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What Influences People to Transfer from One Technological Service to Another: Examples of Online and Mobile Banking

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Abstract

Given that the adoption of a single technological service or product, which has been investigated comprehensively in recent decades, this study attempts to explore what influences people to transfer (or not transfer) from one technological service or product to another. Because relevant literature suggests that individual behavior can be traced, predicted, and explained by the theories of social psychology, this study employed the relative comparative concept and the theory of planned behavior with two economic effects to develop a research structure investigating what influences people to transfer from one technological service to another. Online and mobile banking were chosen as an illustrative example. Since they pertain to both technology-enabled services and web-based services, the findings in this study may also be applicable to the transition or selection between competing alternatives such as software platforms, Web browsers, and mobile messaging apps. The study may advance current theoretical basis about investigating determinants of influencing consumers to transfer from one technological service or product to another.

Keywords: Technological services, mobile banking, online banking, theory of planned behavior

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影響消費者轉換科技服務的原因：以網路銀行與行動銀行為例

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摘要

由於過去數十年來，探討科技服務或產品採用與否的相關研究已經很多，因此，本研究嘗試探討影響消費者從某一個科技服務或產品轉換到另一個科技服務或產品的因素。奠基於理性行為理論主張：消費者的行為是可以被解釋、預測的，因此本研究利用計畫行為理論、二個經濟效應與相對比較的概念，去建構研究架構，並用此研究架構去探討、可能影響消費者從某一個科技服務或產品轉換到另一個科技服務或產品的原因。由於網路銀行與行動銀行同時具備科技服務與網站服務的特性，本研究的發現，或許也可應用到其他彼此之間，互相有競爭性、替代性的科技服務或網站服務的案例中，比如：軟體平台、瀏覽器。此外，本研究也可以擴展目前以理性行為為理論基礎的研究，從集中於探討：單一科技服務或產品的採用與否，擴展到去探討互相有競爭性、替代性的科技服務或產品彼此之間的採用轉換。

關鍵詞：科技服務、行動銀行、網路銀行、計畫行為理論

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1. Introduction

Understanding what motivates consumers to adopt a new technological service or product has long been a critical topic in the information systems research. This is chiefly because the likelihood of success when designing and commercializing a novel technological service or product is highly related to understanding what encourages or discourages consumers to adopt technological services or products. Therefore, numerous studies in the past decade have investigated the factors that influence people's decisions to use a novel technological service or product. However, a literature review indicates that previous studies have excessively focused on the adoption of a specific technological service or product and have neglected to investigate the transition between technological services or products. Accordingly, this study attempts to investigate what influences people to transfer from one technological service to another that provides the same or similar functions and purposes.

Although what motivates consumers to transfer from one technological service or product to another is rarely studied, a literature review shows that this study is not entirely unique. A few scholars have investigated the selection between two or three alternatives, such as three self-service banking channels (Curran & Meuter 2005), two instant messaging services (Lin et al. 2006), and two web application platforms (Lin et al. 2011). Contrasted to the little academic literature, many market surveys have reported the following two scenarios. The first is that consumers continue using current services despite believing that the new services/products are good or desirable, such as analog TV vs. digital TV, Windows XP vs. Windows Vista, and current iPad 2 vs. new iPad in Asia. Conversely, the second scenario is that consumers choose to switch to another service/product despite being satisfied with the current services or products, as demonstrated in the transition from BETA to VHS, from ICQ to MSN, and from Internet Explorer to Firefox or Chrome in Europe.

The above discussion reveals that understanding what causes consumers to transfer from one service or product to another is as important as understanding the adoption of a specific service or product. Particularly, for businesses to customize marketing strategies or research developments of a new technological service or product that cater to different customer segments, understanding consumer preference or choice from a current service or product to a competing one that has similar functions and purposes is crucial and required. Therefore, given that the adoption of a single service or product,

which has been investigated comprehensively in recent decades, there is a potential need to explore what influences people to transfer from one technological service or product to another.

2. Theoretical Basis

Since the better the process of consumer adoption of a novel technological service or product is understood, the higher the chance of success in commercializing and selling the service or product to consumers. Numerous studies have been performed on this topic in the past decades. Through extensively reviewing the literature, this study discovered that the vast majority of these studies are based on social psychology theories. This phenomenon is chiefly because individual behavior is traceable, predictable, and explainable, as social psychology theories contend (Ajzen & Fishbein 1980; Ajzen 1991; Yu & Tao 2007). Therefore, theory of reasoned action (TRA), technology acceptance model (TAM), theory of planned behavior (TPB), innovation diffusion theory (IDT), and their variations have been widely employed as the research basis for investigating why individual are willing or unwilling to accept a new technological product or service.

In TRA, the attitudinal beliefs refer to how individual would favorably or unfavorably view the consequences of performing the behavior and the evaluation was usually expressed as the individual possibility of executing the behavior. The subjective norm (SN) is the sum of normative beliefs formed from the social influence, and refers to how reference group would view the behavior and the evaluation was usually expressed as the degree of motivating individual to comply with these reference groups. Although the strong generalization of TRA varies across studies, TRA has limitation in analyzing behaviors over which people have incomplete volition (Ajzen 1991). To explain non-volitional behaviors, Ajzen proposed an additional construct, called perceived behavior control (PBC), for the TRA, thus forming TPB. Since then, various studies have applied TPB to predict behavioral intention (BI) and actual behavior, and demonstrated that TPB is better and more robust than TRA is (Madden et al. 1992; Chan & Lu 2004).

Notably, this paper is intended for a mixed audience, including academics and practitioners, not all of whom are familiar with the social psychology theories that underpin the theoretical basis for the research. Therefore, TPB, TRA, TAM, and IDT with their meanings are tabulated in Appendix 1, so that readers can check the meaning

of these as they proceed through the paper. Besides, as mentioned in the Introduction Section, although research on what motivates consumers to transfer from one technological service to another is scant, even less research has examined consumers' preferences among two or three alternatives. A review of literature indicates that Laroche and Sadokierski (1994), Dabholkar (1994), Candel and Pennings (1999), and Berg, Johson and Conner (2000) applied the TPB to explore choice behavior among several non-technological services or alternatives.

Curran and Meuter (2005) used the TAM to explore the consumer selection among ATM-banking, Tele-banking, and online banking. Lin et al. (2006) employed the TPB and the relative comparative concept to explore consumers' choices between ICQ and MSN. Recently, Lin et al. (2011) used the extended TPB to explain the choice between Java and Microsoft. Given that these studies illustrated that the TPB is effective for predicting what influences consumers to make choices between competing alternatives, this study used TPB and the relative comparative concept as a theoretical basis to investigate what influences people to make a transition between technological services.

3. Hypothesis Development

Comparing customer perceptions between online and mobile banking, Laukkanen (2007) conducted 20 in-depth interviews with bank customers and concluded that the most noted differences are the convenience of location-free access and the visual appearance of mobile devices to access the services. By gathering 2,675 responses from customers at a large Finnish bank, Laukkanen and Pasanen (2008) discovered that online and mobile banking users differ demographically in age and gender. By drawing 681 samples from the population of Singapore, Riquelme and Rios (2010) identified that consumers generally have their own preferred channels (i.e., branch banking, ATM, online banking, Tele-banking, and mobile banking) when accessing banking services, which is also consistent with another research conducted in Thailand (Sripalawat et al. 2011).

Considering remote villages where limited computers connected to the Internet, Cruz et al. (2010) observed that Brazilian banks have significant potential to offer mobile banking services to consumers living in rural areas. Similarly, Dasgupta, Paul and Fuloria (2011) noticed that the emergence of mobile banking may give Indian banks a favorable commercial opportunity because of limited Internet access compared with significant cell phone penetration levels in rural areas. Riquelme and Rios (2010)

commented that the main customer segments of mobile and Internet banking might be dissimilar. Dasgupta et al. (2011) pointed out that mobile banking early users might not come from current Internet banking users.

Consequently, the rapid advances in 4G wireless communication, smart phones, tablet computers, and the intensive use of cell phones have caused banks to realize that continual and fast advances in wireless communication technologies and devices have stimulated and created various commercial opportunities for banks. Therefore, banks in Taiwan have recently spent large amount of money on developing mobile banking systems. In this line of thinking, online banking is defined as "the provisioning of information and services by a bank to its customers through the Internet", whereas mobile banking is defined as "the provisioning of information and services by a bank to its customers through wireless channels".

Taken the above together, although both online and mobile banking are frequently deemed as "electronic banking" by the public, studies show that online and mobile banking may differ regarding service channel characteristics, customer resources, and user preferences. Accordingly, in accordance with TPB structure, this work posits the following hypotheses based on the relatively comparative concept:

H1: Perceived relative BI significantly influences people to transfer from online to mobile banking;
H2: Perceived relative attitude significantly influences individual relative BI;
H3: Perceived relative SN significantly influences individual relative BI;
H4: Perceived relative PBC significantly influences individual relative BI;

After extensively reviewing the literature on the adoption of online banking and mobile banking, this study summarized the key influences in a belief-centric manner as shown in Table 1 which displays the relationships between TPB beliefs and the adoption of Internet or mobile banking. Notably, except for the psychological beliefs, this work also noticed that some studies found the economic effects to be an influential factor for people to use Internet or mobile banking. For example, Sathye (1999) and Polatoglu and Ekin (2001) identified that cost savings have a significant influence on an individual's willingness to bank online. In contrast, Kuisma, Laukkanen and Hiltunen (2007) found that economic barriers are a critical reason for resistance against banking online by using a mean-end approach.

Table 1：Key factors under TPB beliefs for the adoption of online/mobile banking

Beliefs	Internet Banking	Mobile Banking
Attitude	**Relative advantage** (Liao et al. 1999; Shih and Fang 2004; Hernandez and Mazzon 2007) **Usefulness** (Liao and Cheung 2002; Wang et al. 2003; Chan and Lu 2004; Eriksson et al. 2005; Curran and Meuter 2005; Jaruwachirathanakul and Fink 2005; Guriting and Ndubisi 2006; Cheng et al. 2006; Amin 2007; Yiu et al. 2007; Eriksson and Nilsson 2007; Guriting et al. 2007; Qureshi et al. 2008; Aldas-Manzano et al. 2009; Yaghoubi and Bahmani 2010) **Convenience** (Liao and Cheung 2002; Gerrard and Cunningham 2003; Kolodinsky et al. 2004; Wan et al. 2005; Lee et al. 2005) **Easy-of-use** (Sathye 1999; Liao et al. 1999; Wang et al. 2003; Kolodinsky et al. 2004; Chan and Lu 2004; Eriksson et al. 2005; Curran and Meuter 2005; Guriting and Ndubisi 2006; Cheng et al. 2006; Pikkarainen et al. 2006; Amin 2007; Hernandez and Mazzon 2007; Yiu et al. 2007; Guriting et al. 2007; Qureshi et al. 2008; Hua 2009; Yaghoubi and Bahmani 2010)	**Perceived advantage** (Brown et al. 2003; Puschel et al. 2010; Khraim et al. 2011; Lin et al. 2011) **Usefulness** (Luarn and Lin 2005; Amin et al. 2008; Riquelme and Rios 2010; Koenig-Lewis et al. 2010; Sripalawat et al. 2011; Dasgupta et al. 2011) **Location-free convenience** (Yang 2009) **Cost effective** (Yang 2009) **Fulfill personal needs** (Yang 2009) **Easy-of-use** (Luarn and Lin 2005; Amin et al. 2008; Puschel et al. 2010; Dasgupta et al. 2011; Lin et al. 2011) **Perceived barriers** (Laukkanen et al. 2007) **Complexity** (Cruz et al. 2010; Khraim et al. 2011) **Compatibility** (Puschel et al. 2010; Koenig-Lewis et al. 2010; Khraim et al. 2011; Lin et al. 2011) **Perceived barriers** (Laukkanen et al. 2007) **Compatible/suitable devise** (Cruz et al. 2010)

	User-friendliness (Liao and Cheung 2002; Wan et al. 2005) **Complexity** (Gerrard and Cunningham 2003; Shih and Fang 2004; Ndubisi and Sinti 2006) **Difficulty** (Mansumitrchai and Al-Malkawi 2011) **Compatibility** (Gerrard and Cunningham 2003; Kolodinsky et al. 2004; Shih and Fang 2004; Lee et al. 2005; Ndubisi and Sinti 2006; Kuisma et al. 2007; Hernandez and Mazzon 2007; Mansumitrchai and Al-Malkawi 2011) **Inertia** (Sathye 1999; Gerrard et al. 2006) **Habit** (Kuisma et al. 2007) **Speed** (Liao and Cheung 2002; Shih and Fang 2006)	
Subjective Norm	**Awareness** (Sathye 1999), **Image** (Liao et al. 1999; Kuisma et al. 2007; Hernandez and Mazzon 2007) **Visibility** (Liao et al. 1999; Hernandez and Mazzon 2007) **Reference group** (Karjaluoto et al. 2002; Laforet and Li 2005) **Observability**	**Subjective norm** (Puschel et al. 2010; Sripalawat et al. 2011) **Interpersonal word-of-mouth** (Suoranta and Mattila 2004) **Awareness** (Laforet and Li 2005) **Normative influence** (Amin et al. 2008) **Social morms** (Riquelme and Rios 2010) **Visibility**

	(Kolodinsky et al. 2004) **Friends** (Chan and Lu 2004) **Relatives** (Chan and Lu 2004) **Peers** (Chan and Lu 2004) **Normative influence** (Shih and Fang 2004) **Subject norm** (Shih and Fang 2006) **Families** (Chan and Lu 2004) **Opinion leader** (Lassar et al. 2005)	(Puschel et al. 2010) **Image** (Dasgupta et al. 2011)
Perceived Behavioral Control	**Prior experiences in computer** (Karjaluoto et al. 2002; Laforet and Li 2005) **Prior experiences in technology** (Karjaluoto et al. 2002; Laforet and Li 2005) **Prior experiences in computing** (Guriting and Ndubisi 2006) **PC competence** (Gerrard and Cunningham 2003) **Computer self-efficacy** (Wang et al. 2003; Guriting and Ndubisi 2006) **Self-Efficacy** (Shih and Fang 2004; Hernandez and Mazzon 2007) **Experience** (Lee et al. 2005) **Internet Self-efficacy** (Lassar et al. 2005) **Lack of knowledge**	**Experiences in computer** (Laforet and Li 2005) **Experiences in technology** (Laforet and Li 2005) **Perceived Self-Efficacy** (Luarn and Lin 2005; Sripalawat et al. 2011; Dasgupta et al. 2011; Khraim et al. 2011) **Aging** (Laukkanen et al. 2007) **Age and gender** (Laukkanen and Pasanen 2008) **Perceived behavioral control** (Puschel et al. 2010) **Competence** (Lin et al. 2011)

	(Aslam et al. 2011) **Behavioral Control** (Yaghoubi and Bahmani 2010) **Access** (Polatoglu and Ekin 2001) **User involvement** (Liao and Cheung 2002) **Facilitating condition** (Shih and Fang 2004) **External environment** (Jaruwachirathanakul and Fink 2005)	

By interviewing consumers in person, Luarn and Lin (2005) identified perceived financial cost as a negative effect on behavioral intention to use mobile banking. Yang (2009) argued that mobile banking adoption is highly encouraged by economic factors such as advantageous transaction service fees or discouraged by economic considerations such as concerns on basic fees for connecting mobile banking. Through analyzing 196 respondents in the Sultanate of Oman, Sadi et al. (2010) noted that high cost was crucial for unwilling to use mobile banking. Cruz et al. (2010) empirically concluded that men are more concerned on the cost of Internet access and service fees than women are when using mobile banking services, and cost was the frequent factor prompting customers to avoid the use of mobile banking.

In contrast to that economic theory has received less attention on the adoption of electronic banking, economic theory has been exploited to investigate e-marketplace adoption (Bakos 1991; 1997; Strader & Shaw 1999; Benslimane et al. 2005; Yu 2006; Zhu et al. 2006; Yu & Tao 2007; Au & Kauffman 2008).The emergence, adoption and growth of the e-marketplace depend significantly on economic effects, concluded by these studies. Attracting customers to use e-marketplace, retaining customers to continue using current e-marketplaces, or pushing customers to switch to another e-marketplace are strongly affected by economic incentives, critical mass, network externalities, transition cost, and/or path dependency.

A technology or service is considered to have a transition cost between using and discarding it as long as it has a lock-in characteristic caused by incurring non-recoverable, termination or switch costs (Weiss & Anderson 1992; Heide & Weiss

1995; Shapiro & Varian 1998; Reimers & Li 2005). A transition cost occurs when users switch service (Hazlett et al., 2006), as illustrated in the transition from BETA users to VHS users (Dennis & Reinicke 2004). Potential users choosing between technology-enabled services must consider whether the service that is available today will become unavailable or obsolete service in the future, especially in an environment where technology-enabled services evolve stochastically over time. Consequently, banking services could incur transition costs when switching between service channels. The following hypothesis is presented based on this discussion:

H5: Transition cost significantly influences individuals relative BI regarding the transition from online to mobile banking.

Network externality depicts an economic scenario where a technology's or service's value or appeal increases in correspondence to a rise in the number of consumers (Economides 1996).Markets that are formed from technology or service with network externalities are called network market. The value, effectiveness, and attractiveness of the technology or service in a network market always rise as long as new consumers are added to the market. When the actions of people can impact directly on the economic utility of others, then each person is considered to have a network externality on the behaviors of other people (Allen 1988; Brynjolfsson & Kemerer 1996; Au & Kauffman 2001; Lee et al., 2003; Yu & Tao 2007).

Numerous studies have shown that an inferior technology or service may not be replaced by superior alternatives because network externalities play a critical role in its adoption and use (Choi 1994; Economides 1996; Choi &Thum 1998; Hoppe 2000; Kauffman et al.2000; Au & Kauffman 2001; Gallaugher & Wang 2002; Asvanund et al. 2004). Typical examples of products or services displaying network externality include telecommunication services (Allen 1988), software (Brynjolfsson & Kemerer 1996), and peer-to-peer music-sharing (Asvanund et al. 2004). By examining short messages services, Kim, Park and Oh (2008) and Lin and Bhattacherijee (2008) found that network externality is a significant motivation for people using a new wireless service. Similar examples can be illustrated in instant message services (e.g., ICQ and MSN), electronic mail systems (e.g., Google and Yahoo), and search engines (e.g., Google and Baidu).

Taken the above together, network externalities are an economic scale phenomenon that depicts the utility derived by the consumer from a technology-enabled service.

Consequently, the utility of online or mobile banking will be increased or decreased in correspondence to number of online or mobile banking users. Likewise, network externalities may also exist in mobile phone service networks, computer operating systems (OS), cell phone OS, and App platforms. In line of this thinking, the following hypothesis is posited:

H6: Network externality significantly influences individuals relative BI regarding the transition from online to mobile banking.

4. Constructing Questionaire & Sampling

A critical task for questionnaire-based studies is constructing a valid questionnaire. Because of the limited research related to this study, a focus-group interview and a panel discussion with banking executives and scholars were held to check the elative comparable concept and the economic effects as well as the TPB structure for the transition from online to mobile banking. The presented hypotheses were also analyzed to ensure suitability. The questionnaire items was designed using the following steps to ensure the validity of constructs used in this research: (1) items measuring corresponding constructs were extracted from the literature and reworded to fit the context of the transition from Internet to mobile banking; and (2) banking executives and academics attended a focus-group interview and a panel discussion to examine and reword the survey questions.

The initial questionnaire was improved during the focus group interview and panel discussion. A pre-testing was conducted after ensuring that the research structure and questionnaire clearly reflected the research purpose. Ten respondents participated to double check and verify that the questionnaire was brief and clearly comprehensible. The questionnaire comprised 24 questions that were organized into two sections. The first section contained 18 questions to assess relative attitude, relative SN, relative PBC, transition cost, network externality, and relative BI. All questions in the first section were measured using a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree) as shown in Table 2. The second section was composed of 6 questions. The first question measured actual behaviors to determine if respondents had already transferred from online to mobile banking services. The remaining five questions collected basic data such as gender, age, education level, occupation, and annual income.

Table 2：Constructs and corresponding items

Construct	Corresponding Items	Items Sources
Relative Attitude	In conducting banking affairs, RA1: I think using mobile banking is better than using online banking; RA2: Using mobile banking instead of online banking is a wise idea; RA3: I like using mobile banking rather than using online banking.	Yaghoubi and Bahmani (2010), Sripalawat et al. (2011), Puschel et al. (2010), Riquelme and Rios (2010)
Relative SN	RSN1: People important to me think that I should use mobile banking rather than online banking; RSN2: People close to me think that using mobile banking instead of online banking is better for me; RSN3: Most people in my social network think that it is better to use mobile banking instead of online banking.	Karjaluoto et al. (2002), Chan and Lu (2004), Shih and Fang (2004), Laforet and Li (2005), Amin et al. (2008), Riquelme and Rios (2010),Puschel et al. (2010), and Sripalawat et al. (2011)
Relative PBC	RPBC1: I have more capabilities to use mobile banking than online banking; RPBC2: I have more resources to use mobile banking than online banking; and RPBC3: I have more knowledge to use mobile banking than online banking;	Yaghoubi and Bahmani (2010), Sripalawat et al. (2011), Puschel et al. (2010), Riquelme and Rios (2010)
Relative BI	When dealing with banking affairs (RBI1) I prefer using mobile banking to online banking (RBI2) I would use mobile banking more often than online banking (RBI3) I am willing to recommend mobile banking to others rather than online banking	Venkatesh and Zhang (2010), Luarn and Lin (2005), Sripalawat et al. (2011)
Transition Cost	When using mobile banking, (TC1) Transition from online to mobile banking causes a loss of benefits; (TC2) Transition from online to mobile banking causes a sunk cost; (TC3) Transition from online to mobile banking causesa waste of investment	Heide and Weiss (1995), Klemperer (1995), Shapiro and Varian (1998), and Yu and Tao (2007)

Network Externality	In comparison of online banking and mobile banking, you expect: (NE1) the number of mobile banking users will exceed the number of online banking users; (NE2) the market of mobile banking will be larger than that of online banking; (NE3) the value of mobile banking will be higher than that of online banking.	Farrell and Saloner (1986), Katz and Shapiro (1985; 1992),and Yu and Tao (2007).

Because respondents in most online surveys are young students without or with low income, this study employed the shopping mall intercept method to diversify the distribution of age, occupation and income. Four part-time research assistants were trained and dispatched to sample respondents in several urban areas during the morning, afternoon, and evening of ten weekdays and two weekends to remove potential sampling biases in accordance with previous research suggestions (De Bruwer & Haydam 1996; Yang 2004; Yu 2011).Potential respondents were told prizes to encourage the completion of questionnaires, as suggested by Karjaluoto, Mattila and Pento (2002), Sax, Gilmartin and Bryant (2003), and Yu and Tao (2007).Data obtained from 595 valid respondents during the summer of 2011 were summarized in Table 3.

Table 3：The profile of samples

Categories		Number of Respondents	Percentage
Gender	Male	311	52.3%
	Female	284	47.7%
Age	Less than 20-year-old	14	2.4%
	20-25 years old	56	9.4%
	25-30 years old	88	14.8%
	30-35 years old	49	8.2%
	35-40 years old	68	16.4%
	40-45 years old	76	12.8%
	45-50 years old	48	8.1%
	50-55 years old	44	7.4%
	55-60 years old	68	11.4%
	60-65 years old	48	8.1%
	above 65 years old	36	6.1%

Occupation	Banking/Finance/Insurance	75	12.6%
	ICT/Electronics	57	9.6%
	Biomedical/Hospital	26	4.4%
	Construction/Real Estate	28	4.7%
	Culture/Media	22	3.7%
	General Manufacturing	54	9.1%
	General Service	124	20.8%
	Education	32	5.4%
	Police/Military Service	18	3.0%
	Government Employees	29	4.9%
	Self-Employed (i.e., lawyer, accountant, designer)	7	1.2%
	Student	88	14.8%
	House Keeper	28	4.7%
	Others	7	1.2%
Education	Below Senior High	15	2.5%
	Senior High Diploma	79	13.3%
	Associate Bachelor Degree	148	24.9%
	Bachelor Degree	266	44.7%
	Master Degree	78	13.1%
	Ph.D. Degree	9	1.5%
Annual Income	Less than NT$ 250,000	158	26.6%
	NT$ 250,000 - 500,000	102	17.1%
	NT$ 500,000 - 750,000	170	28.6%
	NT$ 750,000 - 1,000,000	81	13.6%
	Over NT$ 1,000,000	84	14.1%
transferred from online to mobile banking	Yes	175	29.4%
	No	595	70.6%

Table 3 shows that approximately 59.3% of respondents had a bachelor degree or higher, and 311 (52.3%) respondents were men and 284 (47.7%) were women. The top five occupations of respondents were 20.8% in the general service sector, 14.8% was student, 12.6% in the banking/finance/insurance sector, 9.6% in the ICT/electronics

sector, and 9.1% in the general manufacturing. Of the total respondents, 26.6% were younger than 30 years, 45.5% were 30-50 years of age, and 27.9% were older than 50.Approximately 43.7% of respondents had annual incomes below NT$500,000, 42.2% had annual incomesbetweenNT$500,000 and NT$1,000,000, and 14.1% had annual incomes above NT$1,000,000.

5. Data analysis & Hypothese Test

Content validity was verified because all questions measuring the constructs had been adapted from previous studies to fit the transition from online to mobile banking. Cronbach's alpha was used to assess the reliability, composite reliability, factor loadings and the average variance extracted (AVE) were used to assess the convergent validities, and the discriminant validity was assessed by examining if the squared roots of AVE exceed the correlations between all possible pairs of latent variables in accordance with Lee et al. (2009) and Yu (2011). Table 4 shows that all factors in the measurement model had adequate reliability and convergent validity, because all Cronbach's alpha values, composite reliabilities, and factor loadings exceeded acceptable criteria of 0.7, and the AVEs were greater than 0.6 in all cases. Table 5 shows whether diagonal elements are the square roots of AVE and off-diagonal elements are correlations between constructs. Since all diagonal elements are higher than off-diagonal elements in the corresponding rows and columns, the discriminant validity is supported.

Table 4：Reliability and validity examination of the constructs

Construct	Items	Factor Loadings	Cronbach alpha	Composite Reliability	AVE
Relative Attitude	RA1	0.847	0.906	0.876	0.7023
	RA2	0.891			
	RA3	0.836			
Relative SN	RSN1	0.750	0.815	0.857	0.6677
	RSN2	0.862			
	RSN3	0.897			
Relative PBC	RPBC1	0.792	0.863	0.867	0.6862
	RPBC2	0.947			
	RPBC3	0.944			

Transition Cost	TC1	0.848	0.857	0.896	0.7419
	TC2	0.909			
	TC3	0.888			
Network externality	NE1	0.797	0.814	0.832	0.6237
	NE2	0.853			
	NE3	0.730			
RelativeBI	RBI1	0.838	0.826	0.833	0.6252
	RBI2	0.779			
	RBI3	0.896			

Table 5：Discriminant examination of the constructs

	Relative Attitude	Relative SN	Relative PBC	Transition Cost	Network externality	Relative BI
Relative Attitude	**0.8380**					
Relative SN	0.286**	**0.8171**				
Relative PBC	-0.642**	-0.417**	**0.8284**			
Transition Cost	0.511**	0.319**	-0.359**	**0.8613**		
Network externality	0.497**	0.667**	-0.470**	0.295**	**0.7897**	
Relative BI	0.784**	0.358**	-0.600**	0.497**	0.525**	**0.7907**

Since existing literature focuses primarily on the adoption of a single technology or service while neglecting the transition between them, this study pioneers the combination of the relative comparative concept, the TPB, and two economic factors (transition cost and network externality). Therefore, regression analysis is more suitable than the structural equation model for testing the pioneered research structure. Therefore, the linear regression method was used to verify hypotheses 2-5, whereas the logistic regression method was employed to examine hypothesis 1because of its binary dependent variable. The results displayed in Figure 1 and Table 6 shown that attitude, relative PBC and Network Externality significantly influences relative BI, which in turn

significantly influences actual behavior. Meanwhile, relative SN and Transition Cost did not significantly affect relative BI. Consequently, hypotheses 1-2,4 and 6 are accepted, whereas hypotheses 3 and 5 are rejected.

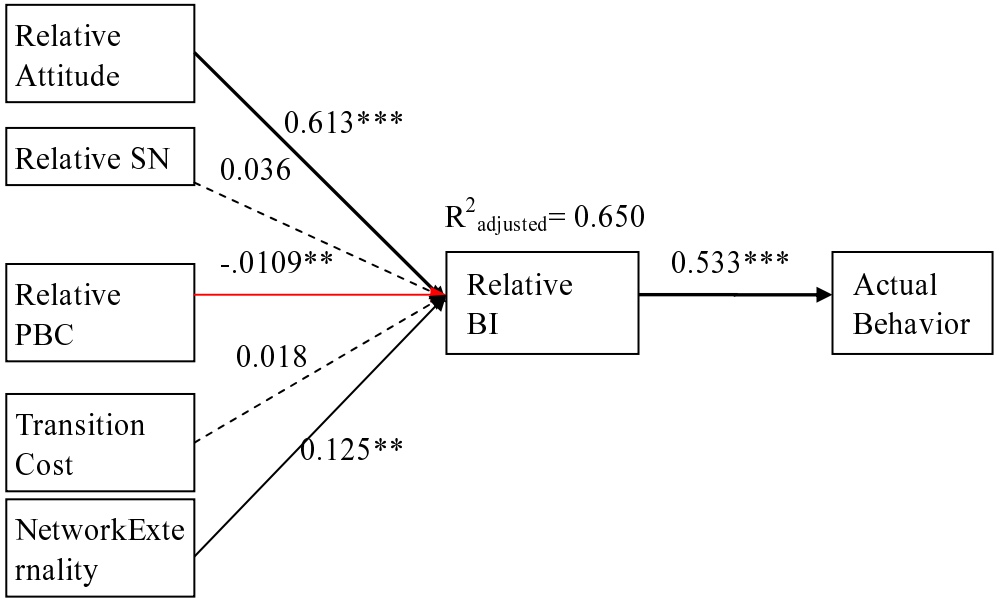

Figure 1：The computed regression results for the proposed model

Table 6：The logistical regression result

Dependent Variable	Independent Variable	Beta value	Wald Chi-Square	Result Summary
Actual Behavior	Relative BI	0.533	31.303	X^2 (*df*=1) = 35.969, P-value=0.000, -2 log likelihood = 684.930, Overall correct classification rate = 78.6% (97.6% for not transfer from online to mobile banking)

Based on the relative comparative scale, the generated path coefficient between relative PBC and relative BI was -0.109, whereas traditional TPB studies that focus on the adoption of a specific technology or service have typically indicated that the coefficients between constructs are all positive. This negative coefficient reveals that respondents have more confidence, capability or resources focusing on the Internet than

mobile devices to access banking services. The following possible two reasons might explain this result.

First, approximately 23% of respondents were older than 50 years and 26.6% of respondents were younger than 30. Through drill-down analysis, this work found that most of respondents aged below 30 years were students, accustomed to using mobile devices, and felt uninhibited using mobile devices to access banking services, but they had no practical living or working needs to use mobile banking. Meanwhile, respondents older than 50 years of age may have practical or financial needs that could be met using mobile banking, but they may not be familiar with using mobile devices to access web-based services. Second, wireless service costs are significantly higher than standard Internet service costs in Taiwan because the telecommunications industry is monopolized by a single company. Additionally, the performance quality of 3G network is poor in Taiwan and the schedule for 4G infrastructure constructions is far behind than those of other developed countries (i.e., Northern European nations, South Korea, Singapore, and Hong Kong).

Drill-down analysis was also performed to examine the negative path coefficients between relative PBC and other constructs as shown in Table 5.Table 5 indicates relative PBC was a discouraging factor for people switching from online to mobile banking, whereas other constructs were positive factors for people transforming from online to mobile banking. That is, the current state of respondents' living or/and working environments and resources favors online banking instead of mobile banking.

Overall, the generated figures that are shown in Tables 4-6 reveal that the extended TPB proposed herein can effectively advance current knowledge regarding what influences people to transfer from online to mobile banking. By analyzing 595 respondent questionnaires that were collected through the shopping mall intercept method, this study shows that relative attitude significantly influences relative BI at the level of p-value < 0.001, and that relative PBC and network externality significantly influences relative BI at the level of p-value < 0.01. Relative BI significantly influences actual behavior at the level of p-value < 0.001. In addition, relative SN and transition cost do not play a significant role in affecting relative BI.

6. Discussion, Implications and Conclusions

By integrating the relative comparative concept, TPB and two economic effects of transition cost and network externality into an extended TPB, the generated empirical

results clearly indicate that 65% of people's BI regarding the transition from online to mobile banking can be explained and that people's transition (or not transition) from online banking to mobile banking can be effectively predicted. Therefore, the proposed research structure was supported by the empirical results for understanding what encourages or discourages consumer transition from online to mobile banking. Because mobile and online banking pertains to both technology-enabled and web-based services, the findings in this study may be applicable to the transition or selection between competing alternatives, such as software platforms and Web browsers. Consequently, this study contributes to both the theory and practice of this topic.

Following the empirical results, relative SN is not a salient role influencing people to switch from online to mobile banking. This might be because accessing banking services is an unobservable personal behavior, not observable fashion, and not a social interaction. People might choose between online and mobile banking according to their personal needs, preferences, or convenience. Accordingly, a more suitable strategy is not executing celebrity marketing strategies. It is to design/provide specific services that meet potential customer requirements, to enhance mobile banking advantages such as location-free convenience that meet current customer needs, and to innovate mobile banking services that lead or create the public's favor. That is, the first implication derived from this study is to execute two kinds of marketing strategies. One targets existing customers by continuously satisfying their personal requirements to retain their preference and loyalty of mobile banking. The other strategy is to target potential customers by crafting special services to fulfill their expectation when using mobile banking. Exactly knowing what current users care and what prospective users want is the common point behind these two strategies.

According to the above discussion, social networks not significantly impact consumer attitudes because of the insignificance of SN in the context of transitioning from online to mobile banking. In other words, people tend to think that banking is a personal rather than social issue. In line of this thinking, banks should put efforts on personal issues such as how to make a customer's personal life more efficient by using mobile banking, how to enhance a customer's willingness to interact with bank e-agents, and how to offer a customer valued-added services beyond receiving instant financial information, checking bank account, and many other usual services. This implies that potential customers may increase their willingness to use mobile banking if they believe their personal needs can be fulfilled by using mobile banking. Therefore, the concept of collaborate commerce may be useful in designing a new mobile banking service.

Customers will benefit from designing mobile banking services through bank collaboration, and vice versa. Hence, banks should offer more than what they provide on the Internet banking and should be aware of what consumers expect from mobile banking. This leads to the third implication that people usually prefer to continue using their current banking channels unless new channels offer featured or value-added services that are not delivered by current channels.

In contrast to relative SN, other psychological factors of relative Attitude and PBC play salient roles influencing people to transfer from Internet to mobile banking. Figure 1 reveals that relative attitude is the most crucial factor for people deciding whether to transfer from Internet to mobile banking. Since relative attitude extremely significantly influences relative BI (p-value < 0.001), the most effective strategy persuading potential users to use mobile banking is to shift their attitudes. Therefore, banks are suggested to focus on understanding what forms consumer attitudes and how to change current nonuser attitudes. Through the execution of effective business or marketing strategies that turn consumer attitudes toward favoring mobile banking, the current users' loyalty could be increased and the potential users would be drawn to using mobile banking. The fourth implication is thus presented.

The generated results also show that relative PBC affects people negatively from online to mobile banking. People who are not current users of mobile banking services have more confidence, capability and/or resources for using banking services through the Internet rather than through mobile devices. In other words, although the penetration rate of mobile phone is extremely high, many people are unprepared for using mobile banking. This may be attributable to their living habits and/or working environment being unsuitable or unfavorable for mobile banking. Consequently, the fifth implication derived from the study is that marketers must analyze targeted customer environment to ensure that customers are prepared to use the technology-enabled service. That is, the timing and available resources for targeted customers must be taken into account when banks launch and design an innovative service.

Regarding the insignificance of transition cost for people moving to mobile banking, the reason may be due to the high usage rate of mobile devices (e.g., cell phone). Rapid advances in information and communication technology during the past decade have significantly reshaped people lifestyle through working, learning, entertainment, and chatting habits. Therefore, moving from online to mobile banking does not cause any significant economic transition costs. Transition cost originates from consumer's transition from one service to another, which includes money investments

(such as investments in mobile devices) or time investments (such as use experience) (Jackson 1985; Weiss & Anderson 1992).Given high penetration of mobile devices, the main cost of using mobile banking is probably wireless communication access. Because wireless communication infrastructures and costs are controlled by telecommunication firms, as discussed in Carlsson, Walden and Bouwman (2006) and Cruz et al. (2010), customers may benefit from bank-value offers rather than cost reduction.

In other words, consumer-perceived costs are charged by wireless service providers, whereas consumer-perceived service is delivered by mobile banking. Hence, in modern lifestyles, consumers did not take transition cost into account when deciding to use (or not use) mobile banking. Since the panel discussion and focus-group interview revealed that incentive programs (i.e., reducing transaction fees, bonus, and gifts) were frequently used by banks, banks may need to redevelop current marketing strategies that focus on incentive programs. Given that the major motivation for consumers to use mobile banking is not cost reduction but their current lifestyles, the sixth implication is that banks need to consider targeted customer lifestyles when developing a more effective strategy to draw consumers into using mobile banking.

In contrast to Transition Cost, Figure 1 shows that network externality significantly influences people to transfer from Internet to mobile banking. Hence, two implications may be derived. One is that number of mobile banking users will dramatically increase with more and more people moving to use mobile banking services. The other one is that the rate of transition from Internet to mobile banking remains low, primarily because the number of Internet banking users significantly exceeds that of mobile banking users at the time of this survey. Therefore, if banks want mobile banking becomes the main channel for banking, the number of mobile banking users must exceed a critical mass. Accordingly, the ninth implication culled from this study is that the effect of network externality plays a salient role influencing people to transfer from one technology-enabled service to another. Therefore, consumer confidence, capability, and resources for the use of banking services through mobile devices will eventually surpass those for the Internet if network externality exists in the context of banking.

In addition to the mentioned business implications, a theoretical implication is presented. Numerous studies based on social psychology theories such as TAM, TPB, IDT or their variations focused on the adoption of single service or product has caused these types of studies to become redundant and have reached full maturity. Through the 595 valid respondents, this study empirically shows that what influences people to transfer from one technological service or product to another can be effectively

explained by social psychology theories. Therefore, by adding a relatively comparative concept into an extended TPB model, this study expands the application domain of current social psychology theories from the adoption of single product or service to the choice between competing products or services.

7. Limitations

Like any study, there are certain limitations to this study. First, using customer perceptions to compare online and mobile banking is not novel because Laukkanen (2007) ever employed the means-end theory to compare online and mobile banking by customer perceptions so as to understand consumers' preferences. However, as summarized in Table 1, the extant literature on the adoption of online or mobile banking has attributed the key factors influencing people to adopt (or not adopt) online/mobile banking into Attitude, SN and PBC. In contrast to the adoption of single online or mobile banking, this study explored what influences people to transfer (or not transfer) from online to mobile banking and the generated empirical results indicated that relative SN is not a significant factor and only relative Attitude and PBC play salient roles influencing people's relative BI which in turn affects people to transfer from Internet to mobile banking. Moreover, relative Attitude positively influences relative BI, while relative PBC affects people negatively from online to mobile banking. Consequently, except for many implications discussed in the previous section, further studies to assert the above differences between the present study and the earlier studies focusing on the adoption of single online or mobile banking are necessary.

Comparing with huge literature focused on investigating the adoption of single online or mobile banking, this work is still a pioneer study on understanding what motivates individuals to transfer from online to mobile banking. Particularly, this study integrates the relative comparative assessment, TPB, and two economic effects of transition costs and network externality into an extended TPB. Hence, a regression method was employed to analyze the collected data and examine the proposed hypotheses. Future studies on the transition from one technological service to another are recommended to employing the Structured Equation Model to analyze and test the model's robustness. The third limitation is that the respondents were conveniently sampled from Taiwanese population and the questionnaire was limited to evaluate the transition from online to mobile banking. Thus, caution is required when generalizing the methodology and findings to different contexts or countries with different cultures.

The fourth limitation is that this study considered Internet banking precedes mobile banking. For some people such as Indian consumers living in rural areas, mobile banking may precede internet banking. Therefore, future research should take this situation into account. Finally, the literature focuses on the adoption of single technologies or services, and neglects the switch from one technology or service to another. Therefore, this is a preliminary study attempting to advance current theoretical and practical knowledge on what influences people to switch between similar technology-enabled services. Further and more elaborate research is necessary to verify and enhance the validity and application of the presented methodology.

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Appendix 1

Theories	Abbreviations	Meaning and Purposes
Theory of reasoned action	TRA	TRA, presented in 1975, theorizes that an individual behavior is determined by a person's behavioral intention (BI), and BI is jointly determined by attitude toward the behavior and subject norm regarding the behavior.
Technology acceptance model	TAM	TAM, proposed in 1986, adapted TRA to forecast individual computer acceptance behavior. According to TAM, actual behavior of individuals in adopting a technology can be explained by their perceived usefulness (PU) and perceived ease-of-use (PEOU).
Theory of planned behavior	TPB	To explain non-volitional behaviors, Ajzen added another construct, called perceived behavior control, into TRA, thus forming TPB in 1985. Thus, the TPB is an extension of TRA and aims to explain human behavior from the perspective of social psychology.
Innovation diffusion theory	IDT	IDT, pioneered by Rogers in 1962, applies a process-oriented viewpoint to explain how an innovation can be accepted and diffused within a social system. IDT contends that innovation adoption or rejection begins with end-user awareness of the innovation, and diffusion is a process through which an innovation is communicated via certain channels over time among members of a social system.