

國立臺灣大學資訊管理學研究所碩士論文

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網路平台該多開放？

電子服務環境中開放策略與顧客權益的關係研究

How Open Should an Online Platform Be?
Relationship between Open Strategy and Customer Equity
In the E-Service Context

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首先要感謝我的指導教授黃明蕙博士。在論文研究過程中，教授適時的提供指導與協助，讓我不致於迷失了方向。很感謝教授如此用心及有耐心的指導我教授的指導是我這兩年來最大的收穫。教授甚至邀請馬里蘭大學的Dr. Rust做為我的口試委員，雖然這樣給了我很大的壓力，但這真的是很特殊並很實用的經驗！而交通大學的羅濟群教授也針對我論文提出了很實用的建議，這樣的經驗與成長讓我一生受用。整個準備論文的過程與三位口試委員的意見都深深讓我體認到學術研究的艱辛與嚴格，並深感所學之不足。經過這次的經驗，我更期許自己在以後的日子裡也要持續的學習新知，才能更提升自己的競爭力！

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論文摘要

論文題目：網路平台該多開放？電子服務環境中開放
策略與顧客權益的關係研究

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Facebook, Google 和 Yahoo 接連的宣佈了各自的開放策略。網路平台業者認為透過開放策略，可以吸引到更多的程式開發者來開發更多有創意的應用程式，而更多的應用程式則意味著可以吸引更多的使用者，也就是網路平台業者最大的資產。因此，「開放」已經變成了網路業中最流行的用語。但是當網路平台業者接連實行開放策略時，對於使用者如何衡量開放策略的研究卻是很缺乏的！因此，此研究把網路平台的開放策略、Web2.0 的特性與顧客權益做一連結，希望可以提供管理者一種不同的角度來做為擬訂競爭或行銷策略的依據。

此研究證明了開放與否與 Web2.0 的三個特性對網路平台的顧客權益是非常重要的，而基於問卷資料的分析，此研究進一步提出了以下的建議：

1. 網路平台業者應實施某種程度的開放，而不是完全的封閉
2. 網路平台業者應持續的提升其用戶數目與使用者認知的平台開放程度
3. 網路平台業者必須先定義出顧客權益三個驅動因子個別對公司的重要性，如此網路平台業者才能制訂出最佳的開放策略
4. 使用者參與和使用者使用頻率，與開放策略相同，網路平台業者必須先定義出顧客權益三個驅動因子個別對公司的重要性，才能進一步衡量哪一個使用者使用情形因子應該獲得較多的投資

關鍵詞：開放策略、顧客權益

THESIS ABSTRACT

How Open Should Online Platform Be? Relationship between Open Strategy and Customer Equity in E-Service Context

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Facebook, Google and Yahoo have all introduced their open strategy to the public. Via an open strategy, online platform providers presume they can encourage more developers to develop innovative applications. More popular applications mean more users, which are the most precious assets of an online platform. As a result, “open” has become a buzzword in the internet industry. But while all website hosts are trying to include an open element in their websites, their knowledge of how customers perceive their open strategy is insufficient.

This research links online platforms’ open strategy and Web 2.0 characteristics with Customer Equity, which might provide another viewpoint in the composition of competitive and marketing strategy. Also, this research proves that being open and having the three Web 2.0 characteristics are crucial to the Customer Equity of online platforms.

Based on the survey data analysis, this research offers the following suggestions:

1. Online platforms should implement an open strategy in their online services instead of staying “closed”.
2. Online platform providers should keep enhancing the Size of Network of their platform and their perceived Degree of Openness.
3. Online platform providers should first decide their priority in the three drivers of Customer Equity. After doing so, they can compose the best open strategy for their online platform.

4. For User Participation and User Usage Frequency, as in the case of open strategy, online platform providers should first decide which driver is the most important, then decide which of the factors that engage users should be the focus of investment.

Key Words: Open Strategy, Customer Equity



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1. Introduction

1.1. Motivation

On June 1, 2007, Facebook, one of the most popular social networking websites, launched Facebook Platform. Facebook Platform enables anyone to build social applications on Facebook and on the web, and lets developers create applications that allow users to share and stay connected. Now over 650,000 developers are helping make the Web more social.(Facebook, 2009) The strategic move of launching Facebook Platform has and continues to be extensively discussed around the world. After five months, Google, MySpace and a number of other social networking websites launched the OpenSocial Foundation on November 1, 2007. OpenSocial aims to deliver an open framework that is scalable, interoperable, and inclusive of all existing communities to ensure rapid adoption.(Mitchell-Wong, Kowalczyk, Rosheloval, Joy, & Tsai, 2007) It integrates third-party content into the site and gives external developers access to user data. These open interfaces enable popular site enhancements.(Felt & Evans, 2008) Also, an open API might make more application fusions possible.(Leng, 2009) But while all the website hosts are trying to include an open element (such as Google allowing users to embed Google Maps into their own websites or blogs, or Yahoo releasing a service called SearchMonkey, which lets users customize their own search results in their own websites based on Yahoo's search engine) in their services, their knowledge of how online platform providers implement openness is somehow insufficient. Since the word "open" has become increasingly popular in recent years, it is necessary to understand the kinds of open strategy online platform providers are adopting.

Nevertheless, online platform providers need a precise method to evaluate profitability in a very dynamic environment. Companies usually evaluate their profit-related performance in terms of product profitability. However, given the success of the customer centric concept, the product profitability computation is insufficient.(Rust, Kannan, & Ramachandran, 2005) Under this circumstance, Customer Equity is designed as an integrated approach to marketing that can form the basis for more effective marketing strategies.(Rust, Hogan, & Lemon, 2002) But, besides openness, are there other factors that will influence the Customer Equity of online platform providers? If so, to what degrees will they affect it?

Openness can enable popular site enhancements and might make more application fusions possible, and Customer Equity can be a method to evaluate the profitability of a company. Therefore, the relationship between openness and Customer Equity should be known. By

understanding that, online platform providers might be able to compose a more sophisticated marketing strategy or a more profitable business model.

1.2. Research Objective

Based on the research motivation, this research has three objectives:

1. To list and categorize online platforms at different levels of openness, since the literature related to the openness of online platform providers is not sufficient. By doing that, we can have a clearer understanding of how open these online platform providers are and can go further to explore the relationship between openness and Customer Equity;
2. To ascertain factors that might influence the open strategies of online platforms and Customer Equity; and
3. To reach useful conclusions that can help online platform providers to build or modify their open strategy and increase Customer Equity.

The research questions have been composed as follows:

1. What kinds of open strategies are online platform providers adopting?
2. How do the characteristics of online platforms influence Customer Equity?
3. How open should online platforms be from the perspective of Customer Equity?

2. Literature Review

2.1. The Concept of Openness

The term “open” is not new at all. In the software industry in 1998, a part of the free software community splintered off and began campaigning in the name of “open source”, which stands for certain rights that a software license must grant.(DiBona, Ockman, & Stone, 1999) Open source does not just mean access to the source code, it also ensures compliance with free redistribution, derived works, no discrimination against persons or groups, and no discrimination against fields of endeavor. Its full definition is in Appendix B under Source Code Perspective. The philosophy of open source considers issues in terms of how to make software “better”.(Stallman, 2007)

The concept of open source became popular at that time for several reasons: it could lower costs for users; it was better quality than the non-open source model; it could be customized; it was faster in the development cycle; and it could reduce redundant coding efforts.(Wynants & Cornelis, 2005)

The open source movement is still in progress, and the word “open” has been extended and applied to different industries. Besides open source, now we even have an open software service (an open service provided by a software application running online and making its facilities available to users over the internet via an interface) ("The Open Software Service Definition (v1.1)," 2008) and open knowledge (open data, content or information) ("Open Knowledge Definition v1.0," 2008) that give rise to the trend of openness in the internet industry. Facebook, Google and Yahoo, the current three internet giants, all put the concept of openness into practice. As a result, the concept of openness has now become even more popular than before. However, according to the Open Software Service Definition composed by the Open Knowledge Foundation, an open software service should be open both in terms of data and source code.("The Open Software Service Definition (v1.1)," 2008) This criterion is very important in determining the level of openness of a software service provider.

2.2. Web 2.0 and Openness

The growing importance of Web 2.0 and its effects on consumers and organizations frequently make headlines and are increasingly attracting academic attention.(Constantinides & Fountain, 2008) The definition of Web 2.0 can be described as “a set of economic, social and technology trends that collectively form the basis for the next generation of the internet— a more mature, distinctive medium characterized by user participation, openness, and network

effects.” (Musser, 2006) It is evident that openness has already been recognized as an important characteristic of Web 2.0, and many successful websites contain Web 2.0’s attributes in that they are massively connected, decentralized, user focused, lightweight, emergent, and open (Musser, 2006) to different degrees. The reasons for referring to the characteristics of Web 2.0 in this research are as follows:

1. The Web 2.0 movement emphasizes the trend towards openness.(Constantinides & Fountain, 2008) This description shows that the idea of openness is actually one of the concepts of Web 2.0.
2. User participation can facilitate content or service provisions of the site. It is also a channel for the service provider to directly reflect on and fulfill the individual needs of customers.(Lai & Chen, 2008)
3. Web 2.0 thrives on network effects: databases that get richer as more people interact with them, applications that become smarter as more people use them, and marketing applications that interact with each other to form a broader computing platform.(Loreto, 2007)

Since this research is trying to discover the relationship between open strategy and the increase in customer value, it is necessary and reasonable to include the characteristics of Web 2.0, which are very influential in the success of online service providers, in the research model.

2.3. Definition of Online Platform

According to the literature, a software platform is a software package that enables the realization of application systems.(Taudes, Feurstein, & Mild, 2000)

Because this research will discuss software platforms which can be accessed by the public via the internet, the definition of an online platform in this research is a software platform which must accessible via the internet.

2.4. Customer Equity

“Products come and go, but customers remain.”

---- (Rust, Lemon, & Zeithaml, 2001)

Given the success of the customer centric concept, the product profitability computation is insufficient.(Rust, et al., 2005) Under this circumstance, customer equity is designed as an integrated approach to marketing that can form the basis for more effective marketing strategies.(Rust, et al., 2002)

Customer equity combines the ideas of direct marketing, service quality, relationship quality, brand equity, and customer lifetime value.(Rust, et al., 2002) Customer equity is defined as the “total of the discounted lifetime values summed over all of the firm’s current and future customers.”(Rust & Kannan, 2003) With this definition, the scholars later defined three factors that can drive customer equity. The concept of customer equity and its three drivers are leading marketing into a new paradigm.

2.5. The E-service context

E-service is defined as the provision of a service over electronic networks.(Rust & Kannan, 2002) Its fundamental philosophy is the focus on customers — meeting their needs precisely and thereby growing markets and revenue.(Rust & Kannan, 2003) The definition and philosophy of E-service make it a perfect context to answer the main question of this research: what is the relationship between open strategy and increasing customer value? The E-service paradigm represents a coherent point of view that challenges many of the traditional assumptions about how to use the online environment to raise profits.(Rust & Kannan, 2003) The relationship between open strategy and user value is more than a direct causal relationship. The importance of user participation in contributing to the success of an information system has been a long held theoretical belief.(Terry & Standing, 2003) In order to clarify the correlation between open strategy and user perceived value, we also have to consider some user characteristics.

2.6. Conceptual Framework

Based on the above literature review, the conceptual framework of this research is composed in Figure 1:

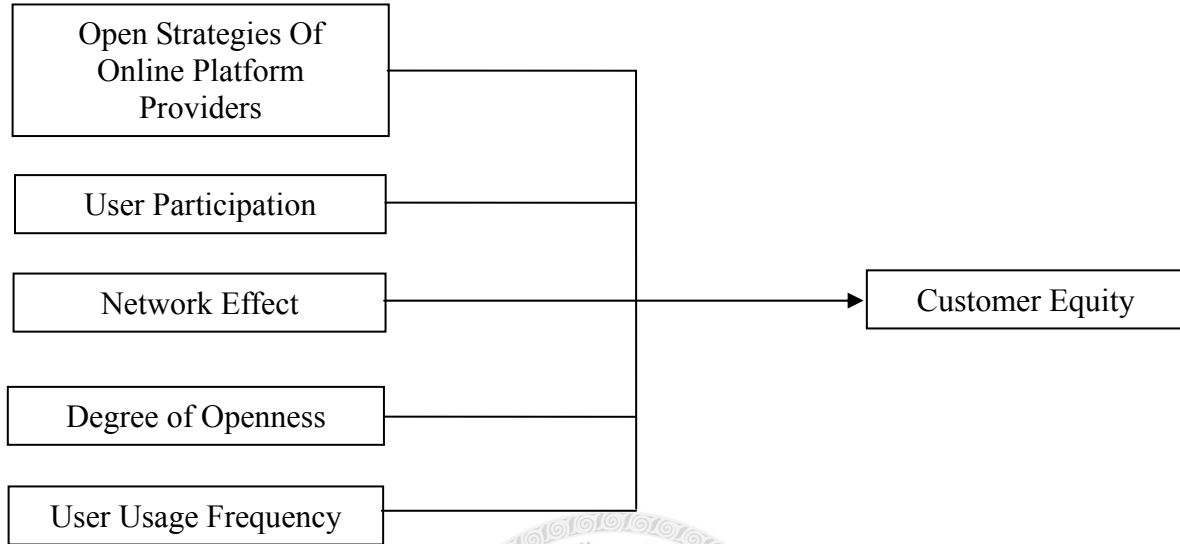


Figure 1. Conceptual Framework

This research will take a closer look at each factor in the conceptual framework in the rest of the literature review.

2.7. User Participation

The definition of User Participation in the Information Management field refers to the behaviors, assignments, and activities that users or their representatives perform during the information system development process.(Hartwick & Barki, 1994) In order to fit the research topic, the definition of User Participation in this research is “the behaviors and activities that users perform with the online platform.” Traditionally, as with other kinds of public media, most of the content on the internet was created by companies. Internet browsers did not have the power to speak in cyber space at the time. They could only receive information which the content providers were willing to publish. But that situation has changed in the age of Web 2.0, because Web2.0 is participative. Participation will become a more pervasive aspect of our online lives.(Miller, 2005) Also, User Participation can facilitate content or service provisions of the site and become a channel for the service provider to directly reflect on and fulfill the individual needs of customers.(Lai & Chen, 2008) However, User Participation in most, if not all, social media sites is not uniformly distributed.(Lerman, 2007) Therefore, this research considers it necessary to include User Participation in its framework.

2.8. Network Effect

Network Effect refers to the concept that “the value to each customer depends upon the number of other customers (and who they are) who also use the service.”(Li, Chen, & Yung-ShaoYeh, 2007) Since Network Effect is one of the characteristics of Web 2.0 and has already been proved to be the key to market dominance in the Web 2.0 era(O'Reilly, 2007), this research aims to determine whether Network Effect will influence Customer Equity.

2.9. Open Strategy and Degree of Openness

The openness of Web 2.0 mainly refers to the opening of content, APIs, and the development of open source software and applications.(Leng, 2009) We can appreciate that the openness of Web 2.0 is not only about the opening of content; it also includes the opening of APIs and source code. Therefore, online platform providers can implement different levels open strategy. They can go totally open, which means open in terms of data and source code (like Wikipedia), or they can just provide open APIs to let third party developers access and use their data in some preset protocol (like Facebook). Web 2.0 emphasizes the trend towards openness(Constantinides & Fountain, 2008), and since openness is one of the characteristics of Web 2.0, this research aims to determine whether the different levels of Open Strategy and Degree of Openness will influence the Customer Equity of online platform providers.

2.10. User Usage Frequency

Web page revisitation is a prevalent activity. Users tend to frequently visit just a few websites. This pattern of behavior substantially contributes to the high revisitation rates reported in the previous section.(Cockburn & Mckenzie, 2000) This research intends to connect the User Usage Frequency with Customer Equity, and in doing so, determine the causes of revisitation.

2.11. Three drivers of Customer Equity

The three drivers of Customer Equity, as defined by Doctor Roland T. Rust, are Value Equity, Brand Equity and Relationship Equity. Each has a set of actionable subdrivers — drivers that build (or detract from) the firm’s overall Customer Equity.(Rust & Lemon, 2001) Adapted from “E-service: the revenue expansion path to E-commerce profitability”, Figure 2 is the visualized relationship between Customer Equity and its three drivers.

E-SERVICE: THE REVENUE EXPANSION PATH

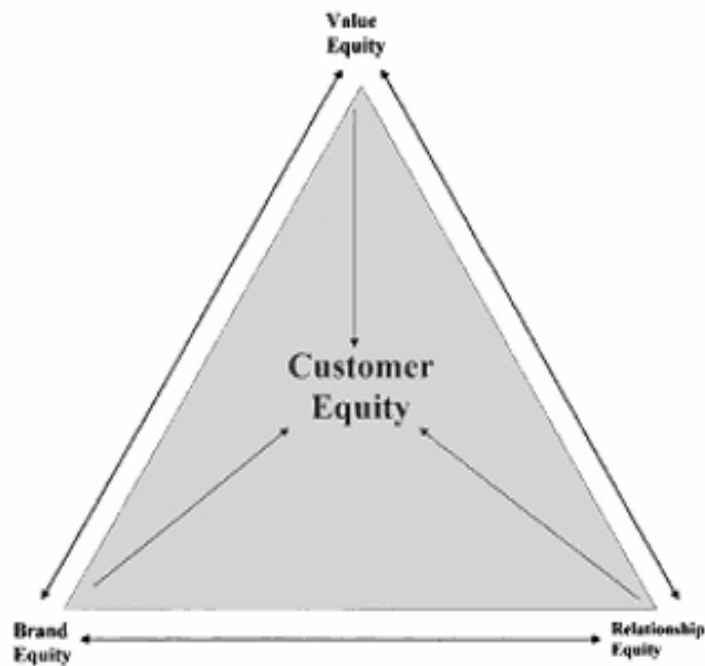


Figure 2. The drivers of Customer Equity.

(Rust, et al., 2005)

Due to the research context, the terms “customer” and “user” will be used interchangeably in this research. The goal of this research is to determine the level of openness that online platform providers should aim to achieve. However, most online platforms generate revenue from advertising, which is priced based on eyeballs, the number of unique user clicks, and the value of screen real estate.(Grover & Teng, 2001) For this kind of company, the traffic of the platform is its most important asset. In order to attract more users and keep existing ones at the same time, online platform providers should adopt a customer centric strategy. Customer Equity is crucial for online platform providers and therefore also a perfect model to be applied in this research.

3. Methodology

3.1. Research Framework

Based on the literature review, it is evident that the three main characteristics of Web 2.0, which are User Participation, Openness, and Network Effect, are now crucial factors for online platforms. Therefore, this research aims to identify the relationship between open strategy, the three characteristics of Web 2.0, User Usage Frequency and the three drivers of Customer Equity. If you take a closer look at the factors in the conceptual framework, you will find that those factors can actually be categorized into three groups, which are User Engagement, Number of Users and Relative Openness. Therefore, this research first categorizes all the factors in the conceptual framework according to their similarities, and then determines the research framework. The research framework is illustrated in Figure 3.

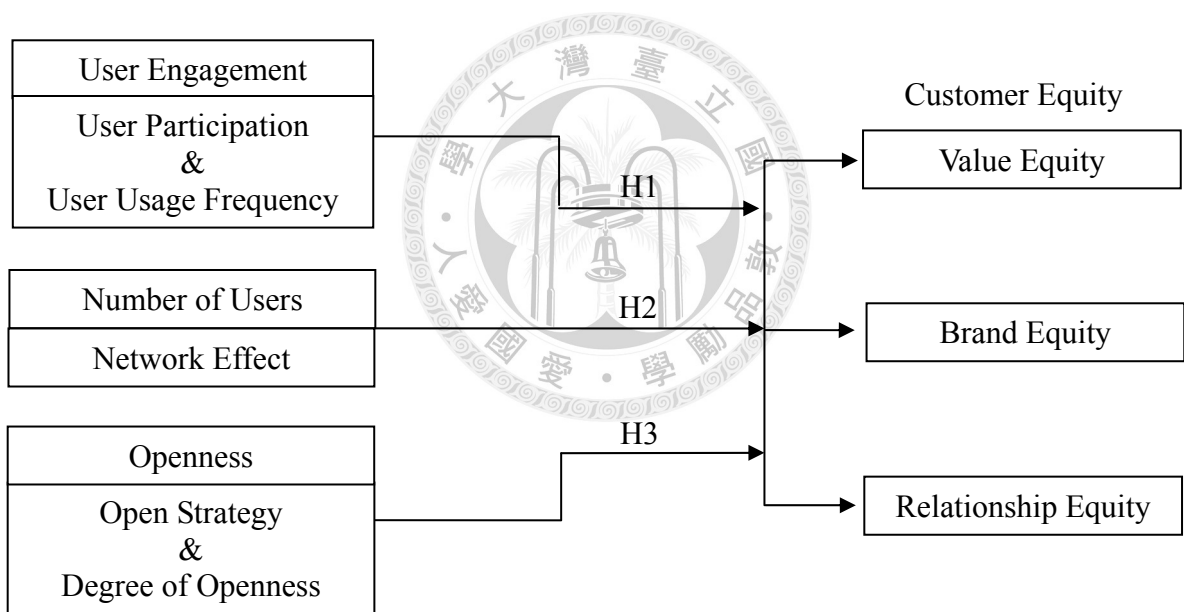


Figure 3. Research Framework

3.2. Research Hypotheses

The hypotheses of this research are listed and explained below:

H1: The more actively a user engages in an online platform (in terms of level of participation and usage frequency), the more likely the user is to perceive that the platform has higher value.

Hypothesis 1 will test the relationship of User Participation and User Usage Frequency with the perceived value of the platform. If it is proven correct, it will mean that as User

Participation and User Usage Frequency increase, the perceived value of the platform also increases. In Hypothesis 1, User Participation and User Usage Frequency are independent variables, while Value Equity, Brand Equity and Relationship Equity are dependent variables.

H2: The more users an online platform has, the more valuable the platform is.

If Hypothesis 2 is proven correct, it will mean that as Network Effect increases, Value Equity, Brand Equity and Relationship Equity also increase. In Hypothesis 2, Network Effect is an independent variable, while Value Equity, Brand Equity and Relationship Equity are dependent variables.

H3: The more open an online platform is (in terms of open strategies and degree of openness), the more valuable the platform is.

If Hypothesis 3 is proven correct, it means that as Open Strategy and Degrees of Openness increase, Value Equity, Brand Equity and Relationship Equity will also increase. In Hypothesis 3, Open Strategy and Degrees of Openness are independent variables, while Value Equity, Brand Equity and Relationship Equity are dependent variables.

3.3. Operational Definition of Variables

Based on the literature review, this research composes the operational definitions of the variables. However, due to the newness of the research topic, related literature is quite limited. Also, in order to fit the characteristics of online platforms, this research has had to alter some questions from previous research. As a result, the operational definitions are not perfect. A summary of the operational definitions of variables is given in Table 1. The complete questionnaire is shown in Appendix A.

Table 1 Operational definition of variables

Variable	Conceptual Definitions	Operational Definitions
User Usage Frequency	The frequency of usage of the platform (Teo, Lim, & Lai, 1999)	<ol style="list-style-type: none"> 1. The average time they use the platform per session 2. How often they use the platform on average (Teo, et al., 1999)
Network Effect	Value to each customer depends upon the number of other customers (and who they are) who also use the service (Li, et al., 2007)	<ol style="list-style-type: none"> 1. Whether there are many people in the interviewer's network using this platform 2. Whether the interviewer perceives the platform as a popular one 3. Whether the interviewer would prefer the people in his network to use this platform 4. Whether the interviewer can interact with many users on this platform 5. Whether the interviewer can manage his/her social relationship
User Participation	Perceived importance, behaviors and activities that users perform with the online platform (Hartwick & Barki, 1994)	<ol style="list-style-type: none"> 1. Whether User Generated Content is important to the platform 2. Whether the platform has substantial UGC 3. Whether interviewer has uploaded much content onto the platform 4. Whether the interviewer browses the contents shared by other users 5. Whether the interviewer is an active user of this platform
Value Equity	User's objective assessment of the utility of the brand (Rust, et al., 2005)	<ol style="list-style-type: none"> 1. It's worth spending time and effort on this platform 2. The service of this platform is reliable 3. This platform's services are better than other 4. The services provided by this platform meet my needs perfectly 5. The user interface of this platform is easy to use 6. I can easily find the information I want on this platform (Rust, et al., 2005)
Brand Equity	User's perception of the brand (Rust, et al., 2005)	<ol style="list-style-type: none"> 1. I often notice and pay attention to the platform's information 2. I often notice and pay attention to information the platform sends to me 3. The platform is well known as a

		<p>good corporate citizen</p> <p>4. The platform is an active sponsor of community events</p> <p>5. The platform has high ethical standards with respect to its users and employees</p> <p>6. The image of this platform fits my personality well</p> <p>(Rust, et al., 2005)</p>
Relationship Equity	<p>User's inclination to adhere to the brand, above and beyond the user's objective and subjective assessments of the brand</p> <p>(Rust, et al., 2005)</p>	<p>1. I have uploaded a large amount of personal information or information about my connections on the platform</p> <p>2. The customization function of the platform is important to me.</p> <p>3. The platform knows a lot of information about me</p> <p>4. This platform recognizes me as special</p> <p>5. I feel a sense of community with other users of the platform</p> <p>6. I have a high level of trust in this platform</p> <p>(Rust, et al., 2005)</p>
Degree of Openness	<p>Perceived Openness of the platform</p> <p>(Leng, 2009)</p>	<p>1. I think the platform's source code is open</p> <p>2. I think the platform's data is open</p> <p>3. I think the platform is open overall</p>

3.4. Pretest

Since many online platforms exist on the internet, this research has had to narrow down the number of online platforms that should be included in the questionnaire. Considering the site rankings of Taiwan(Alexa.com, 2009b) and the world(Alexa.com, 2009a), ten famous online platforms which possess the characteristics of Web 2.0 have been chosen for the questionnaire.

Each of these ten online platforms has its own open strategy and has a different level of openness. In order to avoid redundant data and to simplify the questionnaire, this research has adopted expert evaluation to assess the level of open strategy of each of these ten online platforms and rank all of them. After the evaluation process, this research will determine the most open, the least open and one that ranks halfway between the two. The ten websites are listed below.

Table 2 Ten Selected Online Platforms

Platform	Traffic Rank	Selected Reason	Open Strategy
Amazon	Worldwide #34	Medium worldwide traffic rank and active in applying open strategy	Opened a series of APIs that publish on Amazon Web Service(AWS) website
Facebook	Worldwide #4	High worldwide traffic rank and active in applying open strategy	Opened a series of APIs and Facebook Connect(the access rights for data in Facebook)
Flickr	Worldwide #33	Medium worldwide traffic rank and active in applying open strategy	Opened a series of APIs and can mash up with Yahoo!'s services
Google	Worldwide #1	High worldwide traffic rank and active in applying open strategy	Opened a series of APIs and launched the OpenSocial project
MSN Live	Worldwide #5	High worldwide traffic rank	Adopted the protocol "OpenID" that allows users using a single account to log on to many online services
Wikipedia	Worldwide #7	High worldwide traffic rank and active in applying open strategy	Totally open in both source code and data
Wretch	Taiwan #2	High traffic rank in Taiwan	No open strategy
Yahoo!	Worldwide #2	High worldwide traffic rank and active in applying open strategy	Opened a series of APIs and released a few source codes of their services
Yam	Taiwan #7	High traffic rank in Taiwan	No open strategy
Youtube	Worldwide #3	High worldwide traffic rank and active in applying open strategy	Opened a series of APIs and can mash up with other online services

Due to the research topic, related previous academic materials are limited. As a result, this research adopted the criteria from the Open Source Initiative and Open Knowledge Foundation. The experts who executed the evaluation were myself (the researcher), and a colleague from our laboratory.

According to the Open Software Service Definition composed by the Open Knowledge Foundation, an open software service should be open both in data and source code. ("The Open Software Service Definition (v1.1)," 2008) Therefore, this research has evaluated the selected ten online platforms in terms of both data and source code. Appendix B details the

evaluation criteria: a combination of the definition of open knowledge (data), which reference from the website of Open Knowledge Foundation and the definition of open source code from the website of the Open Source Initiative.

Following the criteria composed by the Open Knowledge Foundation and the Open Source Initiative, the two experts were asked to grade each online platform with a 0 to 100 score with respect to both data and source code. A score of 0 meant the platform was not open at all and 100 meant it was totally open. After the grading process, the scores of data and source code scores were given equal weight and averaged to determine the total openness score of each of the ten online platforms. The evaluation result is presented in Table 3.

Table 3 Evaluation Result

Platform	Scores from Expert A	Scores from Expert B
Amazon	65	65
Facebook	50	45
Flickr	55	45
Google	50	50
MSN Live	35	40
Yam	45	35
Wikipedia	100	85
Wretch	20	30
Yahoo!	45	55
Youtube	40	35

In order to test the validity of the evaluation results, this research conducted a statistical test. The correlation coefficient of the result from two experts is 0.939787. Since the correlation is quite high, the evaluations of the two experts are consistent.

In order to avoid redundant data and to simplify the questionnaire, this research aimed to determine the most open platform (which has adopted a fully open strategy), the least open platform (which has not adopted an open strategy) and one halfway between the two (which has adopted a partially open strategy). The experts held a long discussion concerning some differences in the evaluation results. After this discussion, they agreed that the most open platform was Wikipedia, the least open platform was Wretch, and the partially open platform was Facebook.

3.5. Sampling Method

Data for this research was collected via an online questionnaire. Due to the research context, this questionnaire only targeted web surfers who had used E-Service online platforms included in this research. Therefore, the use of online questionnaire was suitable. The questionnaires were distributed through different kinds of online platforms, such as online forums, bulletin board systems, Facebook and Wretch. By distributing the questionnaire through many platforms, this research tried to increase the reliability of the data and; avoid biased data which might skew the results.

This experiment collected 322 samples and incomplete responses were disregarded. The funding of the survey is kindly provided by National Science Council, and the project number is 96-2416-H-002-043-MY3. 103 people were Wretch users, 105 were Facebook users and 114 were Wikipedia users. The demographic data of respondents is included in Table 4.

Table 4 Respondent Demographic Data

	Frequency	Percentage (%)
Gender		
Men	138	43
Women	184	57
Age		
<18	6	1.9
19~25	221	69.1
26~32	77	24.1
33~39	13	4.1
>40	5	0.9
Level of Education		
Junior High	1	0.3
Senior High	13	4.1
College	217	67.2
Graduate or above	91	28.4

3.6. Hypotheses Testing

H1: The more actively a user engages in an online platform (in terms of level of participation and usage frequency), the more likely the user is to perceive that the platform has higher value.

Regression models 1-1~1-3:

Independent Variables: User Participation and User Usage Frequency;

Dependent Variables: the three drivers of Customer Equity.

H2: The more users that an online platform has, the more valuable the platform is.

Regression models 2-1~2-3:

Independent Variable: Network Effect

Dependent Variables: the three drivers of Customer Equity.

H3: The more open an online platform is (in terms of open strategies and degree of openness), the more valuable the platform is.

Regression models 3-1~3-3:

Independent Variables: Degree of Openness and Open Strategy

Dependent Variables: the three drivers of Customer Equity

This research uses the above nine regression models to test the hypotheses. The categorical variable (E-service Open Strategy) has to be transformed into two dummy variables before being included in the regression model. The transformation is given in Table 5.

Table 5 Transformation to dummy variable

Category	Dummy 1(Fully or not)	Dummy 2(Partially or not)
Not open	0	0
Partially open	0	1
Fully open	1	0

This research uses SPSS to conduct the statistical analysis. The regression reports are shown in Table 6 to Table 15.

Table 6 Regression Models Summary

Regression Model	F Value	P
H1-1 (Value Equity)	59.663	<0.000
H1-2 (Brand Equity)	22.187	<0.000
H1-3 (Relationship Equity)	42.504	<0.000
H2-1 (Value Equity)	57.212	<0.000
H2-2 (Brand Equity)	47.920	<0.000
H2-3 (Relationship Equity)	75.219	<0.000
H3-1 (Value Equity)	54.806	<0.000
H3-2 (Brand Equity)	20.126	<0.000
H3-3 (Relationship Equity)	23.560	<0.000

Table 7 Regression result of User Engagements and Value Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.134	.237		8.986	.000
User Participation	.520	.048	.514	10.731	.000
User Usage Frequency	.118	.079	.072	1.499	.135

Table 8 Regression result of User Engagements and Brand Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.471	.236		10.488	.000
User Participation	.045	.078	.031	.580	.562
User Usage Frequency	.317	.048	.348	6.598	.000

Table 9 Regression result of User Engagements and Relationship Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.289	.265		4.869	.000
User Participation	.127	.088	.072	1.444	.150
User Usage Frequency	.487	.054	.451	9.022	.000

In Tables 7, 8 and 9, under the 0.05 significant level, we discover that User Participation is positively related to Value Equity. At the same time, User Usage Frequency is positively

related to Brand Equity and Relationship. The test result of Hypothesis 1 is summarized in Table 10.

Table 10 Test result of Hypothesis 1

	Value Equity	Brand Equity	Relationship Equity
User Participation	Positively Related	Not Significant	Not Significant
User Usage Frequency	Not Significant	Positively Related	Positively Related

Table 11 Regression result of User Numbers and Value Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.755	.250		10.999	.000
Size of Network	.383	.051	.390	7.564	.000

Table 12 Regression result of User Numbers and Brand Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.398	.229		10.473	.000
Size of Network	.320	.046	.362	6.922	.000

Table 13 Regression result of User Numbers and Relationship Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.406	.262		5.372	.000
Size of Network	.459	.053	.437	8.673	.000

In Tables 11, 12 and 13, under the 0.05 significant level, we discover that the Size of Network is positively related to Value Equity, Brand Equity and Relationship Equity. The test result of Hypothesis 2 is summarized in Table 14.

Table 14 Test result of Hypothesis 2

	Value Equity	Brand Equity	Relationship Equity
Size of Network	Positively Related	Positively Related	Positively Related

Table 15 Regression result of Openness and Value Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.378	.200		11.916	.000
Open StrategyDummy1	.417	.124	.194	3.353	.001
Open StrategyDummy2	.241	.117	.110	2.060	.040
Degree of Openness	.430	.043	.503	9.985	.000

Table 16 Regression result of Openness and Brand Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.457	.204		12.068	.000
Open StrategyDummy1	.161	.127	.083	1.271	.205
Open StrategyDummy2	.398	.119	.201	3.334	.001
Degree of Openness	.280	.044	.362	6.375	.000

Table 17 Regression result of Openness and Relationship Equity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.886	.238		7.925	.000
Open StrategyDummy1	-.023	.148	-.010	-.157	.876
Open StrategyDummy2	.729	.140	.311	5.223	.000
Degree of Openness	.324	.051	.354	6.311	.000

In Tables 15, 16 and 17, under the 0.05 significant level, we discover that the Degree of Openness is positively related to Value Equity, Brand Equity and Relationship Equity. But the result concerning Open Strategy is not clear. In order to find out whether different Open Strategies can lead to different values of the three drivers of Customer Equity, this research

conducted the ANOVA analysis to determine whether any differences exist between each Open Strategy group. The ANOVA analysis report follows.

Table 18 ANOVA Analysis Report

	Total Avg.	Avg. of Fully-open	Avg. of Partially-open	Avg. of Non-open	F Value	Post Hoc Test
Value Equity	4.59	5.09	4.49	4.19	24.672	1-2,1-3,2-3
Brand Equity	3.94	4.11	4.07	3.64	8.775	1-2,1-3
Relationship Equity	3.62	3.59	4.02	3.25	13.743	1-2,1-3,2-3

Note: The Post Hoc Test adopted a 0.05 significance level

As is shown in Table 18, differences indeed exist in different Open-Strategy categories. After digging deeper into each category, the Post Hoc test result shows that the more open the platform is, the higher the Value Equity. In terms of Brand Equity and Relationship Equity, the mean of the non-open category is lower than that of Partially-open and Fully-open. But in Brand Equity, the difference is not noteworthy at the 0.05 significance level. In terms of Relationship Equity, the mean of the Partially-open platform is higher than that of the Fully-open.

Based on Tables 15 to 18, the test result of Hypothesis 3 is summarized in Table 19.

Table 19 Test result of Hypothesis 3

	Value Equity	Brand Equity	Relationship Equity
Open Strategy	Positively Related	Non-Open category has the lowest mean	Non-Open category has the lowest mean
Degree of Openness	Positively Related	Positively Related	Positively Related

4. Discussion and Conclusion

According to the analysis results, this research offers some suggestions for online platform providers.

1. Because the non-open platform has the lowest Value Equity, Brand Equity and Relationship Equity, this research suggests that online platforms should implement an open strategy in their online services instead of staying “closed”.
2. The Size of Network and Degree of Openness (perceived) are very important factors in boosting the three drivers of Customer Equity of an online platform. Therefore, online platform providers should continue to enhance these two factors.
3. Different levels of Open Strategy indeed have different Value/Brand/Relationship Equity. But the differences do not always increase along with the level of Open Strategy. Therefore, online platform providers should first decide which driver is the most important. By doing that, they can compose the best open strategy for their online platform. The fully-open strategy is not always the best policy to improve the Customer Equity.
4. User Participation is only positively related to Value Equity. Therefore, improving User Participation is one of the strategy options for online platform providers eager to enhance their Value Equity.
5. User Usage Frequency is positively related to Brand Equity and Relationship Equity. Therefore, improving User Usage Frequency can also increase Brand Equity and Relationship Equity.

This research has aimed to determine the relationship between Open Strategy, the three characteristics of Web2.0 and Customer Equity. The contributions of this research are as follows:

1. This research proves that being open and possessing the three characteristics of Web2.0 are very important to the Customer Equity of online platforms.
2. This research links online platforms’ Open Strategy and Web2.0 Characteristics with Customer Equity, which might provide another viewpoint in the composition of the competitive and marketing strategy.

3. The results of this research can be used for examining and improving the current open strategy of online platforms. Online platforms could have some clues about how to enhance the traffic of their platform.
4. The importance of the three drivers of Customer Equity depends on the industry's status, the maturity of the company, and the status of competitors.(Rust, Zeithaml, & Lemon, 2000) Therefore, online platform companies must first define their priority and the weight of their company's Value Equity, Brand Equity and Relationship Equity. After determining their priority in the three drivers, an online platform provider can decide which driver it should invest in most and then make use of the conclusion of this research.
5. Online platform companies can treat the questionnaire as a check list of their service. In any case, while resources are limited (which is always true in the real world of business), the regression result of this research can be combined with the related cost analysis to give managers an idea of how to improve Customer Equity efficiently.

However, this research does have some limitations. First, due to insufficient academic literature related to open strategy and Web2.0, this research has had to define some variables or has had to reference non-academic materials. Second, there are many online platforms for different usage purposes, but considering the traffic status and the implementation of open strategy, this research can only focus on general online platforms.

Despite the limitations, this research will hopefully provide managers of online platforms with a different point of view and; suggest alternative ways to compose their competition strategy. Furthermore, although being open is a crucial factor in boosting Customer Equity, the idea of openness is still not very popular in Taiwan's internet industry. It is hoped that this research will remind Taiwan's internet industry of the importance of openness and help Taiwan's online platform providers progress to the next level.

Appendix A: Questionnaire Website

網路平台開放性研究調查

這是一個關於網路平台開放性與顧客權益的學術研究。
研究的目的是希望對網路平台的開放性與其顧客權益的互動關係有更完整的瞭解。

您在此調查中的任何資料會完全保密，僅做為學術分析之用，
在將來的學術研究報告中，將不會出現可供辨認身分的資料。謝謝您的協助。

填答說明：

本問卷請由網路平台的使用者填答，問卷中的問題請單純根據您個人的感受、想法及經驗回答即可。
若有任何問題或指教，請電(02)3366-1211 或E-mail: r96725050@ntu.edu.tw。謝謝您！

由於每位有效填答者可獲得超商禮卷，故請留下您的姓名及電子信箱，以便利之後禮券發放作業！

請輸入您的姓名：

請輸入您的電子信箱：

請問您最熟悉的網路平台是：

請選擇
Wikipedia
Facebook
無名小站

網路平台開放性研究調查

第一部份：基本資料

1. 請問您的性別：
2. 請問您的年齡：
3. 請問您的教育程度為：
4. 請問您接觸網路的時間約為：
5. 平均每週上網時數：
6. 每次使用Wikipedia的平均時間：
7. 平均多久使用一次Wikipedia：

以下題目請依照您個人的主觀意見填答，謝謝！

- | | | | |
|-------------------------------|-------|---|------|
| 8. 我有很多親朋好友在使用Wikipedia | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 9. Wikipedia規模較大，使用者眾多 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 10. 為了某種便利性，我會希望親友使用Wikipedia | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 11. 我在Wikipedia可與許多使用者互動 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 12. 我可以透過Wikipedia經營人際關係 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 13. Wikipedia中，使用者貢獻的資料是很重要的 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 14. Wikipedia中，有許多使用者貢獻的內容 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 15. Wikipedia中，我貢獻了大量的內容 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 16. 我經常在Wikipedia瀏覽其他使用者分享的內容 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 17. 我在Wikipedia是很活躍的使用者 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |

網路平台開放性研究調查

第二部份：使用者觀感

- | | | | |
|--|-------|---|------|
| 18. 使用Wikipedia時，付出時間與精力是值得的 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 19. Wikipedia的服務是可靠的 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 20. 整體而言，Wikipedia的服務比其他網路平台好 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 21. Wikipedia提供的服務很符合我的需求 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 22. Wikipedia的介面是很容易使用的 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 23. 在Wikipedia中可以輕易的找到想要的資訊 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 24. 我經常發現並注意Wikipedia相關的消息 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 25. 我經常發現並注意Wikipedia發送給我的資訊 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 26. Wikipedia是知名的優良企業公民(包括社會責任、環境保護、勞工關係、對人權之尊重等 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 27. Wikipedia經常贊助公益活動 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 28. Wikipedia對員工和使用者有較高的道德標準 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 29. Wikipedia的形象符合我的個性 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 30. 我在Wikipedia存放了大量的個人資料或人際關係資訊 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 31. Wikipedia上客製化的功能對我很重要 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 32. Wikipedia知道很多關於我的資訊 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 33. Wikipedia可以辨認出我並提供特別的服務 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 34. 我覺得我和Wikipedia其他使用者屬於同一社群 | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |
| 35. 我非常信任Wikipedia | 非常不同意 | <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 | 非常同意 |

[繼續作答](#)

網路平台開放性研究調查

請閱讀以下文字後再回答問題：

網路平台的開放性可從兩部分來衡量，第一部分是原始碼，第二部分是內容，衡量標準如下：

原始碼的開放指的是讓使用者可以自由使用、下載、修改與散布執行程式及原始碼。

一般主流的商業軟體，僅讓使用者安裝並使用該軟體，但無法直接修改與散布軟體原始碼，例如目前個人電腦上最常使用的商業文書處理軟體與電子試算表軟體等，消費者沒辦法看到這些軟體的原始碼，更禁止使用者複製給其他人。

而內容開放的作品是指任何在比較寬鬆的版權條例下發布的創造性作品(例如文章、書籍、圖像、音像及影像製品等)。內容開放的作品允許任何第三方在不受較嚴格限制的情況下自由複製信息。有些內容開放材料還允許第三方不受限制地對原作品進行修改或再發布

請回答以下問題

36. 我覺得Wikipedia在原始碼的部分是開放的 非常不同意 ○1 ○2 ○3 ○4 ○5 ○6 ○7 非常同意
37. 我覺得Wikipedia在資料的部分是開放的 非常不同意 ○1 ○2 ○3 ○4 ○5 ○6 ○7 非常同意
38. 整體而言，我覺得Wikipedia是開放的 非常不同意 ○1 ○2 ○3 ○4 ○5 ○6 ○7 非常同意

按此送出

Appendix B: The Evaluation Criteria

Cited from the website of

Open Knowledge Foundation (<http://opendefinition.org/1.0>),

and

Open Source Initiative(<http://www.opensource.org/docs/osd>)

The term “knowledge” is taken to include:

1. Content such as music, films, books
2. Data be it scientific, historical, geographic or otherwise
3. Government and other administrative information

Data Perspective	Source Code Perspective
<p>1. Access</p> <p>The work shall be available as a whole and at no more than a reasonable reproduction cost, preferably downloading via the Internet without charge. The work must also be available in a convenient and modifiable form.</p>	<p>1. Free Redistribution</p> <p>The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.</p>
<p>2. Redistribution</p> <p>The license shall not restrict any party from selling or giving away the work either on its own or as part of a package made from works from many different sources. The license shall not require a royalty or other fee for such sale or distribution.</p>	<p>2. Source Code</p> <p>The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code, there must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost preferably, downloading via the Internet without charge. The source code must be the</p>

preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed.

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The license must allow for modifications and derivative works and must allow them to be distributed under the terms of the original work. The license may impose some form of attribution and integrity requirements: see principle 5 (Attribution) and principle 6 (Integrity) below.

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The work must be provided in such a form that there are no technological obstacles to the performance of the above activities. This can be achieved by the provision of the work in an open data format, i.e. one whose specification is publicly and freely available and which places no restrictions monetary or otherwise upon its use.

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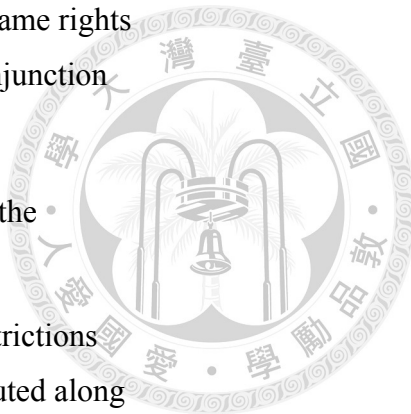
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