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A study of the factors influencing users' decisions to pay for Web 2.0 subscription services

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A subscription-based business model provides a stable source of revenue for Web 2.0 services. In order to understand why website users are willing to pay for online contents, this study explored the factors that influence users' decisions to pay for subscriptions online. Eleven important variables were identified, and a survey was conducted to group them into three factors representing the aspects of general service, Web 2.0, and Web 1.0, respectively. As a result, the willingness to pay for subscriptions was classified with a high degree of accuracy. In addition, a Web 2.0 site which charged its heavy users subscription fees provided samples for the second survey. The research construct was validated and the paying members were successfully distinguished from regular members. The results show that the aspects of general service, Web 2.0, and Web 1.0 are all important factors; of these the Web 2.0 aspect had the highest impact on the decision of whether or not to pay for subscriptions. Furthermore, implications for management in operating Web 2.0 websites are discussed and suggestions are provided.

Keywords: Web 2.0; willingness to pay for subscriptions; exploratory factor analysis; confirmatory factor analysis; logistic regression

Introduction

The term 'Web 2.0' originated in a series of conferences regarding new web technologies and has become a popular topic of investigation in recent years (Griffiths & Howard, 2008). Although the meaning of Web 2.0 remains elusive (Yourdon, 2006), O'Reilly (2005) identified seven features to distinguish it from the previous generation of web services generally known as Web 1.0. These features include (1) The Web As Platform, (2) Harnessing Collective Intelligence, (3) Data are the Next Intel Inside, (4) End of the Software Release Cycle, (5) Lightweight Programming Models, (6) Software Above the Level of a Single Device, and (7) Rich User Experiences. From the users' points of view, Clarke (2008) pointed out that Web 1.0 reflected old, centralised patterns of business, with corporate-controlled resources serving remote consumer–clients. On the other hand, Web 2.0 provides a platform allowing consumer–clients to actively participate in the service. He considered the following as the key features of Web 2.0 services: (1) a focus on data-based services rather than on software; (2) a large number of small channels for consumers, as opposed to a small number of big ones; and (3) inherent scalability instead of ever-growing server-farms. From the perspective of technology, three types of Web 2.0 collaborative tools are particularly important: Blogs, Mashups, and Wikis (Dearstyne, 2007). Blogs are user-generated web journals offering opinions and information that

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may include texts, images, and links to other blogs and web pages; Mashups are web applications integrating contents from more than one source into an integrated application; and Wikis are websites allowing users to add, remove, edit, and change contents. These tools have changed the development of Internet-based social network sites. Several well-known websites, including Youtube, Flickr, Wikipedia, and Facebook, are typical Web 2.0 services that exemplify the applications of these collaborative tools. According to a report by Ho (2010), Web 2.0 websites have played increasingly important roles as top-ranking websites in Taiwan since 2008. In 2010, 25% of the top 100 websites in Taiwan provided Web 2.0 services.

All of the Web 2.0 services are facing the same challenges as any other business, namely, making profits and surviving. Various Internet-based revenue models have been classified (Jelassi & Enders, 2005; Dubosson-Torbay, Osterwalder, & Pigneur, 2002). Based on a categorisation for e-commerce business (Laudon & Traver, 2007), Enders Hungenberg, Denker, and Mauch, (2008) pre-selected 87 international Web services published on Wikipedia, and came up with three revenue models: (1) advertising models, (2) subscription models, and (3) transaction models. From their findings, advertising models were adopted most frequently while fewer services used subscription and transaction models. From the perspective of business, the advertising model requires higher traffic flow than the other two models. According to a survey conducted by the *Wall Street Journal* regarding the paying attitudes of web users towards contents and services, most users considered that e-mail and Internet services should be free (Mangalindan, 2002). Changing users' attitudes and encouraging them to pay for online services are big challenges. Another survey by Jupiter Research (2004) reported that 63% of respondents from 2101 samples would not pay for the contents of a website. However, the online advertising market is often dominated by a few predominant players and a transaction model usually requires a high level of traffic flow. Charging users for subscribing to online services is considered one of the major sources of revenue with several successful examples having been identified (Enders et al., 2008). *The Economist* (2009) also indicated that charging users for online content is inevitable. Although several papers studied the question why users are willing to pay for online content, they all stated that more studies on different online contents are necessary (Dou, 2004; Lopes & Galletta, 2006). In addition, Li and Zhang (2006) conducted an extensive literature review of individual shopping behaviour online and detected a problem requiring further research. Most of the studies used student samples in an e-commerce context making it questionable to generalise their results to regular customers. This matter was also mentioned by Lopes and Galletta (2006) who suggested that future studies should extend the area to actual consumers. In response to these issues to study the factors influencing a user's decision to pay for subscriptions for Web 2.0 services, this research collected data from both student samples and those of regular customers so that the results would be more generalisable. Student samples were used to develop a conceptual construct while actual users from a Web 2.0 service validated the construct and provided more insights to the users' purchase behaviour.

Theoretical background

As the Internet has become increasingly popular and accepted as a facet of life for most people, electronic channels provide an important avenue for companies to reach their customers and generate sales (Moe & Fader, 2004). Many firms make their products or services available online expecting to attract more customers. Understanding the purchasing

behaviour of online users is an important topic for web service operators in managing their sites. Several papers focused on this issue and provided useful information. Heijden, Verhagen, and Creemers (2003) investigated two types of online purchase intentions in shopping for CDs: technology-oriented and trust-oriented. Using students as the samples, perceived risk and perceived ease of use were found directly to have influenced user attitude towards purchasing intentions. A technology-oriented perspective, along with marketing and psychological perspectives, was included in the framework of the study by Koufaris (2002). With the assistance of a market research firm, samples were randomly selected to participate in a survey regarding their purchase behaviour on an online bookstore. His results showed that shopping enjoyment and perceived usefulness strongly predicted the intention to return. However, unplanned purchases were not affected by the factors in his model. Venkatesh and Agarwal (2006) studied how visitors become customers in four different industries: airlines, online bookstores, automobile manufacturers, and rental agencies. They collected longitudinal data and their results show that the following factors had a significant effect on purchase behaviour: time spent on the site, content quality, made-for-the-medium purchase need, and previous purchase experience. Rather than selling products or services, some web services charge service fees for the transactions made at their sites. Black (2005) examined over three thousands eBay auction transactions and studied how the likelihood to pay online is affected by consumer demographic, economic, and geographic factors. The results pointed to several significant variables, including the value of transaction, buyer gender, rural versus urban residence, and several characteristics of the community in which the buyer lives.

In addition to products (for example, books and CDs), and services (for example, car rental and travel scheduling), virtual products such as music downloads are especially suitable to be transacted online. In the study of Bounagui and Nel (2009), perceived usefulness, perceived enjoyment, and perceived trust were the strongest predictors of college students' behavioural intentions to purchase online music downloads. Online gaming is another example and prior offline purchase experience was found to be significantly related to paying for online games (Barbera, Doncel, & Sainz, 2006). Although most users consider that the Internet should be free (Nielsen, 2010), charging for online contents is one of the revenue models for social network sites (Enders et al., 2008). Dou (2004) confirmed the existence of a 'free' mentality among online users and found that the significant factors of paying for online content and clip arts were linked to usage purpose (business versus personal) and experience with online purchasing. While users pay for clip arts for utilitarian purposes, Lopes and Galletta (2006) studied users' purchase behaviour towards a different type of online content, i.e. intrinsically motivated online content. Examples can be found on sites featuring education, sports, gossip, movie news, books, and adult material. Data were collected from college students and the results showed that the variable of expected benefits was the main antecedent for willingness to pay. Perceived quality and provider reputation affected willingness to pay only indirectly through expected benefits. Wang, Ye, Zhang, and Nguyan (2005) surveyed students to investigate the factors influencing their decision to pay for subscription-based online content. Of the seven variables included in this study, convenience, essentiality, usage frequency, added value, perceived quality, and perceived fairness were significant, while security and two controlled variables, gender and age, were insignificant. When considering the Internet as a platform for interacting with others, word-of-mouth on the web has a greater impact on consumers' purchasing decisions (Riegner, 2007). Finally, Enders et al. (2008) pointed out that differentiating online services is a factor influencing users' decision to pay a membership fee. All of the studies collected offered relevant information

regarding the purchase behaviour of online users towards products, services, or online contents. They provide a foundation for this research to study the user's willingness to pay for online subscriptions.

The theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) and the theory of planned behaviour (TPB) (Ajzen, 1985, 1991) are two theories widely used to predict behaviours in psychology, education, marketing, management, and even medical treatment. However, several studies revealed diverse opinions regarding these two theories. Sheppard, Hartwick, and Warshaw (1988) proposed that the TRA may be constrained by the use of attitudes and subjective norms to predict intentions and the use of intentions to predict the performance of behaviour. Conner and Armitage (2006) also argued that other factors such as belief salience measures and past behaviour may be added to TPB. In order to understand users' online behaviour, I will study the possible variables having impact on their decisions to pay for subscriptions. Based on the extensive literature review regarding users' online purchase behaviour mentioned previously, more than 20 variables have been identified and are listed in Table 1. Those indicating the same concepts or meanings will be considered as one variable, such as free mentality and perceived fairness, perceived benefit and perceived financial cost, etc.

These variables were discussed, revised, and removed partially via two focus group interviews (FGIs) in which group discussions generated data and information that would have been less accessible without the kind of interaction found in a group setting (Lindlof & Taylor, 2002) (please refer to the details in Appendix 1). After the focus group interviews, a Delphi method was then applied to remove more variables with 11 of them retained (please refer to the details in Appendix 2). Therefore, I have consensus results from users' and operators' perspectives. Next, an exploratory factor analysis was used to extract three factors, in which each contains three to five variables. These factors were included in a logistic regression model to distinguish those influencing

Table 1. List of variables influencing users' purchase behaviour online.

Variables	Sources
Perceived benefit, perceived risk, content provider's brand image, past purchasing experience using credit card online, and the strength of free mentality	Dou (2004)
Expected benefits, perceived technical quality of the site, and perceived reputation of the site	Lopes and Galletta (2006)
Perceived usefulness, perceived enjoyment, perceived ease of use, perceived financial cost, perceived trust, perceived risk, and perceived self-efficacy	Bounagui and Nel (2009)
Age, gender, crime index, cost of living, income, cost of living/income ratio, education, transaction value, and geographical factor	Black (2004)
Usage frequency, connection method, intense user, offline purchase behaviour, age, gender, and geographical factors	Barbera et al. (2006)
Added value, security, perceived quality, essentiality, convenience, usage frequency, and perceived fairness	Wang et al. (2005)
Usage frequency, purchase need, and previous experience	Venkatesh and Agarwal (2006)
Perceived control, enjoyment, concentration, perceived usefulness, and perceived ease of use	Koufaris (2002)
Trust, perceived risk, ease of use, and usefulness	Heijden et al. (2003)
Interaction intensity	Riegner (2007)
Differentiations	Enders et al. (2008)

users' willingness to pay for web services from those that made them unwilling to pay. Moreover, I also chose a Web 2.0 service to validate the constructs and derive some empirical findings regarding the factors of paying for subscriptions. Finally, I proposed generic strategic recommendations for the Web 2.0 services with subscription models. In the following sections, the 11 variables are described in detail.

Convenience

Convenience has been found to be an important factor of online user satisfaction (Schaupp & Belanger, 2005). Previous research also examined the effect of perceived convenience, and perceived usefulness on potential users' attitudes, behaviour intention, and actual behaviour (Zeithaml, Parasuraman, & Malhotra, 2002). Bauer, Falk, and Hammerschmidt (2006) applied a transaction process model to electronic service encounters, and developed a transaction process-based scale for measuring service quality. Accordingly, four elements forming the construct of process are availability, waiting time, stability of data transmission, and efficiency of online order processing. These four elements comprise the concept of convenience. Since charge-based Web services usually distinguish themselves from free sites by offering specific or privileged contents, the convenience of obtaining instant access to desired contents plays an important role in users' willingness to pay.

Ease of use

Collier and Bienstock (2006) developed a three-dimensional approach to measure service quality in e-retailing. Ease of use was one of the indicators for process quality, and the empirical results of their study showed that it was significantly related to user satisfaction. Davis, Bagozzi, and Warshaw (1989) compared two theoretical models, the technology acceptance model and the TRA, and concluded that ease of use was an important factor for user acceptance. Lin (2007) found that the perceived ease of use was one of the determinants to sustain a virtual community. The functionalities for users to search data and to expand the contents of their blogs, photos, and information are critical to the success of Web 2.0 services. Therefore, ease of use represents how well a website is capable of providing functions that increase users' incentives to pay. In this study, ease of use is defined as the functionality for users to search for information or generate contents.

Essentiality

Keeney (1999) suggested that the perceived value of information depends on how important or essential it is to meet customers' information needs. Lynch and Ariely (2000) found that higher information quality increased satisfaction, and improved intentions to revisit and repurchase from a website. Wolinetz (2001) reported that consumers were willing to pay for certain information that was otherwise free, if the information met their immediate needs. Therefore, this paper will explore whether or not essentiality of information determines users' intention to pay for online contents.

Added value

Providing added value is a strategy used in many product or service promotion campaigns. For example, passengers who frequently use a particular airline are often awarded free class upgrades or a discounted rate by that airline. Fast food chain stores often give

away free gifts to children to attract more customers. This concept is also applicable in the virtual environment. Wang et al. (2005) studied this variable, and the results indicated that added value affected users' willingness to pay for online services. Therefore, it is reasonable to assume that providing some added-value contents to users would increase their willingness to pay for service on the web.

Perceived service quality

Perceived service quality was considered a customer-based performance measure in Parasuraman, Berry, and Zeithaml (1991). Although not specific to online services, Lee, Lee, and Yoo (2000) surveyed three different industries: an entertainment park, an aerobic school, and an investment bank, and concluded that perceived service quality was an antecedent of customer satisfaction. Zeithaml et al. (2002) mentioned that service quality delivery through websites was an essential strategy for success. For managers of web companies, an awareness of how customers perceive service quality is critical to understanding what they value in an online service transaction (Collier & Bienstock, 2006). Perceived service quality affects users' satisfaction that leads to the users' intention to pay for online services.

Usage frequency

Liao and Cheung (2001) analysed consumer attitudes towards Internet-based e-shopping and identified Internet usage as one of the factors significantly affecting the willingness of Singaporeans to shop on the Internet. Gofen (2003) found that consumers' tendency to use a certain e-commerce vendor was highly influenced by habit. Many web companies have adopted the strategy to collect fees for those users relying heavily on their services. Therefore, it is worth exploring the impact of usage frequency on users' willingness to pay for online services.

Perceived fairness

Over the years, online users have come to believe that web companies are financed by advertisers, and that therefore online services should be provided free of charge. Consequently, when asked to pay for online content access, users may perceive a certain degree of unfairness (McDonald, 2001). Email and web services are commonly perceived as free services by users, and trying to change this belief and encouraging them to pay for online services can be a big challenge (Mangalindan, 2002). Moreover, Goles, Lee, Rao, and Waren (2009) studied online shopping customers' trust, which included magnitude of negative outcome, causal attribution to seller, and perceived fairness of seller response, and concluded that it would influence their intention to engage in future purchases on the Internet. Therefore, it should be beneficial to many web companies to understand the impact of fee-based online services on users' perceived unfairness.

Security concerns

Parasuraman et al. (2005) defined security/privacy as the degree to which a customer believes a site is safe from intrusion, and personal information is protected. Collier and Bienstock (2006) included privacy as one of the items to measure process quality. While privacy may be considered necessary for close relationships, trust may decrease within an online social network. Meanwhile, a new form of closeness becomes general

to most people: the sharing of personal information with a large unknown number of friends and strangers, especially in a social network site. Kumar and Kumar (2010) identified the importance of users' privacy and proposed several principles to help those websites ensure the privacy of user-generated information on social networking services. Moreover, according to the study of Belanger, Hillier, and Smith (2002), the perceived security and privacy risks associated with transacting online have been a continuous concern for consumers. It remains to be investigated how the security issue affects people's decisions regarding their willingness to pay for online services.

Interaction intensity

User-centeredness is an important concept for any Web 2.0 service (O'Reilly, 2005). It is necessary for the Web 2.0 platform to focus on the participation and interaction of users to generate contents such as blogs, photos, videos, etc. Also, Hoegg, Martignoni, Meckel, and Stanoevska-Slabeva (2006) indicated that the quality and the size of the virtual community knowledge pool depended on the number of users. In addition, their participation intensity also influences users' acceptance and loyalty. From the perspective of the media, Riegner (2007) considered the Internet as a tool for interpersonal communication, and studied over 4000 broadband users on their purchase behaviour online. Word-of-mouth on the Web has a greater impact on consumer purchase decisions according to this research. Therefore, interaction intensity is included in this study.

Differentiations

Enders et al. (2008) compared two online services, and found that customers' willingness to pay for the services could be maximised by increasing the levels of user-generated contents and by providing functionalities and incentives so that users could frequently update and expand their profiles. They also realised that offering multiple membership packages with different pricing schemes would encourage users to pay for the membership. Moreover, Chau (2008) studied the cultural issue in order to understand how and what cultural differences may influence the diffusion, adoption, and infusion of the service in a social setting. The results showed that users had drivers of individualism and collectivism for themselves which were derived from their different cultural backgrounds. Steinfield, Bouwman, and Adelaar (2002) also pointed out that many opportunities for differentiation arose from the use of a virtual channel to offer customers information and services that complement the goods and services which are offered in the physical world. Moreover, customers' distraction will result in more product differentiation if consumers tend to perceive products as coherent entities and not if they typically focus on the specific features of products (Lerouge, 2009). Therefore, whether or not differentiations provide a similar impact on users' willingness to pay for online services remains unclear, and will be studied in this paper.

Desire fulfilments

With a focus on hedonic quality aspects, Bauer et al. (2006) proposed a model to capture service quality in online shopping. Enjoyment is one of the five constructs to measure service quality, and it includes four elements: personalisation of service, fun of using a particular website, excitement when shopping online, and entertainment provided by the website. In this study, these constructs represent a certain fulfilment of desire.

Additionally, Lin, Gregor, and Ewing (2008) tried to develop a scale to measure the enjoyment of web experiences. They classified enjoyment on the web as a positive effect and fulfilment of desire. The results of developing the scale were significant to design for enjoyment of web experiences. Understanding consumers' needs on the web may apply to their intentions to pay for web services. Therefore, desire fulfilment could be an important issue in determining whether or not users are willing to pay for online services.

Research methodology

Research framework and questionnaire development

The research framework is shown in Figure 1. In addition to the 11 variables mentioned previously, two questions were added to ask respondents whether or not they were willing to pay for subscriptions. An FGI was conducted, and the comments from the participants provided a basis for questionnaire revisions. The questions regarding the 11 variables were measured using a five-point Likert-type scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, to 5 = strongly agree. The question regarding willingness to pay for subscriptions was answered either 0 = no or 1 = yes.

Adopting 11 items to represent 11 variables is the same method used by Wang et al. (2005) when exploring the factors influencing consumers to pay for online contents. Moreover, 25 MBA students and 15 undergraduate students were selected to be pre-tested for detecting and correcting any ambiguity regarding the meanings of the questions to ensure they were clearly understood by the respondents. The 11 variables were grouped into three factors by adopting an exploratory factor analysis from the data collected at the first survey. Logistic regression was used to explore the factors having impact on users' decisions regarding paying for subscriptions, and the willingness to pay for the

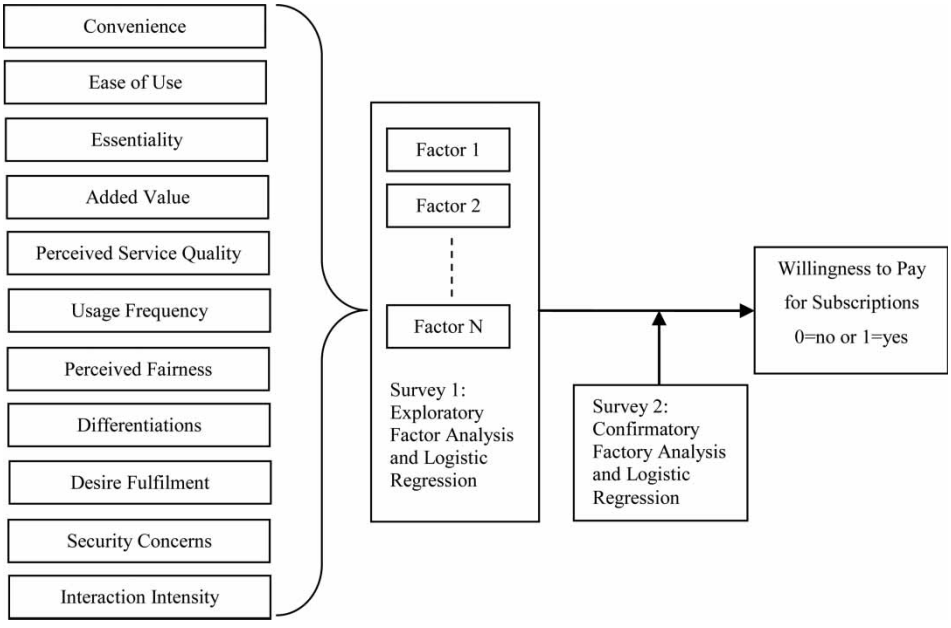

Figure 1. Research framework.

subscriptions was classified with a high degree of accuracy. For the second survey with data collected from a well-known Web 2.0 service, the research constructs were validated by a confirmatory factor analysis (CFA) and a logistic regression was applied to distinguish paying members from ordinary members.

Research samples

The data were collected by adopting both paper- and web-based surveys from students in a university located in northern Taiwan. College students (undergraduate and MBA) were chosen because they are the most active web users (Jupiter Research, 2004; EMarketer, 2009). A small portion of the respondents were EMBA students in order to have a generalised sample. The respondents were instructed to read a cover letter stating the definition of Web 2.0 services before answering the questions. Of the 251 questionnaires distributed, 206 were effective representing an effective response rate of 82%. Table 2 lists the respondents' demographic characteristics, which are similar to the current online population in

Table 2. Demographic characteristics of respondents ($n = 206$).

Demographic characteristics	Frequency	Percentage
Gender		
Female	105	51
Male	101	49
Age (years old)		
<20	54	26.2
21–30	91	44.2
31–40	54	26.2
41–50	7	3.4
Average monthly income (NTD)		
<20,000	111	53.9
20,001–40,000	39	18.9
40,000–60,000	38	18.4
60,001–80,000	11	5.3
80,001–100,000	2	1
>100,000	5	2.4
Education level		
Undergraduate	135	65.5
Graduate	60	29.1
Others	11	5.3
Internet experience (years)		
1–3	4	1.9
>3	202	98.1
Daily usage online (min)		
>30	7	3.4
30–60	51	24.8
>120	148	71.8
Number of transactions online		
0–3	30	14.6
3–10	78	37.8
>10	98	47.6
Average amount/transaction (NTD)		
<1000	115	55.8
1000–10,000	86	41.7
>10,000	5	2.4

Taiwan (TWNIC, 2010). Although 30 respondents had made online transactions fewer than three times, they had more than three years of experience as online users, and most of them were below 20 years of age with little or no control over their economic situation. They were the potential paying users on the web, and initial results showed no significant differences between these 30 respondents and the rest of the sample. Therefore, all of the 206 samples were used for further analysis.

Data analysis and results

The 11 factors were first analysed by an exploratory factor analysis to identify the factors representing the common constructs. The factors extracted were then used as the variables for logistic regression to distinguish the differences between respondents willing to pay and those unwilling to pay for subscriptions. All of the statistical analyses were run on SPSS 17.0 software.

Exploratory factor analysis

Table 3 lists the averages and standard deviations of each of the variables and Table 4 shows the Pearson correlation matrix for the 11 variables. An inspection of the correlation matrix revealed that 48 of the 55 correlations (87.2%) were significant at the 0.01 level, providing an adequate basis for a factor analysis. The measures of sampling adequacy (MSA) for both the entire correlation matrix and each individual variable were all above 0.5, along with the Bartlett test of sphericity significant at 0.001, indicating the appropriateness for factor analysis (Hair, Black, Babin, & Anderson, 2010).

A component method was used to extract the factors, and the results showed that three factors were appropriate with eigenvalues of 4.247, 1.095, and 1.003 for the first component, second component, and third component, respectively. A scree test also indicated that three factors should be considered. Table 5 shows the varimax-rotated factor loading matrix. Factor 1 contains variables 3 (essentiality), 10 (differentiations), and 11 (desire fulfilment), which are the general requirements for services. That users browse websites is the general requirement for essentiality now that the Internet has emerged in daily life (Fallows, 2004), and pursuing differentiation and fulfilling their desires are the common concepts for any service, regardless of whether they are online or offline services. Therefore, factor 1 was identified as 'general service aspect'. Factor 2 includes variables 6

Table 3. Averages and standard deviations of the measures for the 11 variables.

Variables	Average	Standard deviation
1. Convenience	2.85	1.013
2. Ease of use	2.83	0.955
3. Essentiality	3.44	0.964
4. Added value	3.37	1.007
5. Perceived quality	3.19	1.013
6. Usage frequency	2.73	1.027
7. Perceived fairness	3.50	0.972
8. Security concerns	3.00	1.137
9. Interaction intensity	2.58	0.948
10. Differentiations	3.13	1.063
11. Desire fulfilment	3.12	1.000

Table 4. Pearson correlation matrix.

Variable[a]	1	2	3	4	5	6	7	8	9	10
1	1									
2	0.66***	1								
3	0.37***	0.41***	1							
4	0.52***	0.56***	0.53***	1						
5	0.49***	0.53***	0.42***	0.65***	1					
6	0.43***	0.45***	0.23***	0.42***	0.48***	1				
7	−0.27***	−0.24***	0.03	−0.18***	−0.20***	−0.17**	1			
8	0.28***	0.35***	0.21***	0.42***	0.41***	0.43***	−0.01	1		
9	0.25***	0.42***	0.30***	0.34***	0.41***	0.45***	0.02	0.37***	1	
10	0.25***	0.30***	0.41***	0.31***	0.31***	0.21***	0.05	0.15**	0.36***	1
11	0.31***	0.38***	0.49***	0.47***	0.40***	0.31***	0.03	0.29***	0.48***	0.46***

Notes: Overall MSA: 0.874. Bartlett's test of sphericity: 818.7, significance: 0.000.
***Significant at the 0.01 level. **Significant at the 0.05 level. *Significant at the 0.1 level. [a]Refer to Table 2 for descriptions of the variables.

Table 5. Rotated factor loading matrix.

Variables (questions used on the questionnaire)	Factor[a] 1	2	3	
3. Essentiality (Are you willing to pay for the important contents provided by the website?)	0.780			X_1 General service aspect
10. Differentiations (Are you willing to pay because of different levels of membership, and service?)	0.752			
11. Desire fulfilment (Are you willing to pay because using the website fulfils your desires?)	0.722			
8. Security concerns (Are you willing to pay for the effective protection of privacy which is provided by the website?)		0.801		X_2 Web 2.0 aspect
6. Usage frequency (Are you willing to pay in order to use the website more frequently?)		0.725		
9. Interaction intensity (Are you willing to pay for intensive interaction with others on the website?)		0.674		
7. Perceived fairness (Are you 'not' willing to pay out of perceived fairness (website service should be free)?)			−0.767	X_3 Web 1.0 aspect
1. Convenience (Are you willing to pay because of the convenience of acquiring information from the web?)			0.711	
2. Ease of use (Are you willing to pay because the website provides the tools to create content conveniently?)			0.619	
4. Added value (Are you willing to pay for the better information which is provided by the website?)			0.529	
5. Perceived quality (Are you willing to pay for the excellent service quality which is provided by the website?)			0.501	

Note: [a]Only loadings above 0.5 are listed.

(usage frequency), 8 (security concerns), and 9 (interaction intensity). Dholakia, Bagozzi, and Pearo (2004) used usage frequency to measure users' behaviour in virtual communities, and security was considered as a necessary antecedent of participation in a social network site (Casalo, Flavian, & Guinaliu, 2008). Higher social interaction strengthens the relation between commitments and loyalty, which may lead to paying behaviour (Thatcher & George, 2004). Interaction is also one of the features representing the concept of Web 2.0 (O'Reilly, 2005). Consequently, factor 2 was named 'Web 2.0 aspect'. Variables 1 (convenience), 2 (ease of use), 4 (added value), 5 (perceived quality), and 7 (perceived fairness) formed factor 3. Shim, Shin, and Nottingham (2002) and Zhang, Prybutok, Ryan, and Pavur (2009) adopted ease of use, added value, perceived quality, and perceived fairness to measure a website's service, design, and online shopping performances for retailer websites. Therefore, factor 3 was labelled 'Web 1.0 aspect' to distinguish it from the second factor. Cronbach's α of the three factors were 0.742, 0.773, and 0.706 for general service aspect, Web 2.0 aspect, and Web1.0 aspect, respectively. All of them exceeded the benchmark of 0.7 recommended by Nunnally and Bernstein (1994), indicating that the reliability of the construct in this study was acceptable.

Since the dependent variable in this study is binary (1 is for willingness to pay for subscriptions, which are paid memberships; 0 is for unwillingness to pay for subscriptions, which are ordinary members), logistic regression was appropriate for the two-group analysis for two reasons. First, it did not face the strict assumptions of normality and equal variance across groups. Second, it was similar to multiple regression (Hair et al., 2010). Adopting the three factors extracted from the factor analysis mentioned previously and using factor scores to represent the factors for each respondent generated the results of logistic regression shown in Tables 6 and 7. The score of variable 7, perceived fairness, was reversed by subtracting the original value from 5 so that the correlations and the loadings are all positive within the factor. The accuracy of the two groups and that of the entire sample all passed the criterion of 63.1%, which is one-fourth greater than the proportional chance criterion ($0.55^2+0.45^2 = 0.505$). The prediction accuracies of the cross-validated sample also achieved this criterion. The Press's Q was 41.1, exceeding the critical value of 6.63. Press's Q is the measure of the classificatory power of the discriminant function when compared with the statistical results from a chance model. If the calculated value is more than the critical value, the classification results are significantly better than the expected value by the chance model (Hair et al., 2010). Factors 1 and 3 were significant at the 0.01 level, while factor 2 was significant at the 0.1 level. The Hosmer and Lemeshow Chi-square, Nagelkerke R square and Pseudo R square indicate that overall model fit is

Table 6. Logistic regression results for the willingness to pay for subscriptions.

	B	SE	Wald	DF	Significance	Exp(B)
X_1 (general service aspect)	1.18	0.22	29.38	1	0.00***	3.24
X_2 (Web 2.0 aspect)	0.32	0.17	3.36	1	0.07*	1.37
X_3 (Web 1.0 aspect)	0.49	0.17	8.23	1	0.00***	1.63
Constant	−0.30	0.16	3.34	1	0.07*	0.74
Hosmer, and Lemeshow χ^2 significance					0.214	
Nagelkerke R square					0.285	
Pseudo R square					0.227	

Notes: ***Significant at the 0.01 level. **Significant at the 0.05 level. *Significant at the 0.10 level.

Table 7. Classification results.

Sample	Observed	Predicted 0	Predicted 1	Total
Analysis	0	80 (70.8%)	33 (29.2%)	113
	1	24 (25.8%)	69 (74.2%)	93
	72.3% of samples correctly classified			
Cross-validated	0	81 (71.7%)	32 (28.3%)	113
	1	22 (23.7%)	71 (76.3%)	93
	73.8% of samples correctly classified			

acceptable. It is interesting to observe that the general service aspect was the most critical factor in this model, while the coefficient of the Web1.0 aspect was slightly higher than that of the Web 2.0 aspect. The results implied that users considered general service issues to be the most important factor in deciding whether or not to pay for subscriptions.

Empirical test for the subscriptive payment issue

To test the model developed previously for the willingness to pay for subscriptions, a Web 2.0 site, atlaspost.com mentioned earlier, was selected as the target for an empirical study. It was a typical Web 2.0 site with most of the contents provided by users, and its users had to pay a subscription fee in order to become elite members.

The same 11 questions indicated earlier were included in the survey along with background questions. The questionnaire was posted online from 2009/8/31 to 2009/10/15, and a mechanism was applied to ensure that the collected questionnaire was completed. A total of 313 effective samples were valid for further analysis. One of the questions stated the status of the memberships in which elite members represented paying users. Table 8 contains the demographics of the samples.

A CFA on the measurement model was conducted to test the factor structure, and the results are given in Table 9. All of the indices reached the required levels as recommended, indicating an overall good fit.

The validity of the model was also evaluated. All of the items were highly significant with standardised loadings over 0.5, and an examination of the measurement model indicated that substantial amounts of variance in the measures were captured by the latent constructs. As a result, the convergent validity was demonstrated. As for the discriminant validity of the construct, no confidence interval around the correlation between any two latent constructs included 1, indicating that the discriminant validity was achieved (Jöreskog & Sörbom, 1993; Smith & Barclay, 1997).

A CFA with the three factors, general service aspect, Web 2.0 aspect, and Web 1.0 aspect was used to examine the latent structure for the 11 variables. The tests for internal consistency, convergent validity, and discriminant validity confirmed the adequacy of this structure. Therefore, by following the same approach used previously, the three factors extracted from factor analysis were used to form the Logistic model for classifying the two groups, those willing and unwilling to pay for subscriptions. A total of 313 samples were collected in which 198 cases were used to develop the model and 115 cases were holdout samples for the purpose of validation. The results are shown in Tables 10 and 11. The Hosmer and Lemeshow Chi-square, Nagelkerke R square, and Pseudo R square

Table 8. Demographic characteristics of respondents ($n = 313$).

Variable	Category	Frequency	Percentage
Gender			
	Male	201	64.2
	Female	112	35.8
Age (years old)			
	<25	19	6.1
	16–20	42	13.4
	21–25	67	21.4
	26–30	72	23.0
	31–35	39	12.5
	36–40	40	12.8
	41–45	13	4.2
	>45	21	6.7
Level of education			
	High school or less	139	33.7
	Junior college	101	24.5
	College graduate	48	11.6
	Graduate school	125	30.3
Length of website use per day			
	<1 h	22	7.0
	1–5 h	196	36.7
	5–10 h	73	17.6
	>10 h	22	45.7
Number of Internet transactions			
	<3 times	56	17.9
	3–10 times	110	35.1
	>10 times	147	47.0

Table 9. Goodness of fit of confirmatory factor analysis.

Goodness of fit	Suggesting value	Analysis results
χ^2/df	<3 (Bagozzi & Yi, 1988)	2.40
GFI	>0.9 (Bentler, 1982)	0.95
AGFI	>0.9 (Bentler, 1982)	0.92
CFI	>0.95 (Bentler, 1988)	0.97
NFI	>0.90 (Bentler & Bonett, 1980)	0.95
NNFI	>0.90 (Bentler & Bonett, 1980)	0.96
RMSEA	<0.08 (Diamantopoulos & Siguaw, 2000)	0.062

Table 10. Logistic regression results for the willingness to pay for subscriptions.

	B	SE	Wald	DF	Sig.	Exp(*B*)
X_1 (general service aspect)	1.627	0.328	24.565	1	0.000***	5.091
X_2 (Web 2.0 aspect)	2.815	0.464	36.822	1	0.000***	16.699
X_3 (xWeb 1.0 aspect)	0.546	0.218	6.273	1	0.012**	1.726
Constant	−17.603	2.656	43.921	1	0.000***	.000
Hosmer, and Lemeshow χ^2			0.435			
Nagelkerke *R* square			0.598			
Pseudo *R* square			0.439			

Notes: ***Significant at the 0.01 level. **Significant at the 0.05 level. *Significant at the 0.10 level.

Table 11. Classification results.

Sample	Observed	Predicted 0	Predicted 1	Total
Analysis	0	113 (88.3%)	15 (11.7%)	128
	1	17 (24.3%)	53 (75.7%)	70
		83.8% of analysis samples correctly classified		
Holdout	0	64 (94.1%)	4 (5.9%)	68
	1	15 (31.9%)	32 (68.1%)	47
		83.48% of holdout samples correctly classified		

indicated that overall model fit was acceptable at a significant level. Two factors were significant at the 0.01 level, while one factor was significant at 0.05. Factor 2 was the most important factor, followed by factor 1, and factor 3 was the least influential factor, compared to the other two factors. The classification results in Table 11 show that the prediction accuracy measures for the analysis sample were 88.3% (113/128) for non-paying members, 75.7% (53/70) for paying members, and 83.8% for overall samples. The prediction accuracy measures for the holdout group were 94.1% (64/68) for non-paying members, 68.1% (32/47) for paying members, with 83.5% accuracy for the overall samples. All of the accuracy measures were one-fourth greater than the proportional chance criterion (54.26% *1.25 = 67.8%), indicating an acceptable level of classification accuracy. The Press's Q for analysis sample and holdout sample were 96.2 and 54.3, respectively. The classification accuracy for the analysis and holdout samples exceeded at a statistically significant level the classification accuracy expected by chance.

In the study of Lopes and Galletta (2006), expected benefits were the main factor directly influencing willingness to pay for online content, while perceived quality and provider reputation affected willingness to pay indirectly through expected benefits. In this study, reputation was excluded for the variable selection process, and perceived quality had the smallest factor loading of 0.501 in the Web 1.0 aspect, which was overall of least importance. The factor of expected benefits was not on the list of variables for this study, because several participants of the focus group considered it as the results of other variables such as essentiality, differentiations, added value, etc.

It is noted that both this paper and that of Wang et al. (2005) studied the same topic, i.e. the factors influencing consumers' decision to pay for subscription-based online services. However, this research differs from that of Wang et al. in several ways. First, the factors used in this study were obtained through a variety of different techniques. In Wang's paper, all of the variables considered were obtained by means of an extensive literature review. In this research, more than 20 variables were identified through a literature review, and then were further reduced to 11 variables by two focus group interviews and a Delphi method. Second, the research methodologies employed are different. In Wang's study, seven variables were analysed by a multivariate analysis of variance, and then tested by means of a discriminant analysis for willingness or unwillingness to pay for online content. In this paper, a two-stage procedure was used. An exploratory factor analysis and a discriminant analysis were used at the first stage, while a CFA and a discriminant analysis were applied to a real case at the second stage. Third, the respondents' profiles are different. Although student respondents were used in both studies, this paper extended the research to the real consumers of an online company which charged their heavy users subscription fees. Fourth, measures of the respondents' reaction are

different. Willingness or unwillingness to pay for online content and testing the respondents' intentions were used in both Wang's study and the first stage of this paper. However, in the second stage of this paper the actual behaviours of paying or not paying for the subscriptions were collected.

Lastly, the interpretations of the variables are different. Variables were interpreted individually in Wang's results, while factors consisting of three to five variables and representing conceptual aspects were discussed in this study. The top three variables that differentiated willing-to-pay groups from unwilling-to-pay groups in Wang's study were convenience, essentiality, and usage frequency. Interestingly, these three variables accounted for one variable in each of three aspects of this study. Essentiality was included for the general service aspect, usage frequency for the Web 2.0 aspect, and convenience for the Web 1.0 aspect. This indicates that the three aspects defined in this study covered the most important factors in Wang's study. The other three variables with relatively lower discriminant loadings, added value, perceived quality, and perceived fairness were all included in the Web 1.0 aspect, which was the least significant factor to distinguish paying members from non-paying members in this study. Therefore, the conclusion of the relatively less importance of the Web 1.0 aspect on users' decision to pay for online subscriptions was enhanced. It is noted that the factor of security was insignificant in Wang's paper. Security, however, was defined differently in the two studies. It indicated the concern of using credit cards online in their study, while it signified the protection of privacy in this paper. Overlap occurred during the variable selection process in that the protection of privacy was deemed a factor eliciting concerns, including the usage of credit cards online. Moreover, Web 2.0 sites often ask their users registered as members to use their services reserved for members, such as posting articles, replying with personal comments, personalising pages, extra storage, and so on. Providing personal information is often necessary during registration.

Conclusions

Research findings and managerial implications

In this study, I explored the factors which affect users' decisions on whether or not to pay for subscriptions on websites. More than 20 variables were collected from an extensive literature review, and were further reduced to 11 variables through focus group interviews and a Delphi method. The questionnaire was developed accordingly with the contents verified by a focus group interview and a pre-test composed of data collected from a sample of 40 students. After conducting the exploratory factor analysis, 11 variables were grouped into three factors. Factor 1, containing variables 3 (essentiality), 10 (differentiation), and 11 (desire fulfilment), was defined as a general service aspect because its variables are essential to any online or offline service. Factor 2, including variables 6 (usage frequency), 8 (security concern), and 9 (interaction intensity), was named the Web 2.0 aspect because its variables represent typical characteristics of Web 2.0 services. The variables 1 (convenience), 2 (ease of use), 4 (added value), 5 (perceived service quality), and 7 (perceived fairness) formed factor 3, which was labelled the Web 1.0 aspect to characterise those web features excluded from Web 2.0. These three factors were used to form the logistic regression model distinguishing the two groups made up of those willing and unwilling to pay for subscriptions online. The two logistic models provided acceptable prediction accuracies in which the empirical test with a clear target provided better results. All three factors in the two models were significant at a high confidence level. For the first model with samples consisting primarily of students considering their own

favoured Web 2.0 services, the general service aspect was the most significant factor, followed by the Web 1.0 factor, while Web 2.0 was the least important factor. Additionally, an empirical survey using the same variables was conducted on a Web 2.0 website, atlaspost.com, to examine the construct and users' paying behaviour. A CFA provided the necessary support for the construct and the results from a logistic regression model were slightly different from those from the first samples. The importance of the factors was in the order of Web 2.0, general service, and Web 1.0. Without a targeted web service in mind, the respondents in the first survey seemed to react to the questions spontaneously. The general service aspect probably had an impact on the respondents' decision to pay for any services, and became the most significant factor. The Web 1.0 variables were recognised earlier than the Web 2.0 variables by users from the perspective of web development and the former had a slightly higher importance (0.49–0.32). However, the importance of the three factors was reordered when the respondents had a specific web service to decide whether or not to pay for the subscription. The Web 2.0 aspect became the most influential factor because it contained those features attracting users to pay for the content of a Web 2.0 site.

Web 2.0 service operators should pay special attention to the variables consisting of the Web 2.0 aspect. Their users are willing to pay for subscriptions because the service enhances opportunities to interact with others on the site (O'Reilly, 2005). Based on the social exchange theory, interaction is considered rewarding if the benefit perceived by the subject is greater than the effort experienced. In addition, individuals engage in social interaction based on an expectation leading to a social reward such as status approval or respect (Blau, 1964). This approach has been observed in practices in which some websites reward their users with a certain level of interaction such as responding to questions posted online, posting popular articles, etc. In addition, initiating certain types of offline activities should help their users interact more frequently online, but expenses involved need to be carefully monitored. When users are attached to an online service to meet friends and conduct other social activities, their visit frequencies and durations increase (Murugesan, 2007; Byrne, Heavey, & Byrne, 2010). A more efficient way to categorise various topics of interest might also be helpful, and broadening the range of topics could attract more new users and increase their interactions. The last variable for the Web 2.0 aspect to be discussed is security. The lack of face-to-face contact online increases the perceived risk of a relationship among users (Casalo et al., 2008), and the risk of exposure of personal information. To run successful virtual communities, handling member data sensitively is ranked as the number one success factor (Leimeister, Sidiras, & Krcmar, 2006). Web 2.0 service operators should always ensure safe environments for their users so that they are willing to pay for the online services provided. The usage of cookies is also an important factor impacting the concern of user security towards a website. Suggestions include a noticeable and understandable disclosure of cookie use, an option of deleting categories of cookies, and a note that the original domain cookies may be used by a third party (Miyazaki, 2008).

The general service aspect was also highly significant, although it was of less importance than the Web 2.0 factor. Web service operators should keep in mind that, no matter whether theirs is an on-line business or not, customers are always looking for the important value of contents including features to differentiate a particular set of services from others and the desire to be satisfied. Although not as important as the other two factors, the Web 1.0 aspect was still significant in this model. This finding indicates that paying users look for important information, added value, good service quality, and ease of use of the interface on the Internet.

Limitations and future research

This study focused on the factors influencing users' willingness to pay for subscriptions online. The different degrees of importance of these factors indicate that a study covering a wider range of web services is needed. Dubé, Bourhis, and Jacob (2006) provide a good reference for different types of web services. In addition, the prediction accuracies of unwillingness to pay for subscriptions were clearly higher than that of willingness to pay for both of the analysis samples (88.3% versus 75.7%) and holdout samples (94.1% *vs.* 68.1%) during the empirical survey. It is very likely that the paying users are driven by additional factors that require further investigation. Although this paper studied a subscription model, advertisement and transaction models, as indicated previously, are also commonly adopted for online business. While the advertisement model does not really involve users' financial decisions involving the site, another study following the same approach in this research regarding the transaction model should provide the results, along with the analysis from this article, to fully understand the factors influencing users' decisions to pay for online services.

The different results between the two logistic regressions indicate that it is possible that users consider the factors with varied weighting schemes between paying for subscriptions and for transactions. In addition, the three business models do not usually occur together in practice, and various types of combinations such as advertisement and subscription model, advertisement and transaction model, and so on, provide research opportunities for scholars to identify the uniqueness of each model and their corresponding users' behaviour. Understanding the factors influencing users' decisions on different business models will be very beneficial to web service operators. Finally, longitudinal studies would help understand whether the preferences of web users towards web services remain unchanged or vary over time, especially when new contents and new services are continuously added to a site.

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Appendix 1

The focus groups were formed in accordance with guidelines from marketing research (Bellenger, Berhardt, & Goldstucker, 1976; Krueger & Casey, 2009). The participants were heavy web users recruited from ptt/ptt2, which is the largest bulletin board system site in the Chinese society with more than 1.5 million registered members and up to 100,000 users online simultaneously to generate more than 40,000 articles per day (PTT, 2010), and a Web 2.0 service with paying members. Tables A1 and A2 list their background information.

Table A1. Participants of focus group 1.

Gender	Profession	Age	Internet experience
Male	College student	21	5
Male	High-tech employee	28	10
Female	Business consultant	43	12
Male	Sales person	26	8
Female	Estate broker	45	14
Female	College student	23	6
Male	Doctoral student	30	12

Table A2. Participants of focus group 2.

Gender	Profession	Age	Internet experience
Female	Housekeeper	35	10
Male	Software engineer	28	9
Male	Writer	32	8
Female	MBA student	24	7
Male	Bank clerk	33	10
Male	Civil servant	40	15
Female	MBA student	28	11
Female	Self-employment	36	14

Appendix 2

To obtain input from web service operators, practitioners from online services with extensive experience were invited to conduct the Delphi process. Their positions and the Alexa rankings of their online services are listed in Table A3. Alexa.com provides information about websites including Top Sites, Internet traffic statistics and metrics, related links, and online reviews contact information of websites on the Internet for the references of advertisement hosts and users. These experts review the results, the list of variables affecting users' paying decisions for subscribing to online services from the two focus group interviews, and rank their importance by giving individual scores ranging from 1 to 10. Variables with significantly lower scores are removed from the list. This process is repeated until they have reached a consensus (Rowe & Wright, 1999).

Table A3. Participants of the Delphi method.

Firms	Position	Company	Alexa's Taiwan ranking	Alexa's World ranking
A	CEO & Founder	Web 2.0	20–30	3000–4000
B	Director	Web 2.0	1500–1600	128,000–129,000
C	CEO	Web 2.0	200–300	22,000–23,000
D	CEO & Founder	Web 2.0	100–200	14,000–15,000
E	Sales General Manager in Taiwan's Branch	Search Engine	1–10	1–10
F	Senior Consultant	Marketing Research	NA	1,924,000–1,925,000

Source: Alexa.com (2010/07).