular area at the top right represents the variable coefficients. The correlation coefficients all reached a significance level of $p < 0.01$ (two-tailed test). The triangular area at the bottom left represents the variable coefficients that reached a significance level of < 0.001 (two-tailed test). CR stands for construct reliability.

4.3 Structural Equation Model Analysis

Path analyses and regression analyses explore the relationship between visible variables. Factor analysis explores the relationship between potential variables and visible variables. The structural equation model analysis is a model that combines the two methods and includes the first measurement model (the relationship between visible variables and potential variables) and the second structural model (the relationship between potential variables). The results above show that the quantitative table has face validity and reliability, and structural validity. The distinguishing validity of all the perspectives is also to an acceptable level. Confirmatory factor analysis was used to test the adaptation of the models. According to Bagozzi and Yi (1988), the size of the samples should be

no less than 50 and should be five times greater than the estimation parameters. Given the response of 669 effective samples, the present study meets the above requirements. As such, the samples can be subjected to confirmatory factory analysis to test the adaptation of the overall measurement model.

The analytical results show that the chi-square value of the overall measurement model is as follows: $\chi^2(276) = 791.527$, $\chi^2/d.f. = 3.751$, GFI = 0.908, CFI = 0.957, NFI = 0.942, RFI = 0.931, IFI = 0.957, TLI = 0.948, and RMSEA = 0.064. The degree of adaptation exceeds the criteria recommended by scholars, which indicates that the degree of the adaptation of the measurement model in this study is acceptable. The analytical results are described in Table 4.

Table 4: Results of the Confirmatory Factor Analysis

Perspective and items	Standardized loadings	t value	Square multiple correlation values
PS ($\alpha = 0.950$, AVE=0.8506, CR=0.9446)			
PS1	0.891	--	0.794
PS2	0.939	40.288	0.882
PS3	0.936	40.208	0.877
IA ($\alpha = 0.890$, AVE=0.7514, CR=0.8994)			
IA1	0.732	--	0.536
IA2	0.865	23.200	0.749
IA3	0.984	24.355	0.970
PSA ($\alpha=0.716$, AVE=0.4857, CR=0.7354)			
PSA1	0.615	--	0.378
PSA2	0.825	14.823	0.681
PSA3	0.631	12.348	0.398
GN ($\alpha=0.924$, AVE=0.8058, CR=0.9253)			
GN1	0.986	--	0.973
GN2	0.860	36.405	0.74
GN3	0.841	34.562	0.705
CE ($\alpha=0.865$, AVE=0.6227, CR=0.8309)			
CE1	0.885	--	0.533
CE2	0.743	17.260	0.552
CE3	0.730	16.646	0.782
CI ($\alpha=0.925$, AVE=0.7644, CR=0.9284)			
CI1	0.768	--	0.768
CI2	0.702	25.952	0.702
CI3	0.811	27.597	0.811
CI4	0.777	25.517	0.777
ML ($\alpha=0.892$, AVE=0.7573, CR=0.9258)			
ML1	0.859	--	0.739
ML2	0.895	27.221	0.801
ML3	0.842	27.997	0.71
ML4	0.884	29.433	0.781

Note 1: -- The route is set at 1.

Note 2: When the t value is larger than 2.58, it represents a vital level of $p < 0.01$

The confirmatory factor analysis in Table 4 shows the current conditions of the perspectives and the most influential factors. The absence of threats within the environment of the virtual community is the most vital factor in the PS perspective (0.939). Those interviewed are clearly most concerned about the safety of the virtual community environment before they consider participation in any discussions or publishing opinions using a certain identity.

Interaction with others using identifiable virtual identities is the most vital factor for the IA perspective (0.984). This finding means that the respondents participate in activities in virtual communities using identifiable virtual identities. The various users can identify one another's virtual identities.

The most vital factor for the GN perspective is the compliance of the words and deeds of the respondent with the expecta-

tions of the virtual community and other members (0.986). This finding shows that those respondents who interact in the community are influenced by the expectations of other members.

The most vital factor for the CE perspective is the help given to other members from the participation of respondents in the activities of the virtual community (0.885). This finding shows that respondents are willing to dedicate their efforts to participating in the community, sharing their abilities, and assisting other members.

The most vital factor for the PSA perspective is the attention the respondents obtain from other members when using the virtual community (0.825). This finding shows that the respondents care very much whether or not they attract the attention of other community members. The importance of attention is higher than that of care and impressions from others.

The most vital factor for the CI perspective is the importance accorded to respondents in the virtual community (0.777). They want to take pride in being a member of the virtual community, which shows that the degree and sense of CI are highly significant.

The most vital factor for the ML perspective is the willingness of members to participate in the community activities because they feel good in joining the community (0.895). This shows that the respondents have built their community loyalty through use, trust, recommendation, and reuse.

The confirmatory factor analysis shows that the factor loading is between 0.50 and 0.95 and the models can be adapted to the sample data. To determine if there are factor structures at higher levels, a second-order CFA model analysis was conducted to obtain the CVC. The analytical results show that the chi-square value of the overall measurement model is as follows: χ^2 (120)=316.303, $\chi^2/\text{d.f.}$ =3.811, GFI=0.943, AGFI=0.918, CFI=0.968, NFI=0.958, TLI=0.960, RMSEA=0.065, and IFI=0.969. The degree of matching exceeded the criteria recommended by the scholars, which indicates that the degree of matching is acceptable. The standard loadings of all the perspectives are smaller than the significant level of 0.01. The analytical results of the matching degrees are described in Table 5.

Table 5: CVC Second-order Confirmatory Factor Analysis Results

Perspective and items	Standardized loadings	t value	Square multiple correlation values
CVC			
PS	0.604	--	0.365
IA	0.412	7.589	0.171
PSA	0.778	9.566	0.606
GN	0.676	11.463	0.457
CE	0.791	11.720	0.626

Note 1: -- The route is set at 1.

Note 2: When the t value is larger than 2.58, it represents the vital level of $p < 0.01$.

The confirmatory factor analysis for virtual community codependency shows that the highest score is that obtained by CE (0.791), followed by PSA (0.778), GN (0.676), PS (0.604), and IA (0.412). These results show that virtual community codependency influences the dedication and contributions of members and their continuous participation in community activities for others. In addition, the self-image

of the members is more vital than GN, whereas the safety of the community environment has the least effect on their decision to participate, or not, in activities using anonymous identities.

4.4 Hypothesis Testing

The analysis above proves that the potential factor of CVC exists and positively influences ML (0.482), that CVC

positively influences CI (0.862), and that CI positively influences ML (0.497). The results also show that virtual community codependence can be derived from PS, IA,

PSA, GN, and CE. Therefore, the results support the hypotheses of this study, as described in Table 6.

Table 6: Hypothesis Test Results

Hypothesis	Content	Test result
Model	Model matching and data adaptation matching	Matching
Hypothesis 1 (H1)	CVC positively influences ML.	Support
Hypothesis 2 (H2)	CVC positively influences CI.	Support
Hypothesis 3 (H3)	CI positively influences ML.	Support

Effect analysis mainly explores the influential effects of the potential endogenous variables, particularly their direct, indirect, and total effects. The effect values of the perspectives are described in Table 7.

The analysis of the effect of the perspectives on the potential variables shows that the vital and influential factors of CVC

include PSA, CE, GN, PS, and IA. The influence of CVC on CI is significant and it has direct and indirect effects on ML. CI also plays the role of intermediary variable and the most vital variable regarding the overall effect is the effect of CVC on ML. The standardized route is described in Figure 2.

Table 7: Effect Values of the Perspectives

Structural relationship	Direct effect	Indirect effect	Total effect
PS to CVC	0.371	--	0.371
IA to CVC	0.376	--	0.376
PSA to CVC	0.789	--	0.789
GN to CVC	0.670	--	0.670
CE too CVC	0.778	--	0.778
CVC to CI	0.862	--	0.862
CVC to ML	0.482	0.428	0.910
CI to ML	0.497	--	0.497

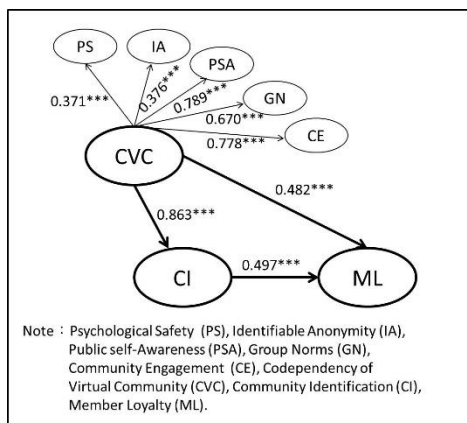


Figure 2: Standardized Route of Framework 4.5. Testing the Intermediary Effect of CI

The analysis of the model effect shows that CI has a certain intermediary effect. A multiple regression test was con-

ducted to understand this intermediary effect.

1. the existence of a $CVC \rightarrow CI$ route

$$CI = \alpha_0 + \alpha_1 CVC + \epsilon \quad (a)$$

Test of the supposition of $H_0: \alpha_1 = 0$, $\alpha_1 = 0.730***$, adjusted $R^2 = 0.532$

Refuse H_0 on the vital level, then coefficient α_1 is significant which means it exists.

2. For the test of non-CI, the route of $CVC \rightarrow ML$ exists.

$$ML = \gamma_0 + \gamma_1 CVC + \epsilon \quad (b)$$

Test of H_0 : the supposition of $\gamma_1 = 0$, $\gamma_1 = 0.687***$, adjusted $R^2 = 0.471$.

Refuse H_0 on the vital level, then coefficient γ_1 is significant, which means the route under non-CI exists as described in Figure 3.

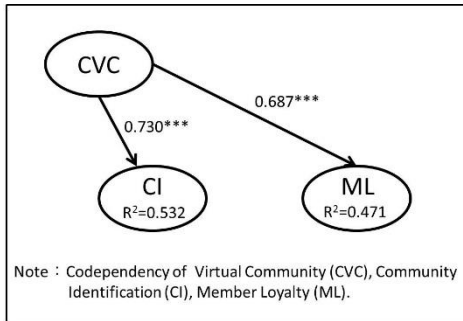


Figure 3: Intermediary Structure Diagram

3. Under CI, test the existence of route $CI \rightarrow ML$, which means that the route effect is weakened

$$ML = \beta_0 + \beta_1 CI + \beta_2 CVC + \epsilon \quad (c)$$

Test and verify H_0 : the supposition of $\beta_1 = 0$ and $\beta_2 = 0$

$$\beta_1 = 0.292*** \quad \beta_2 = 0.473*** \quad \text{adjusted } R^2 = 0.510$$

Refuse H_0 : $\beta_1 = 0$ on the vital level, then coefficient β_1 is significant, which means that the route exists and β_2 is significant. Compared with (b), $\beta_2 = 0.473 < \gamma_1 = 0.687$ shows that ML has a certain intermediary effect, as described in Figure 4.

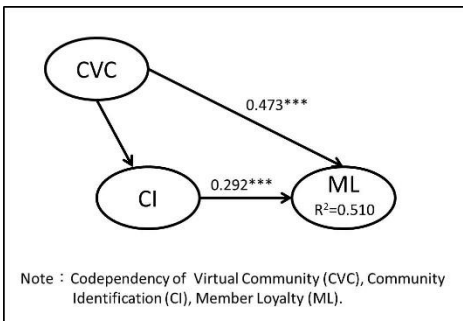


Figure 4: Structural Framework Diagram of the Intermediary Relationship

5. Conclusions

5.1 Discussion of the Research

This study proposed the concept of CVC to explain the behavior of virtual community members through a literature review and observations. The model was verified using a questionnaire investigation

with the conclusions of this research provided below.

1. CVC explains the ML of community members.

The higher the tendency of community members for virtual community codependency, the higher the ML. Previous research has found that when the members of Internet virtual communities have a higher PS, their ML is also higher. This study found that the effects of CE, PSA, and GN are higher than PS, which shows that the members have a vital influence on the sense of responsibility toward the community, their attention to other members, and GN. This finding differs from the previous understanding that an increase in PS increases ML.

With regard to virtual community codependency, the most effective perspective is CE, which shows that high CE increases the codependency of the members and strengthens their ML. Many members who are influenced by the environment of the community also try to satisfy and care for other members, disseminate topics and articles that are of interest to other members, and continuously participate in such community activities. The other members of the community who have been influenced will continue participating in activities and engaging in effective interactions, which is the CVC described in this study.

With regard to GN, every community has its explicit and implicit norms, which the members must maintain and follow together in order to continue and enhance loyalty. Good interactions will create a united and rich community. With regard to PSA, the members care about the opinions of the other members and the attention they receive from other members. To impress other members and increase their loyalty, such members share their opinions. With regard to IA, community members normally use identifiable community iden-

tities when sharing knowledge and interacting with other members. The last variable is PS. According to a previous study, an increase in PS increases ML because community members think that they can peacefully participate in community activities and interact with other members in a safe environment.

2. CVC explains the CI of the communities.

The more significant the tendency toward CVC, the more that CI is influenced. CI is the cause of participation in a virtual community. When the CI is high, the virtual community easily becomes successful. With regard to virtual community codependency, an increase in CI leads to an increase in both CE and ML. The higher the cognition of the community, the more significant the loyalty of the community members. The members' acceptance of the GN of the community enhances the community cognition of the members, who follow and maintain the community rules. With regard to enhancing community cognition through PSA, the more that the image and position of the community members are affirmed by the community, the more the members care about the opinions of other members and the attention they receive, thereby enhancing their community cognition. With regard to IA, community members normally use identifiable community identities. The affirmation of their identities increases their community cognition. Lastly, the higher the level of PS that community members feel, the higher the cognition of the community and the more willing the members become in interacting with the other members.

3. CI has a mediating effect between CVC and ML.

CI is the cause of participation in virtual communities. In the present study, the impact of CVC on CI is obvious, and CVC on ML has a direct and indi-

rect effect, as CI plays the role of the intermediary variables.

5.2 The Meaning of Management

This study shows that ML is influenced by PS. To make the operation of a virtual community successful, community codependency and community cognition of the members must be enhanced. To enhance these factors, the member's responsibility (CE) must first be enhanced to make them willing to serve other members, create an appropriate and friendly community environment, and establish the community's norms.

In addition to the restricting norms, the community members should reach a common view regarding the acceptance of the community rules. The encouragement of members leads to positive behavior. The encouragement of the members, leading them to positive behavior that conforms to community rules, in turn allows them to receive the necessary attention (PSA). The establishment of a unique style makes every member easily identifiable (IA). The creation of a safe community environment to protect the privacy and personal information of the members (PS) is also a significant factor. In addition, the CI should be enhanced through cognition, emotion, and codependency. Thus, enhancing the CI in turn enhances ML and makes the community operation successful.

5.3 Research Restrictions and Recommendations

The following are the limitations and recommendations of this study:

1. This study gives no single explicit definition of codependency and its conception of the term is unrelated to the concept of interpersonal relationships in psychology or other theories. Therefore, interpersonal relationships are outside the scope of this study.
2. Given the limitations imposed by cost, this study conducted its investigation only with the users of traditional Chinese virtual communities and who are mainly located in Taiwan. In the future,

respondents from other regions should be included.

3. In the future, virtual community codependency can be used as an aggregation index for virtual communities and for direct testing of the effects of virtual community operations.
4. Virtual communities are of a large variety and codependency of every kind must be categorized and discussed.

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The Measure and Analysis of E-Personality – The Case of the Neuroticism Scale of the Five Factor Model

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Abstract

The development of social networks and telecommunications has changed human life dramatically. Online behavior in today's information society has become an indispensable part of daily life. Therefore, researchers have focused on network behavior in recent years. Personality traits are regarded as an important determinant of behavior and personality inventories have been applied for diverse reasons in different fields. However, their utilization in the Internet environment, to predict network behavior, may have limits in scope and applicability due to the differences between real-life and the cyber world. This study suggests that a personality type in the cyber world, calling it "E-personality", may differ from real-life personality types. Currently, well-developed personality scales exist for academic use. However, the plausibility of applying them in cyberspace still lacks systematic proof. This study argues that measurement of the E-personality of Internet users is helpful for understanding network behavior. Recently, neuroticism has increasingly gained more attention and is now regarded as an important online personality trait by psychologists today. In light of this, this study is based on neuroticism of the Big Five personality inventory. The study has sampled university students from different types of university in Taiwan, and has testified the reliability and validity of the Inventory through confirmatory factor analysis. The results provide suggestions for practical proposes and future academic studies.

Keywords: E-personality, online neuroticism, confirmatory factor analysis, reliability, validity

1. Introduction

Personality traits have often been used for behavior prediction. In different fields, people look very highly upon personality traits, which are utilized to predict vocational selection, performance at work and study, and clinically as an index to evaluate psychological illness. (Briggs & Myers, 1980; Barrick & Mount, 1991; Komarraju et al., 2011; Piedmont, 1998) However, as the Internet has developed, virtual embodiment has been created in today's network society (Turkle, 1996). We often find ourselves showing network behavior that differs from our behavior in real society. Additionally, we can also find, on the Internet,

plenty of introverts who are actually shy and quiet in real society, but who act like extroverts online, and have a tongue in their heads. This situation reflects the difference between "Real-life Personality" and "Online Personality". Regarding the difference between real-life personality and online personality, former psychologically-related studies had different points of view. Some studies considered the personality of an individual, in principle, being identical to their online personality (Kraut et al., 2002). For example, an extrovert would exhibit extraversion on the Internet, and vice versa. Other researchers regarded both as different personalities and that it is "disinhibition" that makes them different

(Joinson, 2003; Kiesler et al., 1985). Others believed, in fact, that the different personality an individual shows on the Internet, is still part of the personality of that individual, just that they usually hide that aspect in their minds (Suler, 2004). All these points of view have left room for further discussions. This study thinks that if an individual's real-life personality differs to their online personality, it should be discussed and tested respectively. However, in the past, researchers have not become involved much in this subject.

Aboujaoude (2012) believed E-personality does exist, and it may affect real-life personality. In fact, no matter how much the researchers looked, they had already admitted, directly or indirectly, that real-life personality does differ to E-personality. Accordingly, this study plans to develop a scale with reliability and validity for the measurement of E-personality. The main scope of the research will be the characteristics of the virtual personalities of individuals in the Internet environment. The developmental process of the scale follows DeVellis (2012), and those recommended by relevant literatures on personality scale development. (Churchill, 1979; Govindarajan & Kopalle, 2006; Netemeyer et al., 2003; Pearson, 1980). The study will develop a personality test which is suitable for measuring network society behavior. By implementation of a pre-test and sample collection, the applicability and performance will be analyzed. The main purpose of this study is to develop a scale, which is suitable for the utilization of E-personality measurement and can be used as a measuring tool for domestic and foreign researchers.

2. Literature Review

2.1 Personality Theories

Trait theory states that the difference between individuals can be described by several important behavior tendencies. The study of such theory is mainly to find an impact dimension for the descriptions of diverse personalities, and the point of this

research happened to be consistent with the theory of this study. Therefore, this study will utilize several points of trait theory to form a basis. Personality psychologists now have a consensus regarding personality traits, but this differs between regions, countries, and cultures. In general, psychologists believe that personality consists of five dimensions. The most widely acceptable personality traits are the Five Factor Model (FFM), categorized by Costa & McCrae (1986) into neuroticism, extraversion, openness, agreeableness, and conscientiousness. Despite the fact that the categories have not been recognized worldwide (Block, 1995; Eysenck, 1992), the FFM can still be regarded as the most widely accepted personality theory so far.

Neuroticism is the most stable personality trait in personality studies (McCrae & Terracciano, 2005). Neuroticism is a fundamental personality trait in the study of psychology and is characterized by anxiety, fear, moodiness, worry, envy, frustration, jealousy, and loneliness. Individuals who score high for neuroticism are more likely than the average person to experience such feelings as anxiety, anger, envy, guilt, and depressed moods. They respond poorly to stressors, are more likely to interpret ordinary situations as threatening, and minor frustrations as hopelessly difficult. They are often self-conscious and shy, and they may have trouble controlling urges and delaying gratification. Neuroticism is a prospective risk factor for most "common mental disorders", such as depression, phobia, panic disorder, other anxiety disorders, and substance abuse disorder symptoms that traditionally have been called neuroses.

2.2 E-Personality

2.2.1 Online Behavior

Turkle (1995) indicated that the Internet provided opportunities for people to show themselves in different ways. People could slightly change their style, or exaggerate changes in their identity, such as age, experience, personality, appearance, and

even gender. Young (1996) thought that the Internet had the characteristics of interaction. For instance, chat rooms and on-line games are the most addictive interactions. Young also regulated the definitions and characteristics of Internet Addiction Disorder (IAD). The issues of IAD, with the utilization of the Internet nowadays, is the important negative impact on Internet users. Studies have exhibited that excessive Internet users tend to have certain unique personality characteristics. Young (1998) believed that the higher the depressive tendencies of the Internet user, the severer their excessive Internet use would become.

Many discussions have utilized the characteristics of Internet behavior for marketing segmentation analyses, which are similar to the characteristics of population and psychological statistics. The analyses, which were different from historical population statistic variables, mainly differentiated Internet consumers by using new marketing segmentation variables. Bernoff & Li (2010) categorized the public according to the conditions of their participation in network activities. They called it a "Social Technographics Profile", categorizing Internet users by the following types: creators, critics, collectors, joiners, spectators and inactives. Brandtzæg (2010) suggested that Internet users are also classified by following practical types: Non-users, sporadics, debaters, entertainment users, socializers, lurkers, instrumental users and advanced users. Brandtzæg (2012) had also verified these classifications with practical data.

There has been every kind of network behavior from the past until now, and into the future. This study thinks that it could be highly associated with the E-personality of an individual. On the other hand, each E-personality should match its practical type. However, so far, this study has not been able to discuss the mutual relationship.

2.2.2 Introduction of E-personality

Wallace (2001) introduced the concept of an online persona. Our denoted online

persona differs with our real-life persona as we show different traits on different occasions and when meeting different persons. Suler (2004) argued that "rather than thinking of disinhibition as revealing an underlying 'true self', we can conceptualize it as a shift to a constellation within self-structure, involving clusters of effects and cognition that differ from the in-person constellation". The concept of the "E-personality" makes individuals calibrate their offline lives, and thus behavior from their Internet personality may affect their off-line personality as well (Aboujaoude, 2012).

There are three parts of the psychic apparatus as defined in Freud's structural model of the psyche, including id, ego and super-ego. These are the three theoretical constructs in terms of whose activity and interactive mental life is described. According to this model of the psyche, the id is the set of uncoordinated instinctual trends; the super-ego plays the critical and moralizing role; and the ego is the organized, realistic part that mediates between the desires of the id and the super-ego (Ruth, 2006). Freud, in a famous metaphor, compared the psyche to an iceberg. Figure 1 is based on Freud's metaphor. Like an iceberg, nine-tenths of the psyche is invisible to us under water level (solid line figure 1), submerged in the unconscious. According to Freud's personality theory, this research argues that Internet users will show personality traits deeply hidden inside them in the cyber world. This study suggests that in the Internet world, the water level will fall (dotted line in Figure 1) and Internet users will show more of their inside traits unconsciously, seen as Figure 1. It is still us who is online, but it's a part of ourselves that we generally keep fairly hidden but which in the Internet world, is revealed. These personality traits exist in the cyber world. This study calls it E-personality. E-personality may be consistent, inconsistent or different extend.

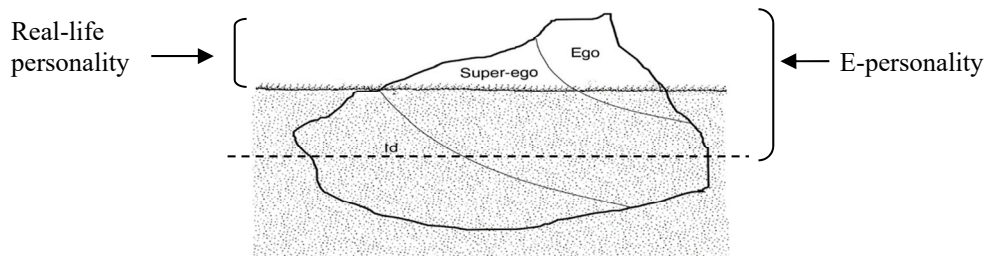


Figure 1: E-personality, Adjusted from Dewey (2007)

Regarding the relevant study subjects of IS, which are personality related, in early phases scholars utilized the impact of personality trait on successful utilizations of information systems. Now it has developed into the impact of personality traits on utilizations of the Internet (McElroy et al., 2007; Devaraj et al., 2008) and the personality traits of utilization with the encouragement of social networks (Seidman, 2013). Past studies have mainly focused on the relationships between real-life personality traits and Internet or IT usage. They take the Internet as "a tool". However, for this study, we regard the Internet world as "a society". This study argues that E-personality does exist and it affects Internet users' behavior. Additionally, an individual's behavior in the cyber world shows different kinds of pattern from those in the real world and sometimes an individual has network behavior, which differs from our behavior in real world. The fundamental way to start to look at E-personality is to understand Internet users' behavior.

3. Research Method

Since neuroticism is a fundamental personality trait and has been suggested as a reliable trait by different nation samples, this study selected neuroticism to test the E-personality facet. Thus, our study has focused on designing a neuroticism personality inventory for online users, calling it the "Online Neurotic Personality Inventory" (ONPI). This study will testify the reliability and validity of the ONPI in an attempt to provide a tool to faithfully re-

flect neurotic behavior on the Internet and that can be applied to subjects for future research. The development of this study scale contained seven steps: (1) specify domain neuroticism of the E-personality, (2) generate sample of items, (3) pilot test, (4) purify the measure, (5) data collection, (6) further refine the measure and (7) access reliability and validity.

3.1 Scale Development

This study will utilize the neuroticism personality inventory of the NEO-PI-R S Form developed by Costa & McCrae (1992) to form a basis. The questions of this scale will be answered by a 5 point Likert Scale. This study will also refer to other relevant personality scales and relevant literatures on network behavior (Aboujaoude, 2012; McCrae et al., 2005; McCrae et al., 1996). It will then revise the contents of the scale accordingly to meet the practical measurement needs of the neuroticism trait of E-personality. There are two basic prepositions of this study: (1) as individuals stay in the network environment, the personality traits that an individual shows may differ from the one in real life. (2) The behavior patterns of the Internet and real life are different, thus they reflect different personality traits.

3.2 Operational Definition of E-personality

The first thing required for the development of a measuring tool for E-personality will be conceptualization of E-personality. The discussion of this study has emphasized the personality traits ex-

hibited by individuals in the network environment. Consequently, the methodology of measurement should be different. No matters how researchers call it: online persona, digital personality, online personality...etc., they all mean the same thing. This study has called it “E-personality” and defines it as: “In the Internet environment,

individuals exhibit consistent, continual and different behavior and reactions than other individuals”. This study aims to measure E-personality and begins with neuroticism. It then defines neuroticism personality traits and detailed facets so as to ascertain an operational definition, as in Table 1.

Table1: The Operational Definition of the Six Facets of Neuroticism Domain in E-personality

Domain facet	Operational Definition	Adjective Checklist Items
Neuroticism	Identifies individuals who are prone to psychological distress on the Internet.	
Anxiety	Internet users are apprehensive, fearful, prone to worry, nervous, tense, and jittery.	Anxious, fearful, worried, tense, nervous, not confident, unoptimistic
Angry Hostility	The tendency to experience anger and related states, such as frustration and bitterness.	Irritable, impatient, excitable, excitable, moody, hard, tense
Depression	The tendency to experience depressive effects on the Internet	Worrying, unhappy, not confident, lack of self-confidence, pessimistic, moody, anxious
Self-Consciousness	Internet users are uncomfortable around others, sensitive to ridicule, and prone to feelings of inferiority.	Shy, lack of self-confidence, timid, defensive, inhibited anxiousness
Impulsiveness	The inability to control cravings and urges on the Internet.	Moody, irritable, sarcastic, self-entered, loud, hasty, excitable
Vulnerability	Internet users feel unable to cope with stress, becoming dependent, hopeless, or panicked when facing emergency situations.	Lack of clear-thinking, lack of self-confidence, anxious, inefficient, not alert, careless

Adjusted form Costa & McCrae (1992)

3.3 Generate Sample of Items

The initial items of the scale were discussed by a professor, three PhD students, three professionals from the industry community, and three graduate students during weekly meetings. In order to maintain the integrity of the entire scale, we intended to neither change the number of items from the neuroticism of NPO-PI-R nor the implication of the original items. Instead, we focused on changing the items that originally referred to behavior in real-world social environments to behavior in cyberspace environments. After finishing the development of the initial scale, we asked English professionals to perform translation and then we back-translated the

items. After bidirectional translation, we invited five professionals with practical experience, and scholars to join the item development, interviewing them to assure their professional credentials. After the interviews, we adjusted the content of the initial items with reference to the opinion of the interviewees, after which we performed the pilot test with the adjusted version and further adjusted the scale. Finally, we invited two professors and three experts to review the scale items to ensure the content validity, nomological validity and expert validity that followed the study of Churchill (1979).

3.4 Pilot Test and Purifying the Measure

We first performed a pilot test before formally distributing the questionnaire in order to discover if there were questions that might be misunderstood due to ambiguous wording and to avoid interference with the scale validity. We gave out 92 questionnaires during the pilot test to students of the employer of the current study's first author. 76 valid questionnaires were returned. During the pilot test, if subjects had any concerns or problems when answering, they could either mention them through a comment section at the end of the questionnaire or communicate with the researchers administering the questionnaire on the spot. Following the suggestions and feedback from the respondents of the pilot test, we performed final adjustments on the scale during a weekly meeting of the study authors before building the final version of the ONPI. (Appendix 1)

4. Data Analysis Results

This study used SPSS to perform statistical analysis and used LISREL to perform confirmatory factor analysis in order to test the construct validity of the scale.

4.1 Participants

Our study took undergraduate students from 13 colleges in Taiwan as the research subjects. In order to cover different types of student and establish a representative norm, the 13 colleges selected in our study included six national universities and seven private universities; divided by type, we included six comprehensive universities, four universities primarily for science and technology studies, and three medical universities. For each university, we selected a full-time teacher employed by the university and invited the students within his or her class to complete the ONPI for a 50 NTD gift card as a reward. A paper survey was conducted in this study. In total, we sent out 1,233 surveys and received 1,109 valid samples. The valid response ratio of the samples was 89.9%. The total sample

includes 534 women (48.2%), 571 men (51.4%) and 4 subjects (0.4%) whose sex is unknown. The age range was 21 to 26.

4.2 Reliability and Validity

The 48 items of the Online Neurotic Personality Inventory developed for our study have fairly good overall internal consistency ($\alpha=0.884$). Table 2 shows the reliability of each personality facet, also showing satisfactory internal consistency with α -values between 0.747 (Vulnerability) and 0.677 (Impulsiveness). These results fully indicate that the scale developed in our study has sufficient reliability. Figure 2 shows that most standardized factor loadings of all items and their constructs are more than the acceptable level (> 0.5). The results of testing convergent validity revealed sufficient validity.

4.3 Model Fit

Our study performed a model fit analysis using structural equation modeling (SEM). In terms of the fit index for model fit, our study referred to the opinions of Bagozzi and Yi (1988), Jöreskog and Sörbom (1989), and Hair et al. (1998), choosing the ratio of χ^2 and degrees of freedom ($\chi^2/\text{d.f.}$), with GFI, AGFI, NFI, NNFI, CFI, and RMSEA as the seven indexes for assessment. Specifically, $\chi^2/\text{d.f.}$ must not be larger than 5; GFI, NFI, NNFI, and CFI should be larger than 0.9; AGFI should be larger than 0.8; and RMSEA should be lower than 0.08. Within the first-order (Figure 2) for the ONPI in our study, the standardized regression coefficients were all significant, implying that the model of online neurotic personality with six facets was quite stable. From Table 3, we can see that all the fit indexes of the models of our study nearly reached their standard ideal values, with only GFI slightly lower than its ideal value, indicating that the model of our study had good model fit.

Table 2: Mean and Standard Deviation for Each Item and the Cronbach's Alpha Values of Facets in the Online Neuroticism Personality Inventory

Domain facets	Item	No.	Mean	S.D.	Cronbach's α If Item Delete	Cronbach's Alpha	Compose Reliability
Neuroticism	Cronbach's Alpha=.884						
N1	N1-1	1	2.59	.972	.709	.738	.767
	N1-2	31	2.57	.913	.706		
	N1-3	61	2.77	.873	.686		
	N1-4	91	2.69	.904	.699		
	N1-5	121	2.81	.868	.692		
	N1-6	151	3.57	.827	.738		
	N1-7	181	2.95	.770	.724		
	N1-8	211	3.47	.884	.731		
N2	N2-1	6	2.60	.893	.703	.730	.750
	N2-2	36	2.46	.874	.687		
	N2-3	66	2.79	.956	.686		
	N2-4	96	2.67	.843	.697		
	N2-5	126	3.10	.877	.727		
	N2-6	156	2.82	.859	.694		
	N2-7	186	3.18	.889	.703		
	N2-8	216	3.24	.876	.719		
N3	N3-1	11	2.84	.904	.736	.742	.764
	N3-2	41	2.81	1.047	.690		
	N3-3	71	2.80	.886	.717		
	N3-4	101	2.87	.986	.714		
	N3-5	131	3.67	.730	.751		
	N3-6	161	2.72	.909	.705		
	N3-7	191	2.91	.901	.694		
	N3-8	221	3.30	.869	.705		
N4	N4-1	16	3.43	.950	.628	.658	.678
	N4-2	46	3.01	.889	.636		
	N4-3	76	3.07	.991	.595		
	N4-4	106	3.11	.878	.625		
	N4-5	136	3.21	.943	.607		
	N4-6	166	3.14	.786	.642		
	N4-7	196	2.97	.912	.613		
	N4-8	226	3.53	.808	.662		
N5	N5-1	21	2.99	.912	.641	.677	.722
	N5-2	51	3.36	.975	.630		
	N5-3	81	2.99	.898	.629		
	N5-4	111	3.84	.777	.687		
	N5-5	141	2.79	.846	.636		
	N5-6	171	3.61	.923	.638		
	N5-7	201	3.39	.881	.641		
	N5-8	231	2.61	.799	.664		
N6	N6-1	26	3.12	.949	.694	.747	.783
	N6-2	56	2.58	.807	.656		
	N6-3	86	3.23	1.001	.700		
	N6-4	116	2.75	.795	.662		
	N6-5	146	3.41	.902	.689		
	N6-6	176	2.64	.787	.655		
	N6-7	206	2.90	.734	.671		
	N6-8	236	3.12	.949	.694		

N1 = Anxiety, N2 = Angry Hostility, N3 = Depression, N4 = Self-consciousness, N5 = Impulsiveness, N6 = Vulnerability

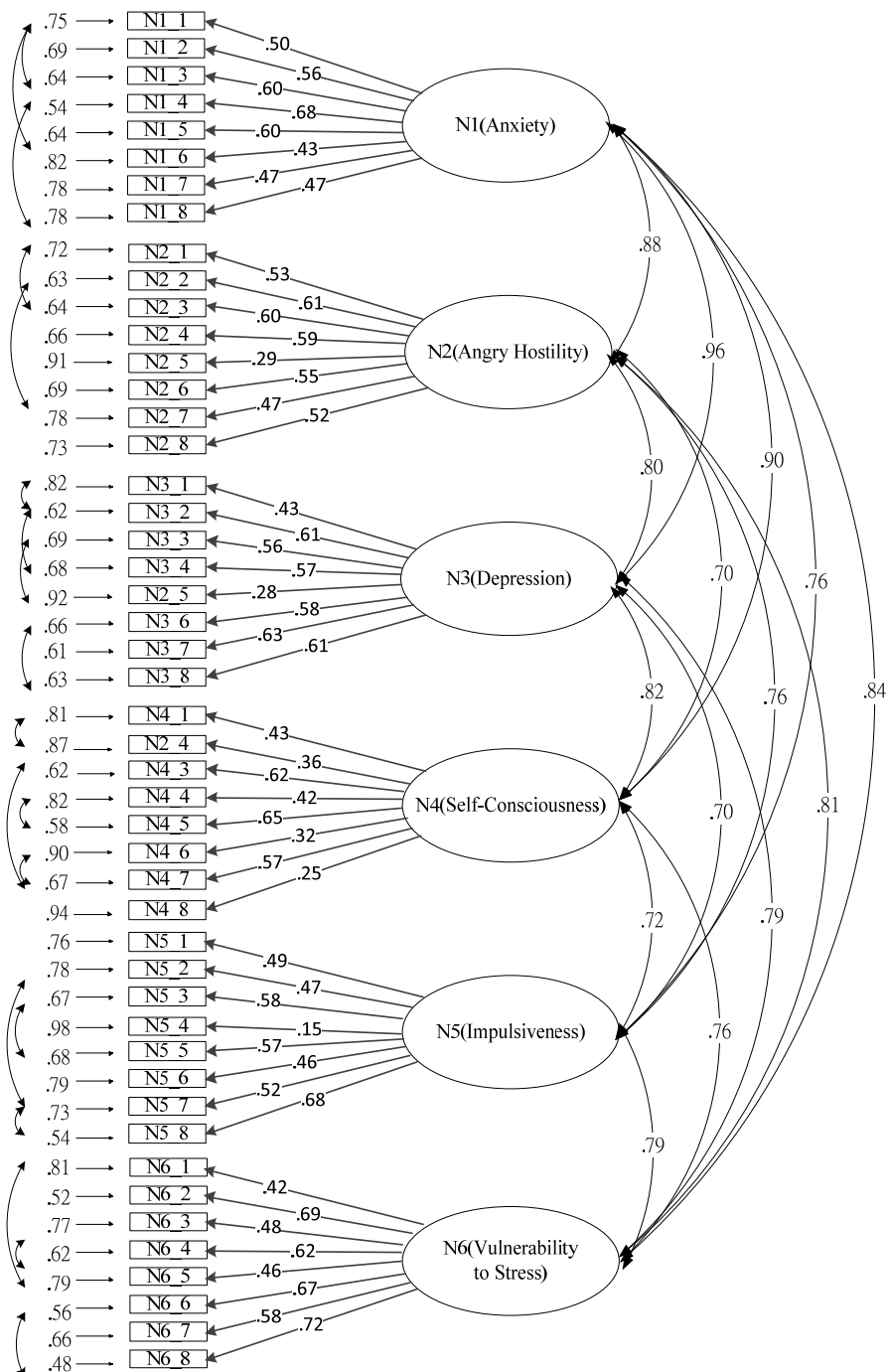


Figure 2: ONPI Measurement Model

Table 3: CFA Fit Indices for ONPI

Fit Indices	Recommended Value	Scholars	ONPI value
GFI	≥ 0.9	Jöreskog and Sörbom (1989)	.71
NFI	≥ 0.9	Bentler and Bonett (1980)	.91
NNFI	≥ 0.9	Bentler and Bonett (1980)	.91
CFI	≥ 0.9	Bagozzi and Yi (1988)	.92
RMSEA	≤ 0.08	Hu & Bentler (1999)	.094

5 Conclusions and Suggestions

This study developed the ONPI, attempting to properly assess the personality of Internet users and understand Internet behavior. The results showed the ONPI to possess enough reliability and validity to be useful for measuring neuroticism in an online setting.

5.1 Findings

The ONPI developed in our study is based on the neuroticism inventory of NEO-PI-R. It possesses good reliability and validity, not only implying that the ONPI is a valid tool for assessing Internet neurotic personality, but also that the neurotic behavior of college students as manifested online may not be so different from real life. Although some articles have emphasized that individuals may exhibit different behavior on the Internet versus in the real world (Aboujaoude, 2012; Suler, 2004), the lives of college students are perhaps simpler than those of the general population. Therefore, any differences present between the two environments may not be distinguishable because of the limited subject variation present.

Nowadays, individuals come into contact with and use the Internet and smart phones from childhood. Interaction with these information technologies are inherently self-oriented, making it is easy for an individual to become excessively self-centered and to develop excessive and unhealthy personality traits during maturation. These can further worsen into trends of exaggeration, complacency, conceit, ego, and selfishness, effects that may even expand into real-world settings. For parents and educational professionals, it is very

important to understand the online behavior of the next generation and prevent them from developing abnormal neuroticism. Specific approaches can include supporting a teenager's self-image, clarifying differences between the Internet world and the real world, further regulation of the use of social networks, proper supervision of the online behavior of teenagers, and building healthy social connections and routines throughout childhood, all efforts that would be of great help for the development of healthy personalities of coming generations. Our study is a beginning and can play a role in measuring the E-personalities of teenagers and young adults.

5.2 Implications

In terms of clinical practice and academic research, the ONPI developed in our study can help as a useful tool by promoting accurate diagnostic standards for defining abnormal personality. In addition, appeals to neuroticism have become an important business development: sales approaches that take advantage of online neurotic behavior are just beginning to unfold, and efforts to end irrational consumption behavior, such as impulse buying behavior on the Internet, can start from assessing the neurotic personality traits of individuals. On the other side, it can be used to predict individuals with unstable neuroticism and can prevent cybercrime. The ONPI developed in our study has good properties, and can be used as an instrument to screen for online neurotic personalities in the population.

5.3 Suggestions and Limitations

This study revealed that the neuroticism inventory is a well-designed personal-

ity inventory and can be revised to testify in the cyber world. However, there is still plenty of space for improvement. Reviewing the factor loadings of the measurement models, eleven of the items in the scale were less than 0.45 (Figure 2); standardized loading estimates should be 0.45 or higher, and ideally, 0.70 or higher, indicating that each item was explained more by its hypothesized reflective construct than by error. Therefore, there is room for improvement.

There are several limitations of our study. First, the ONPI was designed and based on the neuroticism personality inventory of NEO PI-R, and as such, it may not be able to fully reflect all the unique features of online neuroticism personality. Second, due to the limitations of cost and manpower, our study chose college students as the research subjects. Although it is now very common for college students to use the Internet, we still need to consider that our results may not be generalizable to the general population.

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Appendix 1. Online Narcissism Personality Scale

Narcissism Facets	Item	No.	Measure
			In the internet world,
N1	N1-1	1	I am not a worrier.
	N1-2	31	I am easily frightened.
	N1-3	61	I rarely feel fearful or anxious.
	N1-4	91	I often feel tense and jittery.
	N1-5	121	I seldom feel nervous.
	N1-6	151	I often worry about things that might go wrong.
	N1-7	181	I have fewer fears than most people.
	N1-8	211	Frightening thoughts sometimes come into my head.
N2	N2-1	6	I often get angry at the way people treat me.
	N2-2	36	I'm an even-tempered person.
	N2-3	66	I am known as hot-blooded and quick-tempered.
	N2-4	96	I am not considered a touchy or temperamental person.
	N2-5	126	I often get disgusted with people I have to deal with.
	N2-6	156	It takes a lot to get me mad.
	N2-7	186	At times I have felt bitter and resentful.
	N2-8	216	Even minor annoyances can be frustrating to me.
N3	N3-1	11	I rarely feel lonely or blue.
	N3-2	41	Sometimes I feel completely worthless.
	N3-3	71	I am seldom sad or depressed.
	N3-4	101	I have sometimes experienced a deep sense of guilt or sinfulness.
	N3-5	131	I tend to blame myself when anything goes wrong.
	N3-6	161	I have a low opinion of myself.
	N3-7	191	Sometimes things look pretty bleak and hopeless to me.
	N3-8	221	Too often, when things go wrong, I get discouraged and feel like giving up.
N4	N4-1	16	In dealing with other people, I always dread making a social blunder.
	N4-2	46	I seldom feel self-conscious when I'm around people.
	N4-3	76	At times I have been so ashamed I just wanted to hide.
	N4-4	106	It doesn't embarrass me too much if people ridicule and tease me.
	N4-5	136	I often feel that I am not as good as others.
	N4-6	166	I feel comfortable in the presence of my bosses or other authorities.
	N4-7	196	If I have said or done the wrong thing to someone, I can hardly bear to face them.
	N4-8	226	When people I know do foolish things, I get embarrassed for them.
N5	N5-1	21	I rarely overindulge in anything.
	N5-2	51	I have trouble resisting my cravings.
	N5-3	81	I have little difficulty resisting temptation.
	N5-4	111	When I am having my favorite foods, I tend to eat too much.
	N5-5	141	I seldom give in to my impulses.
	N5-6	171	I sometimes eat myself sick.
	N5-7	201	Sometimes I do things on impulse that I later regret.
	N5-8	231	I am always able to keep my feelings under control.
N6	N6-1	26	I often feel helpless and want someone else to solve my problems.

Narcissism Facets	Item	No.	Measure
			In the internet world,
	N6-2	56	I feel I am capable of coping with most of my problems.
	N6-3	86	When I'm under a great deal of stress, sometimes I feel like I'm going to pieces.
	N6-4	116	I keep a cool head in emergencies.
	N6-5	146	It's often hard for me to make up my mind.
	N6-6	176	I can handle myself pretty well in a crisis.
	N6-7	206	There are so many little jobs that need to be done that I sometimes just ignore them all.
	N6-8	236	I'm pretty stable emotionally.
N1 = Anxiety, N2 = Angry Hostility, N3 = Depression, N4 = Self-consciousness, N5 = Impulsiveness, N6 = Vulnerability			

A Study on Taiwan's E-Commerce and Third-party Payment System and the Personal Information Protection and Administration System

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Abstract

This study primarily investigates the actual promotion conditions of the Taiwan Personal Information Protection & Administration System (TPIPAS) and discrepancies with international personal data protection norms. This study uses expert interviews to gather the goals and examines current problems when introducing Taiwanese enterprises to TPIPAS and third-party payment personal data protection. Subsequent to a comparative analysis of the expert interview results and international practices, this study recommends that the Government should take the following steps: 1) provide subsidy measures for the relevant system and strengthen advocacy; 2) form independent agencies with specific responsibilities; 3) draw up clear checklist items; and 4) implement provisions to support third-party payment and formulate an inspection system that builds public trust in the role of an equitable third party in coordination with the Personal Data Protection Act. It is hoped that the results of this study may provide the Government with a reference to continue to improve and promote TPIPAS and third-party payment standards.

Keywords: Personal data protection act, personal information administration system, privacy protection mark, third-party payment

1. Introduction

In recent years, the subject of privacy rights has gained increasing attention and prominence. Important international organizations and nations have one by one drawn up laws and standards to protect the collection, handling, use, and transmission security of the public's personal data. In response to this trend in social development, Taiwan officially implemented the Personal Data Protection Act (also referred to as the "New Personal Data Act") on October 1, 2012. Under the New Personal Data Act, the maximum total amount of compensation in civil damages is limited to 200 million New Taiwan dollars (NT\$),

and the punishment for criminal responsibility is severe, with a maximum of five years imprisonment. Therefore, methods of protecting personal data to avoid inestimable business losses due to the leakage of personal data has become the most important issue confronting enterprises.

To assist enterprises in improving their personal data protection and administration capabilities, the Ministry of Economic Affairs of the Republic of China commissioned the Science & Technology Law Institute of the Institute for Information Industry to promote the "Taiwan Personal Information Protection & Administration System" (abbreviated as TPIPAS), announcing its implementation on Sep-

tember 4, 2012. All social circles have maintained a wait and see attitude, anticipating that the Government could provide an ideal personal data protection and administration system for enterprises. TPIPAS is originally established for Taiwan's E-commerce industries based on the resolutions of the 2009 SRB (Strategy Review Board) of The Executive Yuan, ROC. Consequently, this study uses TPIPAS as the research target for Taiwan's E-Commerce personal information protection administration system.

Furthermore, worldwide, the E-commerce industry has grown rapidly over the last 10 years. China's E-commerce transaction amount reached renminbi (RMB) 4,350 billion in the first half of 2013, a growth of 24.3% in comparison with the same period in 2012 (China EC Research Center, 2013). Because an important cash flow payment mechanism (the "Alipay platform") has filled an absolutely vital role in supporting active E-commerce, on January 16, 2015, Taiwan passed a special law on third-party payment (the Electronic Payment Mechanism Management Act) with the principle objective of balancing E-commerce industry development with the protection of consumer rights and interests. The third-party payment industry has been developing for many years in the United States, the European Union, Japan, and China.

To summarize the above, the goals of this study are as follows:

1. Collect and compare the relevant laws and regulations, standards, and systems on personal data protection and privacy protection marks of Taiwan and Japan.
2. Investigate experts' opinions and refer to international practices to suggest better ways for the Government to implement TPIPAS, DP Mark, and third-party payment's personal data protection.

2. Literature Review

2.1 Personal Data Protection Guidelines for International Organizations

The earliest monograph in the realm of privacy rights was published by Warren and Brandeis (1890) in Issue 4 of the *Harvard Law Review*, leading many internationally renowned personal data protection standards or guidelines to begin from a privacy perspective. In the international sphere, privacy protection under the Organization for Economic Cooperation and Development (OECD) developed relatively early and is well-known. The European Union (EU) and Asia-Pacific Economic Cooperation (APEC) followed the relevant privacy protection policies formulated by OECD. To attain the standards of international norms, each major nation has, in turn, formulated protection policies based on the principles of the EU and APEC protection directives and frameworks. The relationship between major nations and international organizations that promote personal data protection are shown in Figure 1.

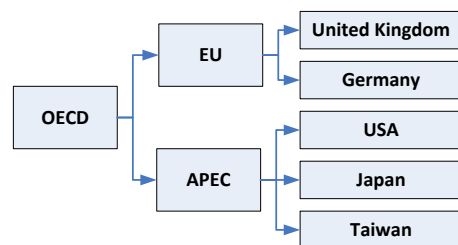


Figure 1: Relationship between International Organizations and Major Nations Promoting Personal Data Protection

2.2 Summary of the Status of the Third-party Payment System and an Overview of Personal Data Protection

The primary issues a user cares about in regard to E-commerce are confidentiality and non-repudiation (Turban et al., 2011). The third-party payment service has been developed in response to the demand for "trust" in E-commerce. "Third party" refers to participation in the E-commerce buying and selling transaction process as an intermediary that vouches for both the

buyer and the seller while at the same time guaranteeing transaction security to both parties, thereby having a neutral third-party role without association to either the buyer or seller. Consequently, this third party must possess personal data information from both the seller and the buyer and responsibly fulfill the duties of authentication and data security protection without leaks. Thus, the phrase “third-party payment service” does not actually appear in the laws and regulations of any nation. The EU uses the term Payment Services (European Communities EC, 2007). The United States uses the term Money Services (NCCUSL, 2000). The People's Republic of China describes the role as a non-financial institution payment service (People's Bank of China Directive, 2010). Japan's Act on Financial Settlement refers to separate “Prepaid Tickets” (Act on Financial Settlement, 2009).

2.3 Comparison of the Personal Data Protection Administration and Privacy Protection Mark Systems between Taiwan and Japan

Taiwan and Japan are geographically close and have both formulated protection policies based on the principles of the APEC protection directive and framework (see Figure 1). In addition, they have maintained long-term close economic exchange and are both APEC member nations (Fan Chiang, 2011). Therefore, the relevant Japanese systems are used as reference targets in a list for comparison, as shown in Table 1. From Table 1, the comparative differences between Taiwan's and Japan's practices will be designed as the experts' interview questions, e.g., do you think the practice should be established with reference to Japan in accordance with the relevant organizations for different functions? Should reference be made to the international practices to establish independent related organizations?

Table 1: Comparison of Personal Data Protection Administration and Privacy Protection Mark Systems between Taiwan and Japan

Item	Taiwan (TPIPAS)	Japan (JIS Q 15001:2006)	Discrepancy Explanation
Public Announcement and Implementation	September 2012	April 1998	Implementation dates differ by 14 years
Related Organizations	None	Privacy Mark System Committee, review organizations and review committees, Inspector Qualification Assessment Committee, Consumer Complaint Window, and Dispute Review Board	Taiwan has not formed any related committees
Related Agencies	1. Counseling agency (10) 2. Verification agency (0, currently held by the Center for Science and Technology Law) 3. Charter agency (Department of Commerce in the Ministry of Economic Affairs)	1. Training institution (4) 2. Investigation agency (18) 3. Charter agency (Japan Institute for Promotion of Digital Economy and Community (JIPDEC))	Japan's investigation agencies are equivalent to Taiwan's verification agencies; they are designated by the three standard classes “organization member”, “industry category”, and “area”
Verification Process	Divided into two stages; book review first, then actual review (verification period indefinite depending on the industry size)	Same as Taiwan	None

Item	Taiwan (TPIPAS)	Japan (JIS Q 15001:2006)	Discrepancy Explanation
Time Limit	Effective period of two years with a one-time extension application (2 years)	Same as Taiwan	None
Industries Involved	The initial stage targeted only E-commerce, retailers without shop fronts, general merchandise retailers, or wholesalers, but TPIPAS is now open to all industries	No set limit	Although TPIPAS has been opened up to all industries, the pertinent cost subsidy targets are limited to those who transact with consumers through websites and who have registered with the authorities at the Ministry of Economic Affairs within the territory of the Republic of China
Number of Enterprises that Have Already Obtained a Privacy Mark	13	13,343	Fewer than Japan by 13,330
International Cooperation	None	<ol style="list-style-type: none"> 1. Jointly promoted the "Mutual Recognition Plan" with U.S. BBBOnline in 2001 (cooperation was terminated in June 2008) 2. Reached agreement on "Information and Communication Association" with the Republic of Korea in September 2002 for the simultaneous release of the "Mark of Mutual Recognition" in addition to the "Privacy Mark" and "Electronic Privacy Mark" issued by each side 3. Cooperated with Dalian, China, in June 2008 to attain "PIPA-P-Mark Mutual Recognition." 	Taiwan does not yet have a case of international cooperation

3. Study Method and Design

3.1 Study Method

This study investigated the experts who have experience of the implementation of TPIPAS, DP Mark, and the third-party payment service in order to suggest better methods for the Government. In addition, this study, incidentally, investigated the

views of different enterprises on the third-party payment system and on personal data privacy protection. Therefore, the research processes of this study started with a literature review in which foreign and domestic documents pertinent to the study were collected, including documents related to the process of amending personal data protection laws and those documents used by all major nations to promote per-

sonal data protection administration systems, privacy protection marks, and third-party payment privacy protection. After analyzing the divergent subjects across the entire set of documents, interview questions and outlines were designed (e.g., if Government enables enterprises to enjoy lower premium discounts, will those enterprises apply for a privacy mark?), and expert interviews were conducted with selected interviewees.

This study seeks to gain an insight into the problems encountered by experts with actual counseling experience of enterprises brought into TPIPAS and that applied for a DP Mark and third-party pay-

ment service personal data protection. By studying an amalgam of related discussion topics in international practices, it is anticipated that the relevant system can be perfected.

3.2 Study Targets

This study selected four interviewees from units registered as TPIPAS counseling agencies and enterprises that had already obtained a DP Mark. The experts who were interviewed were qualified as TPIPAS personal data internal evaluators or verifiers. The backgrounds of the invited experts are shown in Table 2.

Table 2: Background Information on Expert Interviewees Invited to Take Part in This Study

Expert Code Name	Service Unit	Job Title	Relevant License or Qualification	Seniority
Expert 1	Business Management Consulting Firm	Assistant Manager	CISA, CISM, CGEIT, CRISC, TPIPAS Administrator and Internal Evaluator	18
Expert 2	Accounting Firm	Assistant Manager	BS10012, ISO20000, ISO22301, TPIPAS Administrator and Internal Evaluator	6
Expert 3	Computer Parts Manufacturing Company	Manager	CISA, ISO20000, ISO27001, ITIL Foundation, CIW Security Analysis, MCSE and TPIPAS Administrator and Internal Evaluator	8
Expert 4	Digital Technology Development Company	Manager	TPIPAS Administrator and Internal Evaluator	5

4. Analysis and Discussion of Study Results

This study first collected information on the formulation and promotion of personal data protection laws, systems, and privacy marks used by international organizations and major nations. The study then used Japan as a comparison target as it has over ten years of experience in promoting relevant protection systems. Interview topics were designed based on differences at the system level, execution level, and legal system level, which enhanced the interview and collection of suggestions

by various nations on third-party payment personal data protection, a topic which is currently attracting widespread attention.

4.1 Expert Interview Process and Analysis of Results

Following 90 minutes for each expert interview, this study collected and compared the views and perspectives of the experts on TPIPAS implementation to date. The results are summarized in Table 3.

In addition, the experts' views focused on the importance and impact of third-party payment personal data protection are summarized as Table 4.

Table 3: Expert Interview Results and Key Summary Explanations

Expert Views	Topic	Explanation
Points of Agreement	1. Cost Subsidy Measures	If the Government can propose a corresponding subsidy program to the industries it intends to bring into TPIPAS, it would provide an enormous incentive.
	2. Need to Strengthen Advocacy and Widened Promotion	On advocacy, the interviewees believed that TPIPAS is not widely known and that the Government should forcefully and widely advocate for TPIPAS. The Government should also raise the training participation quota so that willing enterprises can send staff to participate in training and attain real benefits.
	3. Need to Set Clear Criteria for Essential Implementation Items	Regarding the execution requirements for verification, TPIPAS only outlines the standard without setting out the approach, which makes it impossible for enterprises to grasp the scope of verification and leads to hesitance in DP Mark application.
	4. Professionalism of Verification Personnel	In terms of the professionalism of verification personnel, all agreed that personnel with a legal background should not hold an inspection role because they lack a business background and cannot conduct inspections based on industry characteristics.
	5. Need to Form Independent Dedicated Agencies	It is only by forming independent dedicated agencies that a system can be truly established and the goal of personal data protection can be achieved, especially when trying to gaining widespread trust in the agencies' public trust and professionalism.
	6. International Cooperation to Promote the "Mark of Mutual Recognition"	If TPIPAS can promote the "Mark of Mutual Recognition" through international cooperation, it would provide a strong incentive for industry. Real incentive can only be attained if serious consideration is given to ensure that the nation sharing the mutual authentication mark is one of interest to the industry.
Points of Disagreement	1. Formation of Verification Agencies	Two of the four interviewees believed that verification agencies must be formed and that units to check standards should be separated from verification units to avoid conflict of interest. The other two interviewees thought the professionalism of the verification personnel was important, not whether verification units were formed.
	2. Need to Truly Execute Severe Punishment to Protect the Interests of the People	Some interviewees suggested that severe punishment must be implemented to enthruse the public into attaching importance to the issue. However, most interviewees believed that even though severe punishment would draw widespread attention, there was no direct relationship with joining TPIPAS.
	3. Suggestions for International Transmission Practices	Some interviewees suggested that an agency dedicated to setting relevant standards on international transmission should be formed. However, most interviewees believed there was no need to form any agency. They thought actual demands could be better met by having the Ministry of Justice present supporting practices and principles and letting the authorities in charge set clear standards on security areas according to individual industries.
	4. Excessive Administrative Inspection Intervention	Most people did not have misgivings about excessive intervention when necessary, or when there was apprehension about a violation of law. The administrative bodies could send in personnel carrying identification so as to conduct inspections. Interviewees only expressed concern about the level of professionalism of the inspection personnel.

Table 4: Summary Table Integrating Experts' Views on Third-party Payment

Topic	Explanation
1. Exclusive Laws and Regulations	<p>Foreign: Advanced foreign nations all placed great importance on the progress of E-commerce and had already formulated exclusive laws and regulations to standardize third-party payment and privacy protection. The United States is more unique as each state set its own laws, but the federal government had drawn up the Money Services Act as a parent law for the states to follow.</p> <p>Taiwan: Taiwan lagged far behind, it promulgated on February 4, 2015.</p>
2. Popular Promotion	<p>Foreign: There is a great deal of civilian demand for E-commerce across all nations. In many countries, civilians took the lead on implementation but were hindered by legal issues, which then drove the government to push for the formulation of special laws.</p> <p>Taiwan: Although there was strong domestic demand for E-commerce, it was hindered by national political factors and various cognitive viewpoints in official discussions. These issues made it impossible in prior years for civilians to effectively urge the Government to promote special laws, creating a backlog.</p>
3. Authorities	<p>Foreign: In most foreign nations, the government unit overseeing financial supervision is in charge. As third-party payment involves important aspects, such as electronic transaction security, financial systems, and personal data protection, the "public trust" and "regulatory mechanisms" must be authoritative and equitable.</p> <p>Taiwan: Same mode as foreign nations. The Financial Supervisory Commission must be trusted as an equitable authority.</p>
4. Personal Data Protection	<p>Foreign: All nations have set dedicated E-signature laws and regulations for protection at a system level. Moreover, some nations have also promoted protection mechanisms such as electronic recognition to strengthen personal data protection.</p> <p>Taiwan: Already implemented Personal Data Protection Act, though no E-signature law has yet been established.</p>

In the analysis of the 14 topics based on the expert interviews, the relatively non-controversial topics were corporate policy, the number of career training-qualified professionals, integration of verification and insurance systems, difficulties in the execution of PDCA (Plan-Do-Check-Act), establishment of an

effective measurement mechanism and formation of related organizations. Therefore, only a summary of the authors' consensus explaining the main suggestions by the experts, and a further comparative analysis of differences with current international practices are shown in Table 5.

Table 5: Expert Opinions and Comparative Analysis with International Practices

Issue	Collected Expert Opinions	Comparative Analysis with International Practices
Cost Subsidy Measures	If the Government needs to propose related subsidy bills to encourage businesses to be brought into TPIPAS, it can also increase the level of public trust in TPIPAS.	<p>Cost Subsidy</p> <p>Although there is no relevant international document on cost subsidy measures by various governments to encourage companies to be brought into a personal data protection administration system, Taiwan's TPIPAS is only a year old and needs strong government support and promotion. Therefore, the proposal of related subsidy bills would be a positive encouragement to attract companies to join TPIPAS.</p>
Strengthening Advocacy and Widening Promotion	At present, TPIPAS is not widely known. Higher quotas should be released for personnel training in	<p>Strengthening and Widening Advocacy</p> <p>In the initial stage of system implementation, Japan had hundreds of applicants. Through continuous training, the numbers have expanded to approximately 2,000 per</p>

Issue	Collected Expert Opinions	Comparative Analysis with International Practices
	particular, so that willing industries can send staff to participate in training and attain real benefits.	year. To date, 13,343 companies have joined (Ministry of Economic Affairs of ROC, 2015). Therefore, in terms of expanding promotion and training, as long as the public has a certain level of trust in the privacy mark, they will take the initiative and demand to be brought into the relevant system.
Safeguarding Public Interests by Implementing Penalties	Most of the experts who were interviewed believed that severe punishments were not linked to joining TPIPAS, and that a system of severe punishments would cause great concern. The law should clearly state the regulations for all circles to follow.	Implementing Penalties The Google Street View car in Germany collected personal data and was fined by the German Government, reflecting the fact that the Federal Data Protection Act penalties were too light. Europe is also discussing the possibility that future common data protection regulations will impose a fine of up to 2% of the company's annual revenue (iThome, 2013). It was observed that, currently, there are few domestic or foreign judicial examples of the aftermath of personal data leaks. However, if a maximum fine is applied in the future, it will cause great concern in all circles.
Clarity in Setting Standards for Key Implementation Items	In terms of implementation clarity, the interviewees unanimously believed that outlining the standards for implementation items without establishing an approach made it impossible for businesses to grasp the scope of verification and led to hesitance in privacy mark application.	Setting Standards for Key Implementation Items The Japan Users Association of Information Systems (JUAS), Japan's verification agency, can convene the entire body of verification personnel to hold discussions on verification work so as to produce a consistent view on verification standards (JUAS, 2014). Taiwan currently has only one verification agency, held by the Center for Science and Technology Law. Moreover, there are only a few verification personnel. In this situation, it is even easier to reach consensus. Therefore, Taiwan should imitate Japan's approach and convene a monthly meeting to establish clear verification standards for verification personnel to implement and follow.
Formation of Verification Agencies and Professionalism	Two of the four respondents interviewed believed that verification agencies should be formed to avoid conflict of interest. In terms of the professionalism of the verification personnel, all thought that the agencies should consist of professionals who understood industry characteristics.	Formation of Verification Agencies Japan's investigation agencies are equivalent to Taiwan's verification agencies; they are designated by the three standard classes of "organization member," "industry category," and "area" (JIPDEC, http://www.jipdec.or.jp/). It was observed that Japan had attained a certain level of maturity in the formation of verification agencies and professionalism in verification personnel. The formation of verification agencies in Taiwan is inevitable. The quality of verification could be increased through competition and cooperation between two or more verification agencies. These agencies should consist of personnel with various professional backgrounds so as to achieve professional audit quality.
Suggestions for International Transmission Practices	Because each industry has a different format, the same standard cannot be applied to all. Actual demands could be better met if the Ministry of Justice presented supporting practices and	International Transmission United Kingdom: By referencing related regulations in the EU Directive, the UK Data Protection Act of 1998 established relevant restrictions on the international transmission of personal data by data administrators, which shows that the United Kingdom was already offering a certain level of guarantee on internationally transmitted per-

Issue	Collected Expert Opinions	Comparative Analysis with International Practices
	principles, and the authorities in charge then set clear standards for security areas according to the industry category so that each business can follow the standards.	sonal data. Taiwan may refer to relevant practices by first having the Ministry of Justice present supporting practices and principles, then turning to the authorities in charge to establish security standards according to the requirements of an individual industry.
Excessive Administrative Inspection Intervention	Most interviewees did not have misgivings about excessive administrative intervention when it was necessary for authorities to enter businesses to conduct inspections; However, they asked whether the inspection personnel would be professionals with the relevant industry background.	Administrative Inspection Authority Although no nation in the international arena has established administrative inspection clauses in personal data-related statutes, many major international nations have established independent dedicated personal data agencies and relevant inspection authorities. Therefore, if Taiwan forms dedicated personal data agencies, the relevant inspection personnel can no longer concurrently work as the personnel of a central authority. Experts in various fields would hold the inspection personnel post, which would be more convincing for public trust and professionalism.
Formation of Independent Dedicated Agencies	The interviewees unanimously believed that it is only by forming independent dedicated agencies that a system can be truly established to achieve the goal of personal data protection, especially in gaining everyone's trust in terms of public trust and professionalism.	Formation of Independent Dedicated Agencies Japan: Established a minister in charge. United States: Established privacy protection commissions. United Kingdom: Established information technology councils. Germany: Established federal information protection commissioners. Almost all major nations have established dedicated agencies for personal data protection, but this role is currently considered as non-dedicated business in Taiwan. Therefore, relevant matters cannot be handled immediately, which easily calls professionalism into question. It is only by forming independent dedicated agencies that a system can be truly established to achieve the goal of personal data protection.
International Cooperation to Promote the Mark of Mutual Recognition	If international cooperation can promote the "Mark of Mutual Recognition," it would be a strong incentive for industry, especially E-commerce. However, real incentive can only be achieved if serious attention is given to ensuring that any nation sharing the Mark of Mutual Recognition is of interest to industry.	International Cooperation Japan: Reached agreement on "Information and Communication Association" with the Republic of Korea in September 2002 for the simultaneous release of the "Mark of Mutual Recognition" in addition to the "Privacy Mark" and "Electronic Privacy Mark" issued by each side. Cooperated with Dalian, China, in June 2008 to attain "PIPA—P-Mark Mutual Recognition" (Kuo, 2008). It was observed that Taiwan has not yet signed any mutual recognition mark with other nations. If this step was one of the promotion goals, it would help industry as well as Taiwan's efforts to widen the promotion of the privacy mark.
Third-party Payment Status and Personal Data Protection	As this process has been hindered by incomplete laws and regulations and government neglect of the practical need for third-party payment in	All nations passed special laws many years ago to regulate the third-party payment system and to protect transaction security and personal data security. However, China, for example, did not have clear specifications on personal data protection. Taiwan: Has not yet completed special laws to regu-

Issue	Collected Expert Opinions	Comparative Analysis with International Practices
	E-commerce, the Government should accelerate the legislative process of third-party payment and support the implementation of personal data protection.	late third-party payment but has already investigated and deliberated on amending the law. In addition to the amount of cash flow payments, Taiwan needs to examine the actual requirements of enterprises to set out sufficient payment amounts. Moreover, Taiwan needs to coordinate better with the Personal Data Protection Act, support the implementation of legal clauses, and formulate an audit system to build the role of an equitable third party that can be trusted by the public.

4.2 Discussion and Suggestions at the System Level, Execution Level, and Legal System Level

Through expert interviews, this study has gained an insight into the implementation problems of the system in force. It now proposes discussion topics and suggestions taken from the expert opinions in Table 6 at the system level, execution level, and legal system level.

From Table 3 to Table 6, the international practices have been summarized from personal data protection laws, systems, privacy marks, and third-party payments by international organizations and major nations. The descriptions of the current situation in Taiwan and the relevant recommendations are summarized from experts' opinions.

Table 6: Discussion Topics and Suggestions at the System Level, Execution Level, and Legal System Level

Discussion Topic	Suggestions Raised by Experts
System Level	
Formation of Verification Agencies and Professionalism	The existence of two or more verification agencies can improve verification quality through competition and cooperation. Verification personnel should have varying professional backgrounds to attain professional audit quality.
Cost Subsidy Measures	Taiwan's TPIPAS is only a year old and needs strong government support and promotion. Therefore, the proposal of related subsidy bills would be a positive encouragement to attract industry to join TPIPAS.
International Cooperation to Promote "Mark of Mutual Recognition"	Although Taiwan has not yet signed any mutual recognition marks with other nations, if this step can be one of the future promotion goals, it would be a help both to industry and to Taiwan's efforts to widen the promotion of the privacy mark.
Formation of Independent Agencies with Specific Responsibilities	It was suggested that Taiwan should imitate other nations in the world and form independent dedicated agencies to enable the establishment of a system to implement personal data protection.
Accelerate the Legislative Process of Third-party Payment	It is only by accelerating the legislative process and establishing an assurance mechanism with public trust that E-commerce and personal data security will be completely safeguarded.
Execution Level	
Strengthening Advocacy and Widening Promotion	Strengthen and widen the level of advocacy and increase training quotas. Allow the public to have a certain level of trust in the privacy mark. To gain the trust of the public, business units would naturally take the initiative and demand to be brought into the relevant system.
Clarity in Setting Standards for Key Implementation Items	Clarity in setting key implementation items can let verification personnel and industry comply with very important parts of TPIPAS.
Third-party Payment References from Other Nations and	Taiwan should refer to other nations on third-party payment laws and regulations, integrate the experience of industry, and continually

Discussion Topic	Suggestions Raised by Experts
Advocacy Strengthening	revise such laws and regulations.
Legal System Level	
Safeguarding Public Interests by Implementing Penalties	In the future, if the maximum fine is applied, it would definitely attract a high degree of public attention. The need to apply the maximum fine must be prudently judged based on conditions, such as clarity in setting policy and the degree of intentionality in leaking personal data so as to avoid creating panic in industry.
Suggestions on International Transmission Practices	It was suggested that the Ministry of Justice should first present supporting practices and principles and then turn to authorities in charge to set security standards according to the requirements of individual industries.
Excessive Administrative Inspection Intervention	If dedicated personal data agencies are formed, the inspection personnel can no longer concurrently work as the personnel of a central authority. The inspection personnel position would revert to being held by experts in various fields, which would be more convincing for public trust and professionalism.
Draft Bill on the Administration of Electronic Payment Agencies	Third-party payment agencies should be cautious when building a personal data identification and recognition mechanism during member registration, should strictly store personal data and transaction records for at least five years, and control leak prevention.

5. Conclusions and Future Studies

5.1 Conclusion

This study collected the practices from Japan and other international practices, before creating the expert interview questions. These questions were designed to gather experts' opinions on better operations for Government so as to implement TPIPAS, DP Mark, and third-party payment personal data protection. Subsequent to a comparative analysis of the expert interview results and international practices, this study recommends that the Government should take the following steps: 1) provide subsidy measures for the relevant system and strengthen advocacy; 2) form independent agencies with specific responsibilities; 3) draw up clear checklist items; and 4) implement provisions to support third-party payments and formulate an inspection system that builds public trust in the role of an equitable third party in coordination with the Personal Data Protection Act. It was hoped that suggestions could be raised from the expert opinions and an amalgam of related topics on international practices so that relevant systems could operate better. The conclu-

sions of suggestions for Government are summarized below:

(1) Organization and professionals:

- The formation of verification agencies is inevitable. The quality of verification could be increased through competition and cooperation between two or more verification agencies.
- Establish independent dedicated agencies to implement personal data protection.
- Imitate Japan's practice of convening monthly meetings to set clear verification standards for verification personnel to execute and for businesses to follow.

(2) International cooperation:

- Cooperate with nations that frequently work with E-commerce to promote the "Mark of Mutual Recognition" and to strengthen trans-border privacy protection and international cooperation.

(3) Promotion and Training:

- Taiwan's TPIPAS is only a year old and needs strong government support and promotion.
- The Government should strengthen and widen the level of advocacy and

increase training quotas to let the relevant systems meld into the lives of all citizens.

(4) Law and regulation adjustment:

- A decision on whether to adopt the maximum fine mechanism for the related penalty should be judged prudently, with a clear focus on whether the behavior was intentional.
- The Government should accelerate the third-party legislative process as soon as possible, properly support personal data protection measures, and circumspectly provide appropriate privacy protection to the personal data of consumers.

5.2 Study Limitations

- (1) Limitations of the literature review: The major nations discussed in this study were primarily limited to representative nations in each region (United Kingdom, Germany, United States, Japan, and Taiwan). Given the scope of an in-depth investigation into the implementation status of Taiwan's related system (TPIPAS), it was impossible to list each nation that had already implemented personal data protection.
- (2) Limitations in the scope of the study: The units invited to take part in the interviews were TPIPAS counseling agencies (10 at present) and businesses that had obtained the privacy protection mark (13 at present). Due to time restrictions, only four were in the pilot stage, during which participating agencies and businesses became interview targets.

5.3 Future Studies

It is suggested that follow-up studies make comparisons with other international standards (for example, BS10012 and ISO27001) and find situations in which the system was insufficient or lacking. This would encourage even more practical corporate experience for a rolling review of TPIPAS so that it becomes a standard with an international following.

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