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Determinants of success for online communities: an empirical study

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Although online communities can significantly facilitate collaboration among Internet users, the determinants of success of online communities have seldom been studied empirically. Using the updated DeLone and McLean information systems success model as a theoretical framework, this study proposes a research model to examine the determinants for successful use of online communities. Based on a survey of 165 community members, this study uses structural equation modelling (SEM) approach to investigate the research model. The analytical results strongly support the appropriateness of the research model in identifying the determinants of success of online communities. The analytical results also showed that system quality, information quality and service quality had a significant effect on member loyalty through user satisfaction and behavioural intention to use the online community. Finally, this study discusses the implications of these findings and offer directions for future research.

Keywords: Success of online communities; System quality; Information quality; Service quality; Member loyalty

1. Introduction

Given the accelerated number of Internet users, an increasing number of online businesses and Internet service providers are building online communities as a means of developing new social relationships through Internet-based technology (Flanagin and Metzger 2001, Nie 2001, Matei 2004). In order to understating the importance of online communities, researchers have been spending much effort to examine the impact of virtual communities on Internet users (Rheingold 1993, Wellman and Gulia 1995, Johnson 2001, Koh and Kim 2004). Moreover, online businesses and community providers are under increasing pressure to identify the key determinants of successful online communities (Preece 2001, Hall and Graham 2004).

Online communities are having a major impact on enhancing Internet users' online experience. For example, Igbaria *et al*. (1998) suggested that sustaining the online community does not only motivate knowledge sharing, it also has significant impact on online business activity. Moreover, Preece (2001) focused on identifying and measuring the key determinants of sociability (e.g. numbers of participants, amount of reciprocity and trustworthiness) and usability (e.g. number of errors, productivity and user satisfaction) for successful online communities. Furthermore, Johnson (2001) argued that adequate technical support and online communication techniques are necessary for success of online communities. Although such studies have provided useful understanding on the success of online communities, the determinants of success for online communities have rarely been empirically examined.

DeLone and McLean's (2003) updated information systems (IS) success model proposed that system quality, information quality and service quality affect both user satisfaction and behavioural intention to use IS, which in turn are direct antecedents of IS effectiveness. The updated DeLone and McLean information systems success model (hereafter referred to as the 'updated D&M IS Success

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Model') is widely utilised to predict and explain antecedents of IS success (Pitt *et al*. 1995, Molla and Licker 2001, McGill *et al*. 2003, Bharati and Chaudhury 2004). The updated D&M IS Success Model is likely suitable as a theoretical foundation for examining the determinants of success for online communities because online community is a form of the Internet-based information system (Wachter *et al*. 2000).

This study focuses on the updated D&M IS Success Model in the context of online communities, and proposed a research model that was applied to examine how three dimensions of quality (e.g. system quality, information quality and service quality) influence member loyalty through user satisfaction and behavioural intention to use the online community. In this study, the research model and hypothesised relationships were empirically tested using the SEM approach, supported by LISREL 8.3 software. Moreover, this study contributes to online community research by further identifying the key determinants of success for online communities. At a minimum, the findings in this study provide a theoretical basis and empirical evidence for predicting and explaining antecedents of member loyalty in online communities. Specifically, this study identifies quality factors essential to support online communities, and discusses the implications of these factors for formulating management strategies that play a significant role in expanding the online community.

2. Literature review

2.1 *Online community*

The online community can be defined as a social relationship aggregation, facilitated by Internet-based technology, in which users communicate and build personal relationships (Rheingold 1993). Wellman and Gulia (1995) described the online community as a relational community, concerned with social interaction among its members. For example, there are interest-organised communities such as hobby clubs, spiritual groups, fan clubs, or corporate community of practices (CoPs). The interest in online communities could be partly attributed to the benefits and opportunities for both individuals and online retailers. For individuals and groups, online communities facilitate virtual collaboration among community members with the potential of transforming the activities of off-line into an online context (Wenger and Synder 2000, Massey *et al*. 2003). Online communities also enable online retailers to expand their markets and provide an effective way to retain potential customers (Armstrong and Hagel III 1996). Consequently, effective management of online communities is paramount to providing value to both online businesses and their customers.

In an effort to make online communities viable, some online communities, such as www.yahoo.com.tw (a community with many special interest groups) and www.ebay.com.tw (a community of buyer and sellers), provide various core services (e.g. chatroom, bulletin board services and free personal web pages). Moreover, Balasubramanian and Mahajan (2001) noted that an online community consists of five characteristics: an aggregation of people, rational members, interaction in cyberspace without physical collocation, social exchange process and a shared objective, property/identity, or interest between members. Preece (2000) also proposed four online community components: people, a shared purpose, policies and computer systems. Furthermore, Kim (2000) suggested five basic factors necessary to become an online community: clear purposes or visions, flexible and small-scale places, members' role (e.g. designing online community activities based on the membership life cycle: visitors, novices, regulars, leaders), leadership of community moderators (i.e. community leaders) and online/off-line events. Despite the discussions about the online communities from a variety of perspectives, researchers agree that online communities can be made feasible by the presence of groups of people who interact with specific purposes, under the governance of certain policies, and with the facilitation of computer-mediated communication (CMC).

An online community is a new business communication channel allowing businesses to interact with Internet users. From the technical perspective, it is a form of the Internet-based information system (Wachter *et al*. 2000). Researchers have increasingly acknowledged that the social interaction supported by technology is crucial to the success of online communities (Preece 2000, Wang *et al*. 2002, Garrety *et al*. 2004). Furthermore, based on the human–computer interaction (HCI) perspective, researchers noted that website attributes (e.g. usefulness, ease of use and website quality) influence member participation in online communities (Preece 2001, Kuo 2003). Koh and Kim (2004) proposed that the technical perspective is useful when addressing virtual community stimulation since it encourages members to resolve disputes and favour quality discussions. Therefore, from the technical perspective, this study adopted the IS success model as the theoretical framework to examine the major determinants of online community effectiveness.

2.2 *Updated DeLone and McLean IS success model*

DeLone and McLean (1992) extensively reviewed IS success literature and proposed the six dimensions of IS success model. The six dimensions for measuring IS success are system quality, information quality, user satisfaction, IS use, individual impact and organisational impact. The D&M IS Success Model (1992) is based on the communications research of Shannon and Weaver (1949) and the information influence theory of Mason (1978). Shannon and Weaver (1949) organised communication problems

into three hierarchical levels: technical, semantic and effectiveness. The technical level investigates the accuracy and efficiency of the communication system producing information, the semantic level focuses on the success of the information in conveying intended meaning, and the effectiveness level is concerned with the effect of the information on the receiver. In DeLone and McLean's (1992) taxonomy, system quality measures technical success, information quality measures semantic success and user satisfaction, IS use, individual impact and organisational impact are the measures effectiveness.

DeLone and McLean (2003) recently considered electronic commerce (e-commerce) environments and the original IS success model and proposed an updated D&M IS Success Model as a foundation for empirical e-commerce research. The model adds a third quality dimension 'service quality' and combines 'individual impact' and 'organisational impact' into 'net benefits'. In the updated D&M IS Success Model (see figure 1), system quality, information quality and service quality affect user satisfaction and behavioural intention to use IS, which in turn are direct antecedents of net benefits. The updated D&M IS Success Model makes significant contributions to e-commerce success-related research in two ways. First, it proposes that e-commerce success measures are multidimensional, and second, it suggests a research model of casual relationships among these dimensions.

Although numerous studies have applied the updated D&M IS Success Model in the context of various Internet-based information systems, including e-commerce system success (Molla and Licker 2001), web-based decision support systems (Bharati and Chaudhury 2004) and Internet shopping malls (Ahn *et al*. 2004), few studies have examined the updated D&M IS Success Model in online community environments. As a powerful CMC medium, the online community exists in cyberspace and is dependent on communication techniques. In an online community, members can perform their tasks effectively and exchange transaction-related information. Online communities are similar to general Internet-based information systems that have a significant impact on individual decision-making behaviours and Internet marketing strategies (Romm *et al*. 1997). Hence, this study suggests that the updated D&M IS Success Model is an appropriate model for explaining the determinants of success of online communities.

3. Research model and hypotheses

This study investigated the applicability of the updated D&M IS Success Model to online communities. Because of the uniqueness of each online community and its management strategies (e.g. member involvement in the online community and member development), member loyalty was considered to be a more appropriate indicator of online community effectiveness than 'net benefits' dimension. The research model tested in this study as shown in figure 2, verified the updated D&M IS Success Model related causal relationships in online community environments. Moreover, this study adapted from the dimension definitions of the updated D&M IS Success Model and modified for use in the online community context. The research model identifies the following six dimensions:

- System quality in the Internet-based information system, measures the desired characteristics of an online community. System reliability, convenient access, ease of use and system flexibility are examples of qualities valued by online community members.
- Information quality measures online community output. The content of an online community includes information accuracy, timeliness, usefulness, completeness and customised information presentation.
- Service quality represents overall user assessment and service delivery assessment in the virtual marketplace. Measures of service quality in an online community include interface design presented to members, trust mechanisms provided by the online community, and willingness to help members and provide prompt service.
- User satisfaction remains an important means of gauging members' opinions regarding an online community.

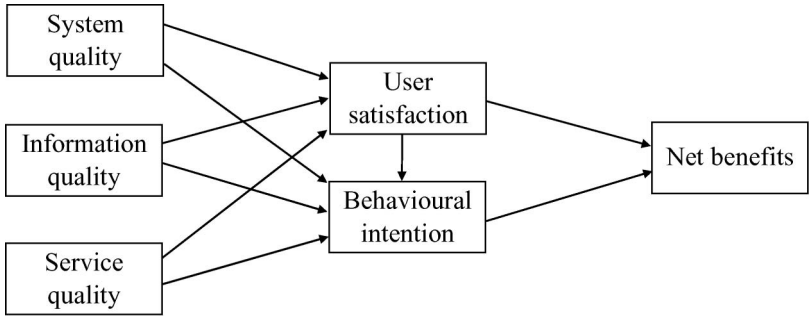

Figure 1. Updated D&M IS Success Model.

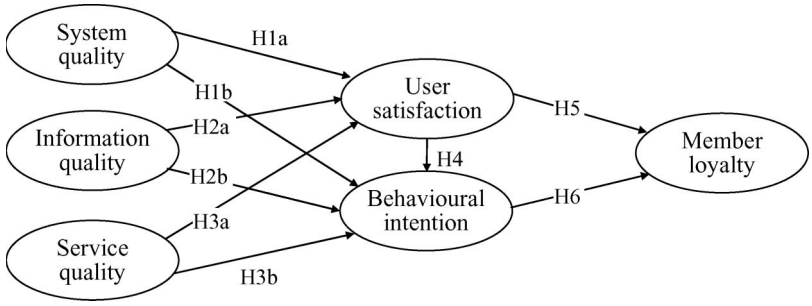

Figure 2. Research model.

- Behavioural intention is a surrogate for actual behaviour and is defined in the members' intention to use the online community.
- Member loyalty measures member involvement in an online community, i.e. participation in community operations and communication with other members.

The proposed research model assumes that system quality, information quality and service quality are linked to user satisfaction and behavioural intention to use an online community, and in turn influence member loyalty. These rationales lead to the following set of hypotheses:

H1a: System quality has a positive influence on user satisfaction with the online community.
H1b: System quality has a positive influence on behavioural intention to use the online community.
H2a: Information quality has a positive influence on user satisfaction with the online community.
H2b: Information quality has a positive influence on behavioural intention to use the online community.
H3a: Service quality has a positive influence on user satisfaction with the online community.
H3b: Service quality has a positive influence on behavioural intention to use the online community.
H4: User satisfaction has a positive influence on behavioural intention to use the online community.
H5: User satisfaction has a positive influence on member loyalty in the online community.
H6: Behavioural intention to use the online community has a positive influence on member loyalty in the online community.

4. Methods

4.1 *Sample and data collection*

This study utilised online community literature and interviews with leaders of diverse online communities. Pretesting focused on questionnaire clarity, question wording and question applicability. During the pretesting, 15 members from different communities taken as subjects were invited to comment on the questions and their wording. Comments from these 15 subjects then provided a basis for questionnaire revisions. Leaders of 20 online communities willing to participate in this study were selected from a group of very successful online communities (e.g. http://tw.club.yahoo.com, http://club.yam.com and http://club.pchome.com.tw), which were the three highest-ranking online communities in Taiwan by Alexa.com in April 2005. The community leaders were requested to randomly distribute the paper-based questionnaires to 10 community members and to collect the questionnaires when completed.

Of the 200 questionnaires distributed, 165 completed and usable questionnaires were received, representing a response rate of 82.5 per cent. Table 1 lists the respondent's demographic characteristics, including gender, age, education level or occupation, involvement with the online community, average using the online community hours per week and online community type.

4.2 *Measures*

In this study, items used to operationalise the constructs were mainly adapted from previous studies and modified for use in the online community context. This study measured six constructs: system quality, information quality, service quality, user satisfaction, behavioural intention and member loyalty. All constructs were measured using multiple items. All items were measured using a seven-point Likert-type scale (ranging from 1 = strongly disagree, to 7 = strongly agree). Table 2 lists all of the survey items used to measure each construct. Four measures of system reliability, convenient to access, easy to use and system flexibility were developed to measure system quality from Bharati and Chaudhury's measures (2004). Five measures of information accuracy, timeliness, usefulness, completeness and customised presentation were developed to measure information quality (Bailey

Table 1. Demographic characteristics of respondents (n = 165).

Demographic characteristics	Frequency	Percentage
Gender		
Female	98	59.4
Male	65	39.4
Missing	2	1.2
Age		
Under 25	134	81.2
Over 25	26	15.7
Missing	5	3.1
Education level or occupation		
Students below university	15	9.1
University students	58	35.1
Master students	20	12.1
Company employees	46	27.9
Others	18	10.9
Missing	8	4.9
Involvement with the online community		
Below 1 year	87	52.7
1 – 3 years	50	30.3
3 – 5 years	12	7.2
Over 5 years	15	9.1
Missing	1	0.7
Average using the online community hours per week		
Below 1 hour	17	10.3
1 – 5 hours	73	44.2
5 – 10 hours	51	30.9
Over 10 hours	21	12.7
Missing	3	1.9
Online community type		
Arts	6	3.6
Computers	37	22.4
Friend groups	28	17.0
Games	26	15.7
Health	7	4.2
News	8	4.9
Recreation	19	11.5
Science	17	10.3
Society	13	7.9
Others	4	2.5

and Pearson 1983). Service quality was measured using a five-item scale that assessed the extent to which the online community was visually appealing, trustworthy and responsive to member requests (Parasuraman *et al.* 1988, Kimery and McCard 2002).

User satisfaction with the online community was assessed with the following three statements: 'Using the online community will help satisfy my social needs', 'The online community's information content meets my needs' and 'Overall, I am satisfied with the online community'. Additionally, based on Ajzen and Fishbein (1980), this study used a three-item scale to measure behavioural intention to use the online community. Terms such as 'worthwhile', 'likely' and 'recommend to others' were used to assess behavioural intention to use the online community. Finally, member loyalty was measured using two items taken from Yoo *et al.* (2002) that measured the extent to which members were involved in the online community.

5. Results

The SEM approach was used to validate the research model. This approach was chosen because of its ability to test casual relationships between constructs with multiple measurement items (Joreskog and Sorbom 1996). Numerous researchers have proposed a two-stage model-building process for applying SEM (Hoyle 1995, Joreskog and Sorbom 1996, Hair *et al.* 1998). Confirmatory factor analysis (CFA) was conducted to examine the reliability and validity of the measurement model, and the structural model also was analysed to test the associations hypothesised in the research model.

5.1 *Measure reliability and validity*

The measurement model was first assessed by CFA. Table 2 presents the results of CFA for measurement model. Greek symbols are used to denote the research model parameters. Exogenous constructs are denoted by ξ, whereas endogenous constructs denoted by η. Consequently, ξ_1 denotes system quality, ξ_2 denotes information quality, ξ_3 denotes service quality, η_1 denotes user satisfaction, η_2 denotes behavioural intention and η_3 denotes member loyalty.

Previous research has noted that the normed χ^2 (the ratio between χ^2 and the degree of freedom) provides direct statistical evidence for the test of model goodness of fit (Joreskog and Sorbom 1996). The observed normed χ^2 for measurement model was 1.99 ($\chi^2 = 275.81$, df = 138), which is smaller than 3 recommended by Bagozzi and Yi (1988). Other fit indexes also show good fit for the measurement model. The goodness-of-fit index (GFI) is 0.91 and comparative fit index (CFI) is 0.95, which exceed the recommended cut-off level of 0.9 (Joreskog and Sorbom 1996). The adjusted goodness-of-fit index (AGFI) is 0.88, which is slightly low but still acceptable (Bagozzi and Yi 1988). The root mean square error of approximation (RMSEA) is 0.06, which is below the cut-off level of 0.08 recommended by Browne and Cudeck (1993). In sum, the measurement model exhibited a fairly good fit with the data collected.

The measurement model was further assessed for construct reliability and validity. Computing composite reliability assessed the internal consistency of the measurement model. The composite reliability for each construct of this study is presented in table 2. The values range from 0.79 (for behavioural intention) to 0.89 (for user satisfaction). The composite reliability of all latent constructs exceeded

Table 2. Results of CFA for measurement model.

Construct/Measure	Factor loading	Composite reliability[b]	Variance extracted[c]
System quality (ξ_1)		0.83	0.69
SQ1: The online community is reliability	0.67		
SQ2: The online community is convenient to access	0.70		
SQ3: The online community is easy to use	0.75		
SQ4: The online community is flexibility	0.80		
Information quality (ξ_2)		0.87	0.76
IQ1: The online community provides accurate information	0.83		
IQ2: The online community provides timely information	0.91		
IQ3: The online community provides useful information	0.88		
IQ4: The online community provides completed information	0.88		
IQ5: The online community provides customized information	0.78		
Service quality (ξ_3)		0.84	0.66
SE1: The online community is visually appealing	0.74		
SE2: The user interface of online community has a well-organized appearance	0.78		
SE3: The online community is trustworthy	0.75		
SE4: The online community dose not show a sincere interest in solving member problems[a]	0.72		
SE5: The online community dose not give prompt service[a]	0.79		
User satisfaction (η_1)		0.89	0.78
US1: Using the online community will help satisfy my social needs	0.84		
US2: The online community's information content meets my needs	0.91		
US3: Overall, I am satisfied with the online community	0.83		
Behavioural intention (η_2)		0.79	0.56
BI1: I believe it is worthwhile for me to use the online community	0.70		
BI2: Based on my experience, I am very likely to use the online community	0.68		
BI3: I will recommend that other people use the online community	0.62		
Member loyalty (η_3)		0.82	0.61
ML1: I am willing to participate in community operations	0.84		
ML2: I am willing to communicate with other community members	0.71		

Note: All t-value are significant at $p<0.001$.
[a]Reverse coded.
[b]Composite reliability: (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (summation of error variances)}.
[c]Variance extracted: (summation of the square of the factor loadings)/{summation of the square of the factor loadings} + (summation of error variances)}.

the benchmark of 0.7 recommended by Nunnally and Bernstein (1994).

Convergent validity is the degree to which multiple attempts to measure the same concept in agreement. Table 2 also presented the factor loadings of the measurement items. The factor loading for all items exceeds the recommended level of 0.6 (Chin *et al.* 1997). Discriminant validity is the degree to which the measures of different concepts are distinct. Discriminant validity can be examined by comparing the squared correlations between constructs and variance extracted for a construct (Fornell and Larcker 1981). The analysis results showed that the square correlations for each construct is less than the variance extracted by the indicators measuring that construct, as shown in table 3, indicating the measure has adequate discriminant validity. In summary, the measurement model demonstrated adequate reliability, convergent validity and discriminant validity.

5.2 *Testing the hypotheses*

The results of structural model analysis are displayed in figure 3. The structural model analysis has a good fit as judged from the goodness of fit indices (GFI = 0.90; AGFI = 0.82; CFI = 0.93; RMSEA = 0.04), and the Chi-square index being significant ($\chi^2 = 313.29$; df = 147; $\chi^2/\text{df} = 2.13$) (Bagozzi and Yi 1988).

The structural model links the constructs to one another. User satisfaction and behavioural intention are linked to member loyalty (β). System quality, information quality and service quality are linked to user satisfaction and behavioural intention (γ).

The analytical results showed that system quality positively affects user satisfaction ($\gamma_{11} = 0.22$, $p<0.05$) and behavioural intention to use the online community ($\gamma_{21} = 0.35$, $p<0.01$), providing support for H1a and H1b. Moreover, information quality significantly and positively

Table 3. Discriminant validity of constructs.

Constructs	ξ_1	ξ_2	ξ_3	η_1	η_2	η_3
System quality (ξ_1)	0.69					
Information quality (ξ_2)	0.24	0.76				
Service quality (ξ_3)	0.21	0.35	0.66			
User satisfaction (η_1)	0.33	0.16	0.14	0.56		
Behavioural intention (η_2)	0.34	0.61	0.32	0.09	0.78	
Member loyalty (η_3)	0.28	0.26	0.45	0.25	0.35	0.61

Note: Diagonals represent the average variance extracted, while the other matrix entries represent the square correlations.

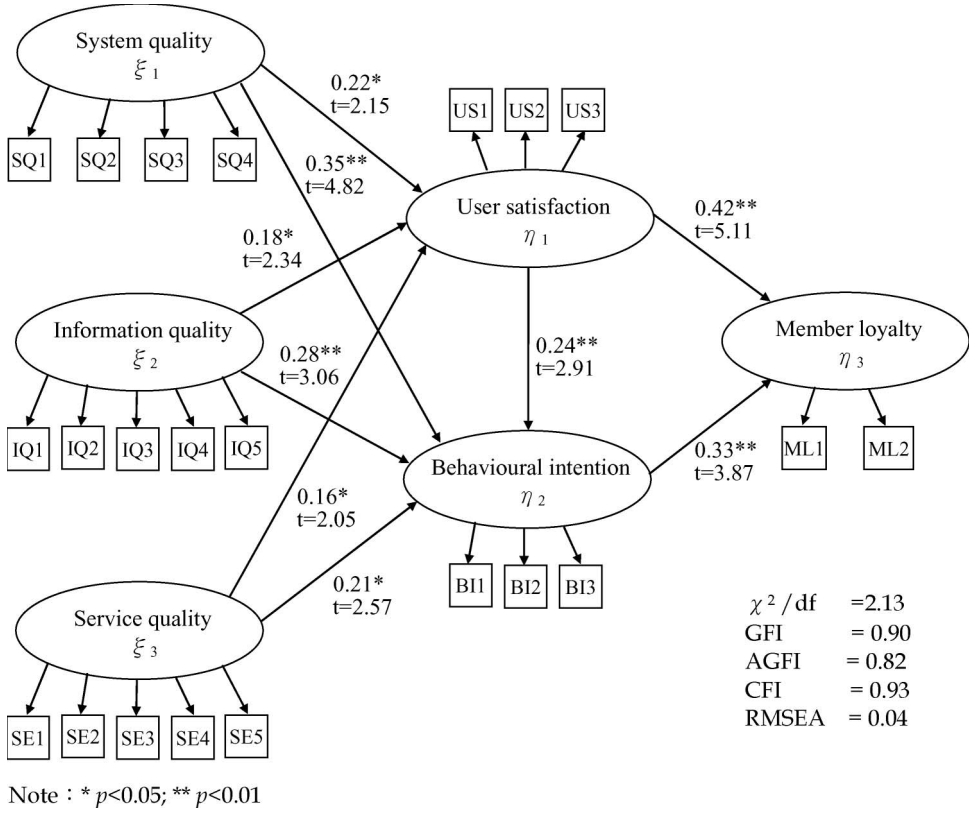

Figure 3. Results of structural model.

affects user satisfaction ($\gamma_{12} = 0.18$, $p < 0.05$) and behavioural intention to use the online community ($\gamma_{22} = 0.28$, $p < 0.01$), supporting H2a and H2b. From H3a and H3b, service quality positively affects user satisfaction ($\gamma_{13} = 0.16$, $p < 0.05$) and behavioural intention to use the online community ($\gamma_{23} = 0.21$, $p < 0.05$). H3a and H3b thus are supported. Furthermore, user satisfaction was found to significantly affect behavioural intention to use online community ($\beta_{21} = 0.24$, $p < 0.01$) and member loyalty ($\beta_{31} = 0.42$, $p < 0.01$), so H4 and H5 are supported. Finally, behavioural intention to use the online community has a positive influence on member loyalty ($\beta_{32} = 0.33$, $p < 0.01$), supporting H6.

6. Discussion and conclusions

6.1 *Discussion of findings*

This study assesses the applicability of the updated D&M IS Success Model and examines how three dimensions of quality (e.g. system quality, information quality and service quality) influenced member loyalty through

user satisfaction and behavioural intention to use the online community. The analytical results of this study are discussed below.

System quality is a significant predictor of user satisfaction and behavioural intention to use the online community. Consequently, enhancing the system quality increases members' satisfaction and behavioural intention to use the online community. The online community's website reliability, access convenience, ease of use and website flexibility comprised system quality criteria. Thus, positive results for these factors resulted in a positive influence on user satisfaction and behavioural intention to use the online community. Website reliability, access convenience, ease of use and website flexibility were important considerations for community members.

Information quality had significant influence on user satisfaction and behavioural intention to use the online community. Consequently, high-quality information increases member satisfaction and behavioural intention to use the online community. Information quality comprises information accuracy, timeliness, usefulness, completeness and information, customised for member needs. Thus, the online community should provide accuracy, timeliness, usefulness, completeness and customised information in the website systems, subsequently increasing user satisfaction and behavioural intention to use the online community.

Service quality significantly affects both user satisfaction and behavioural intention to use the online community. As such, a high level of service quality leads to high levels of member satisfaction and behavioural intention to use the online community. Thus, a high score for service quality (e.g. visually appealing, trustworthy and responsive in the online community) will have a positive influence on behavioural intention and user satisfaction with the online community. Online community managers must provide well-organised websites and prompt service to attract more members' participation.

The analytical results demonstrated a positive relationship among user satisfaction, behavioural intention and member loyalty in the online communities. These findings were in agreement with previous studies of IS-related research (Zhu *et al*. 2002, Kuo 2003, Chiou 2004). Thus, it is reasonable to suggest that satisfied members with behavioural intention to use the online community have a high member loyalty to the online community.

In sum, the contributions of this study to updated D&M IS Success Model research are twofold. First, the findings of this study strongly supported the appropriateness of using the updated D&M IS Success Model to understand determinants of success of online communities. Second, system quality, information quality and service quality were found to significantly influence both user satisfaction and behavioural intention to use an online community, which in turn were direct antecedents of member loyalty.

6.2 *Managerial implications*

This study has the following implications for online communities. First, the new digital economy comprises an increasing number of online communities, and online businesses are encouraged to establish communities to cultivate more personal relationships with consumers. Ultimately, success of an online community depends on member perceptions of website quality and their level of involvement in the community. Online businesses and community providers can use the findings of this study to focus their efforts on the determinants of success for their online communities. Second, because online communication lacks face-to-face contact, online businesses and community providers should focus on the method that creates loyal community members. The results indicated that providing reliable and user-friendly website systems was an important factor for successful online communities. Third, online businesses and community providers should actively seek ways to improve information and service quality, since these factors significantly affect member satisfaction and their intention to use an online community. Online businesses and community providers should establish a service-oriented mechanism for chatrooms and bulletin board services to provide high-quality information and services to community members. For example, establishing a dialogue with community members created value by facilitating members to share experiences, community-specific problems and solutions. Additionally, the online community can provide personalised functions for particular members by creating and managing topics favoured and identified by tracking member activities. This practice can foster a sense of belonging for community members. Hence, improvements in information quality and service quality are necessary to both attract and retain members in online communities.

6.3 *Future research*

There are several future research directions that will further an understanding of online community success. First, future research can use different methodologies, such as longitudinal studies, focus groups and interviews to examine the applicability of the research model adopted in this study. Second, according to the updated D&M IS Success Model, this study focused on how system quality, information quality and service quality influenced member loyalty through user satisfaction and behavioural intention to use the online community. This study, however, did not consider all determinants of success for online communities. Seddon (1997) presented perceived usefulness as a factor that influences net benefits of IS use. Kim *et al*. (2004) proposed that sense of belonging to an online community (e.g. membership, influence and relatedness,

integration and fulfilment of need, and shared emotional connection) has an impact on member loyalty. Ridings *et al*. (2002) verified empirically that dimensions of trust (e.g. ability and integrity) had an effect on member intention to both provide information to, and take information from, an online community. Further research considering these factors could enhance an understanding of success determinants for online communities. Third, although the scales used in this study for measuring member loyalty are similar to scales employed, further research might consider developing more elaborate measures that would facilitate a richer evaluation of member loyalty. Fourth, prior research has suggested a significant relationship between individual differences and Internet usage (Hong *et al*. 2001). Future research can examine whether individual differences, such as age, level of education and online community experiences have any influence on the success of online communities. Finally, previous studies found that culture plays a significant role in Internet user behaviour (Liao and Cheung 2001). Knowledge of how cultural factors (such as lifestyle, cultural environment, technology adoption rate and traditions) affect the member behaviour in online communities will heighten the generalisability of online community research. An understanding of different cultural factors would allow this study to be applied to different cultures and thus provide cross-cultural comparisons.

6.4 *Limitations*

This study had four primary limitations. First, the sample used in this study targeted online communities chosen for convenient sampling. Analytical results presented may therefore have limited generalisability. Second, since this study only considered non-profit online communities, it is unclear whether these analytical results can be generalised to other online communities. Further research can apply this research model to examine profit-oriented online communities, such as eBay.com.tw or brand communities (McWilliam 2000). Third, the sample may have been biased since all the sample communities voluntarily participated in the survey. A more sophisticated sample collection method is needed to eliminate this potential shortcoming. Finally, since the sample was collected in Taiwan, generalisability to other countries might be limited due to cultural differences in member behaviour in online communities.

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