Functional and Symbolic Values of Cloud Terminals: A Study of User Acceptance and Purchasing Behaviors

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The purchasing behavior of cloud terminals is increasingly shaped by the emerging cloud services. Rather than its hardware configuration, performance of cloud intelligent terminals such as the Chromebook is more and more dependent on the cloud service capability. However, it remains unknown what factors will drive user's acceptance and purchase of these cloud terminals. Using the Chromebook and MacBook as two representative products, this study models user's acceptance and purchasing behavior of cloud terminals and examines multiple factors driving the consumer's purchasing decision from the perspective of functional and symbolic values. The results emphasize the importance of symbolic values and cost, and propose that symbolic values of different cloud terminals have different effects on consumers' acceptance and purchase. It has important implications for companies to design and sell cloud terminals based on user's acceptance and purchase intentions.

Keywords: Cloud service; functional value; symbolic value; cost; composite value appraisal; acceptance and purchase.

1. Introduction

Labels proclaiming “Intel Inside” or “Windows Copyright” represent a general way for consumers to evaluate notebooks in the hardware-oriented time of information

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technical products. A typical user may first compare the hardware performance for two models, and then consider whether Windows operating system is installed. Finally the consumer considers appearance and performance ratios. Accordingly notebook manufacturers' advertisements list primarily the following information: Central Processing Unit (CPU) performance, memory, hard disk, operating system, applications, appearance and price.

Since the advent of cloud computation, this selection method has changed. CPU, memory, hardware, operating systems and applications may now be delivered by cloud service providers. Computation and storage are now provided through cloud services, making hardware performance irrelevant. A variety of applications can be downloaded into cloud terminals while notebooks are only used to display the results. With the rise of cloud service intelligent terminals, consumers' habits regarding the acceptance and purchase of notebooks have changed significantly, which will have an effect on the purchasing based on information technology. Theory of planned behavior (TPB) which was proposed by Ajzen indicates that cognitive behavior control has a significant effect on behavior intention.¹ From the perspective of cultural values, there are some remarkable differences for individuals in accepting a new technology.²

On the home page of Chromebook in May, 2013, the Ad says "For the best of Google Boots in seconds. Nothing complicated to learn. Comes with your favorite Google apps. Built for everyday use and perfect for sharing with others". It lists no hardware or software information, but only a good price and 5 Chromebook figures for 4 brands at the bottom of webpage. This advertisement prompts the question: In the age of cloud computation, what motivates consumer's acceptance? What factors can influence purchasing decisions?

When the hardware performance is not the key criteria for the purchase, then how do willingness to accept transforms into the single purchasing decision making?

First, Chromebook cloud service intelligent terminals have both the functional value attribute as a scientific product and the symbolic value attribute as a consumer product. Consumers will consider not only the functional values of products, but also the symbolic values and cost. Since the technical functions are provided by the cloud terminal, the functional values of different products are almost the same, which consequently has a little effect to the purchase decision. Second, the decision making behaviors of consumers are "paying for the services in a long term" instead of "paying for the devices in the first place with free use lifelong". The UTAUT2 model was derived by integrating purchase motivation, price bearing ability and habits. Behavioral intentions and explained degree for technology acceptance is improved significantly.³

However, with a little initial investment, cloud service intelligent terminals like Chromebook is different from traditional notebooks. Consumers has a similar reaction to those cloud service intelligent terminals. Although there are multiple acceptance intentions, only one terminal can be bought per person. There is a

transition from multiple acceptance intentions to single purchase decision. The traditional acceptance theory is not suitable to this circumstance.

Therefore this study considers two intelligent terminals Chromebook and MacBook to establish the acceptance and purchase models for cloud service intelligent terminals. It also studies the transformation of consumer's multiple acceptance intention into single purchasing decision making.

A cloud service is any resource that is provided over the Internet. The most common cloud service resources are Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).⁴ It is an economic perspective on value formation and can be utilized to study the social determination of interpersonal relations. A system of symbolic values is a set of judgments about salient characteristics. The theory of symbolic values aims at explaining the variation of those judgments across social groups and single individuals.⁵ It is produced by immaterial labor and not measured in forms of money, but can be appropriated and capitalized as well.

2. Literature Review and Hypotheses Development

2.1. Literature review

This study concentrates on two factors of information technology acceptance: (1) subjective attribute of individual; (2) objective attributes of technology. As to the former factor, consumer's individual attribute and social attribute are the key factors to determine the decision behavior. Based on this the effectiveness of individual technology acceptance theory is verified.⁶ Qin Li made a view that subjective regulations and objective user group will impact individuals' acceptance intention to information technology.⁷ Concentrating on the objective attribute aspect of technology, Davis investigated the behavioral intention to information system, and proposed TAM model.⁸ He considered that perceived usefulness (PU) and perceived ease of use (PEOU) may influence users' intention, attitudes and behaviors directly. In order to compensate the limitation that TAM model is only suitable certain circumstances for information system, the TAM2 model and TAM3 model is formulated by adding some necessary facets and moderators.^{9,10} Venkatesh *et al.* summarized researches and proposed UTAUT to solve the problem of "the cognitive factors impacting users".¹¹ The accuracy of predicting the users' acceptance to new technology is increased greatly.

The traditional technology acceptance models and diffusion of innovation theory are mainly elaborated from the perspectives of "users" and "functionality". The intrinsic attributes of products are generally embodied by their extrinsic attributes or even the potential benefit individuals can predict¹² while the symbolic value reflects the brand-effect of products which can influence the perceived purchase values.¹³ Tsai tested the SAT-BV model, and suggested that the purchase intention of one brand product is mostly determined by its brand value, and symbolic value is the most importance factor of brand value.¹⁴ When cloud

service intelligent terminals become consumption goods with functional values and symbolic values, the discrimination of functional values is not brought by terminals but by remote cloud service providers through services according consumers' requirements. Therefore traditional technology acceptance theories and models are clearly not the best way to illustrate consumers' acceptance and purchase intentions of buying cloud service intelligent terminals. In order to spread across cloud services this study concentrates on functional values and symbolic values.

2.2. Hypothesis development

Cloud services are the same thing as Web services. However, the term cloud services has been more commonly used as cloud computing has become more pervasive. Theories modeling user acceptance of information system suggest that functional values should denote the factors that are significant while using,¹⁵ such as information quality, system quality, perception expenditure, which consist of two dimensions of functional values.¹⁶ Functional values include PU and PEU, which are the two essential perception factors to behavior intention and use behavior in technical acceptance models. They influence the customer's intention and use behavior in a direct or indirect way.¹⁷ PU refers to the trustworthiness of users after they use this technique and the performance is improved. PEU refers to the trustiness of users on how easy they will learn this technique. These two dimensions of functional values⁸ have impacts on the behavior intention and use behavior in different degrees.¹⁸

Therefore this paper proposes the following hypotheses:

- H1: Usefulness value influences the customers' acceptance behavior to cloud services.
- H2: Ease of use value influences the customers' acceptance behavior to cloud services.

Holbrook considered that customers' purchasing behavior is the process to construct their symbolic roles in essence.¹⁹ Symbolic value indicates the relationships and differences between the figures that the products symbolize. It exists in the subjectivity and expectation of consumers.²⁰ In the perspective of consumers, they will avoid the products with negative symbolic values as far as possible²¹ and the products belonging to the negative lifestyles in their minds.²²

Therefore this paper proposes the following hypotheses:

- H3: Symbolic value influences the customers' acceptance behavior to cloud services.
- H4: Symbolic value influences the customers' purchase behavior to cloud services.

In the studies of information system user's behaviors, many researchers considered the cost as the important factor that influence the user's behavior

and proved perceived cost will have the significant negative effects to the use behavior.^{23,24} Cost does not refer to the absolute price of objective products and services but the subjective perception of consumer.²⁵ Consumers at different levels may have the different perceptions to the same price. Perceived cost is the embodied content of user's perception, which contains the relevant information of use experiences. A consumer makes decisions based on the balancing between values and cost.²⁶ Klemz *et al.* suggested that perceived cost negatively influences the purchase intention through perceived values. The cost perception will intensively influence the consumer to use the intentional product and service.²⁷

Therefore this paper proposes the following hypotheses:

H5: Cost influences the customers' acceptance behavior to cloud services.

H6: Cost influences the customers' purchase behavior to cloud services.

The acceptance intention can be defined as the degree of desire to accept the technique in a short time²⁸ while the acceptance behavior is the functional tests to this technique or product.²⁹ Under certain external environment, the use intention controls the use behavior.³⁰ Limayem *et al.* found that in electronic commerce purchase intentions influence the use behaviors in a directly and positive way.³¹ From the perspective of planned behavior theory, the intention is the most important instructive factor of the behavior.³² When the technique acceptance is regarded as a individual variable introduced into the facet models, use intention always is used as the antecedent variable of acceptance behavior.

Therefore this paper proposes the following hypothesis:

H7: The acceptance intention of cloud service influences the purchase behavior to cloud services.

On the factors which influence the user's perception, Venkatesh *et al.* proposes the UTAUT model. He pointed out at control variables that greatly have effect on the core dimensions, gender, age, experience and intention.¹¹ Morris *et al.* proposed men have a greater focus on their tasks and effectiveness which are related to the consumer's acceptance.³³

Therefore this paper proposes the following hypothesis:

H8-1: Users' age affects the consumer's acceptance intention to cloud service.

While studying individual adoption, gender, which maybe affect the adoption, is concerned in TAM.⁹ The composition of gender, age and experience variables will have a more significant effect, which can more accurately predict the acceptance of new techniques.

Therefore this paper proposes the following hypothesis:

H8-2: Users' gender affects the consumer's acceptance intention to cloud service.

Experience with technology could be effective in technology acceptance.¹ Positive implementation experiences is potentially important for adoption in electronic products.³⁴

Therefore this paper proposes the following hypothesis:

H8-3: Users' experience affects the consumer's acceptance intention to cloud service.

2.3. Research framework

By employing the acceptance theory in MIS and symbolic value purchasing theory in marketing, we construct acceptance and purchase models for cloud service intelligent terminals from perspectives of functional values and symbolic values. We also use the composite value appraisal method to analyze reasons why consumers select one specific terminal rather than another one and the transformation of consumer's multiple acceptance intention into single purchasing decision making. Value appraisal is comprised of two factors: the "importance" of such kind of terminals and "perception" of one specific terminal. Figure 1 shows the theoretical framework model, and proposes hypothesis to explore the influences of functional values, symbolic values and costs to individual's acceptance intentions and purchase behavior. On the process of acceptance decision making, functional values have the vital importance to the PU.³⁵⁻³⁷ Consumers will suggest their own social groups through the symbolic values of products to gain the social recognition.²⁰ Desarbo pointed out that consumer's cost value is the subjective perception to the objective price of a product, which is beneficial to predict the consumer's behaviors and attitudes.³⁸ Perceived cost is subjective to some extent. The higher the perceived cost is, the

Fig. 1. Research framework model.

lower the perceived value will be. The effects of age, gender and experience are also studied.

3. Research Methodology

3.1. Data collection

By employing the situational questionnaire investigation method, aimed to the staffs in IT companies, this study designs the questionnaires to cloud service intelligent terminals Chromebook and MacBook. It researches the influences of consumers' functional values, symbolic values and cost to acceptance intention and purchase behavior of cloud service in China.

The selection of Chromebook and MacBook is mainly based on the following concerns: (1) Chromebook and MacBook are two kinds of cloud service intelligent terminals, which have the functional values and symbolic values of cloud service intelligent terminals; (2) Chromebook and MacBook may take the place of the traditional notebook computers on all social groups. However each consumer only possesses one notebook computer so that we should study the process from multiple acceptance intentions to single purchase decision making; (3) Chromebook and MacBook have differences. They have the different prices, and Chromebook is cheaper than MacBook. They have different performances and functions. Chromebook's services are provided by cloud service providers with a cheaper terminal. The performance of MacBook is supported by its hardware, and cloud services are the extensions for functions. They have the different users. Users of Chromebook pay attentions to the cost performance, and functional values, symbolic values and cost will be considered while users of MacBook pay attentions to the fashion, and only functional values and symbolic values are concerned. The study samples are the staffs of IT companies in Beijing and Shanghai. The main reasons are: (1) Beijing and Shanghai are the international areas which integrate the Chinese traditional culture and the western culture; (2) to some extent the study samples have rich knowledge of new IT techniques (3) they have a relatively high education level, which is beneficial for the test and verification of this study.

The data gathering processes are shown as follows: (1) at the beginning of investigation, choose two groups and each group five persons to carry out a face-to-face investigation. This process will consider whether the target consumers can understand the contents of questionnaires. According to the feedbacks of questionnaires we adjust and modify the contents to complete the design of questionnaires. (2) Train the investigator to ensure that the study samples can understand the whole questionnaire comprehensively. (3) From March 23, 2012 to March 29, 2012, this study carried out a small-scale data gathering. Eighty questionnaires were collected totally. Part of data was pre-processed. Based on the results of pre-process, modify the questionnaire to form the ultimate formal questionnaires.

(4) From May 8, 2012 to May 28, 2012, this study carried out a mass sample data gathering, and totally 648 questionnaires were collected. Remove the invalid questionnaires, there remained 575 questionnaires.

3.2. Measure development

In order to gather the appraisal values between the subjective perception and objective products, when designing questionnaires we partitioned the questions into three parts. The first part will investigate the overall importance appraisal of consumers to cloud service intelligent terminals. In the second part according to the information description of two cloud service intelligent terminals with figures attached consumers can evaluate the perceived values based on their own knowledge and preference. The third part includes the personal information. The study will employ the Likert5 measurement, viz., 1 represents totally disagreed (or not important at all), and 5 represents totally agreed (or very important) to make the scale comparisons more easier.

3.2.1. Scale design

The study designs the questionnaire based on the past studies. (1) *Usefulness and ease of use*. This study refers the usefulness and PEU scales proposed by.⁸ Based on the acceptance features of products, it designs the perceived scales used in this paper with 6 questions. (2) *Symbolization*. Reddy and Srinivas designed and verified the appraisal scales aimed to the product's brand symbolic and functional values. The symbolic scales are composed of two dimensions: reputation and individual expression.³⁹ This study refers the symbolic value scale constructed. Combined with the symbolic features of cloud service intelligent terminals, it designs the perceived symbolic scale with 3 questions. (3) *Cost*. On the basis of TPB and TAM theories, Luarn et al. increased the perceived trustiness, perceived self efficiency and perceived cost.⁴⁰ They measured and verified the user acceptance intention models. Based on the perceived cost scales proposed by Luarn et al.,⁴⁰ this study refers the full service process idea and design the perceived cost scales with three questions. (4) *Acceptance and purchase*. The acceptance intention allows multiple selections while the purchase behavior allows only the single selection.

3.2.2. Composite appraisal

To compare the influences of functional values, symbolic values and cost to these two terminals' acceptance intentions and purchase behaviors, we employ Yuan's composite value appraisal method. On the study of the mobile phone loss behaviors of consumers, Yuan proposed threat appraisal can be composed of perceived harmfulness and perceived importance.⁴¹ By multiplying the average values of perceived harmfulness and perceived importance, she proved that the perceived harmfulness and perceived importance together positively influence the user's reaction to mobile phone loss and the intention to steal another one. When designing the questionnaire,

Table 1. Value appraisal description.

Value appraisal	(Perceived importance/ <i>n</i>) × perceived value
Usefulness VA	(∑Importance usefulness/ <i>n</i>) × ∑PU
Ease of use VA	(∑Importance ease of use/ <i>n</i>) × ∑PEU
Symbolic VA	(∑Importance symbol/ <i>n</i>) × ∑Perceived symbol
Cost A	(∑Importance cost/ <i>n</i>) × ∑Perceived cost

the first part is used to measure the importance appraisal while the second part is to measure the perceived appraisal. To the data processing of importance appraisal and perceived appraisal, multiply these two values and the divide it by 5, we can get the value appraisal data. The calculation is shown as below (see Table 1 for more information):

$$VA_i = \left(\frac{PI_i}{n}\right) \times PV_i; \quad i = 1, 2, 3, 4, 5; n = 3,$$

where VA = value appraisal; PI = perceived importance; PV = perceived value.

3.3. Data profile

Of the 575 valid questionnaires, 342 questionnaires are answered by the male while 233 by female. According to the fifth census of population in 2010, the proportion of male in Beijing is 52.39% and that of female 47.61%; the proportion of male in Shanghai is 51.8% and that of female 48.2%. Considering the IT industry where there

Table 2. Sample analysis of demographic (*n* = 575).

Profile	Frequency	Percentage (%)
Gender		
Male	342	59.48
Female	233	40.52
Age		
< 30 years	308	53.57
31–40	215	37.39
41–50	42	7.3
50 years and above	10	1.74
Educations		
Below bachelor’s education	78	13.57
College/bachelor’s education	304	52.87
Master’s education	178	30.96
Doctor’s education	15	2.61
Salary		
< 2000	36	6.26
2000–5000	221	38.43
5000–10000	205	35.65
10000–20000	67	11.65
> 20000	46	8

has a higher male percentage, samples of this investigation basically complies the population distribution (see Table 2 for more information).

4. Data Analysis and Results

(1) The study will obtain the important data of consumers based on the results of the first part. By using SPSS 17.0 it carries out the exploratory factor analysis of functional values, symbolic values and cost. (2) By employing the composite value appraisal method, process the first part of the questionnaire (importance value data) and the second part (Chromebook and MacBook perceived data) respectively (see Sec. 3.2 and Table 1 for more information). (3) By using AMOS 17.0 to study the structural equations of data after composite value appraisals for these two terminals. Observe the individual consumers' acceptance intention and purchase behavior to cloud service intelligent terminals. (4) By comparing the multiple regression models, study the influences of age, experience variables to models.

4.1. Exploratory factor analysis

In the exploratory factor analysis, by applying the orthogonal rotation method, this paper summarizes four factors: usefulness importance, ease of use importance, symbolic importance and cost importance (see Appendix A for more information). The spherical test results of the four factors all reject the un-correlation hypothesis between variables (Table 3).

4.2. Confirmatory factory analysis

In the confirmatory factory analysis of value components, all estimated parameters λ are all larger than 0.80 with statistical significance. All criteria achieve the standards of models. Cronbach suggested that the reliability determination standards are that $\alpha < 0.35$ represents low reliability, $0.35 < \alpha < 0.70$ represents middle reliability and $\alpha > 0.7$ represents high reliability.⁴² In this study (see Table 4 for more information) each criterion of perceived value component satisfies the fitting optimization index, which means this perceived value component meets the requirement of data fitting.

Table 3. KMO and Bartlett's test.

Factor	Sample adequacy measure (KMO)	Bartlett test of sphericity		
		Degree of freedom significance level (approx. Chi-square)	Degree of freedom (df)	Significance (sig.)
Usefulness importance	0.651	252.796	3	0.000
Use of ease importance	0.596	153.440	3	0.000
Symbolic importance	0.648	158.198	3	0.000
Cost importance	0.627	170.344	3	0.000

Table 4. Fitting optimization criterion of perceived value model.

Criterion	df	χ^2	<i>P</i>	NFI	TLI	CFI	IFI	GFI	AGFI	RFI	RMSEA
Value	12	10.297	0.000	0.797	0.782	0.849	0.854	0.892	0.893	0.706	0.059

4.3. SEM result

This study regards the usefulness value appraisal (VA), ease of use VA, symbolic VA, cost VA of these two terminals obtained by composite VA method as independent variables while regarding the acceptance intention and purchase behavior as dependent variables. By using structural equation model analysis, it observes the parameter estimation between latent variables to find the absolute value of *T* which has not reached the significant level yet. Then we adjust the model to ensure that all of the values can satisfy the significant level by checking *T* values between latent variables. Consequently we obtain the Chromebook model (as is shown in Fig. 2) and the MacBook model (as is shown in Fig. 3).

The fitting optimization index RMSEA < 0.08. Also all the parameters NFI, NNFI, CFI, IFI, GFI, RFI, AGFI are greater than 0.90, which suggests that models have a good fitting optimization. There is no *T* unreached to the significant level (seen in Table 5).

By comparing the acceptance and purchase decision models, we can notice that usefulness value, ease of use value, symbolic value, cost value all influence to acceptance intentions of two intelligent terminals. For Chromebook acceptance intention influences the purchase behavior through symbolic value and cost while for MacBook it influences the purchase behavior only through symbolic value. This is because when compared with MacBook, Chromebook is cheaper and keeps a better price/performance ratio. Consumers who are concerned about both symbolic value

Fig. 2. Acceptance and purchase decision structural equation of Chromebook.

Fig. 3. Acceptance and purchase decision structural equation of MacBook.

and price will choose to purchase Chromebook, and consumers who are indifferent with price will purchase MacBook.

Meanwhile, by comparing these two models (seen in Table 6) we find that in MacBook model, the effect of symbolic value to purchase behavior (Effect = 0.414) is larger than that in Chromebook model (Effect = 0.300). Generally MacBook-buyers prefer to pursuit fashion, and have a strong symbolic value perception while Chromebook-buyers prefer to make decisions between symbolic values and price and have a relevantly weak symbolic value perception.

Analysis results of two structural equations:

Usefulness value, ease of use value, symbolic value and cost have effects on acceptance intention.

Symbolic value and cost value can influence the transformation of consumers from multiple acceptance intentions of cloud service intelligent terminals into purchase behavior.

Table 5. Fitting optimization of structural equation correction model.

	df	χ^2	P	NFI	TLI	CFI	IFI	GFI	AGFI	RFI	RMSEA
Chromebook	104	236.308	0.000	0.962	0.962	0.971	0.971	0.973	0.973	0.951	0.075
MacBook	121	247.041	0.000	0.971	0.972	0.973	0.969	0.973	0.972	0.952	0.066

Table 6. Effect parameters of models.

		UA	EA	PA	SA	UI
Chromebook	UI	0.119	0.427	0.110	0.365	
	PB	0.027	0.098	0.272	0.300	0.229
MacBook	UI	0.079	0.428	0.128	0.394	
	PB	0.026	0.140	0.067	0.414	0.328

Table 7. Multiple regression model comparison.

Model (with a same regression weight)	Comparison model	DF	CMIN	P	NFI	IFI	RFI	TLI
					Delta-1	Delta-2	rho-1	rho-2
Constraint model 3	Un-constraint model 2	12	18.769	0.000	0.001	0.002	−0.001	−0.001
Constraint model 5	Un-constraint model 4	12	18.289	0.000	0.001	0.001	0.000	0.000
Constraint model 6	Un-constraint model 4	12	32.548	0.002	0.002	0.002	0.001	0.001
Constraint model 8	Un-constraint model 7	12	53.697	0.130	0.004	0.004	0.002	0.003

Different consumers have different perceptions to different types of products; symbolic values of different cloud service intelligent terminals are not all the same. Whether cost has an effect on consumer’s purchase behavior or not depends on the specific cloud service intelligent terminals.

4.4. Leaps and bounds regression

In order to test Hypothesis 8 proposed in this study, we compare multiple regression models. Since there involves three control variables — gender, age and experience, we add variables into primary model to formulate model 2–3, model 4–6 and model 7–8. Model 2–3 verifies effects of different genders (male/female); model 4–6 verifies effects of different ages (under 30, 30–40, above 40); model 7–8 verifies effects of experience (experienced/inexperienced).

Results show that constraint model 3 and un-constraint model 2, constraint model 5 and un-constraint model 4, constraint model 6 and un-constraint model 4 are almost the same in some fitting criteria. The ratio of chi-square value and degree of freedom are all less than 2. In order to make a further test, we compare the models with multiple regression model to determine whether there has significance between un-constraint models and constraint models or not (see Table 7).

Observe comparison results such as CMIN and CMIN/DF, Baseline Comparisons, RMSEA, and we can find that all criteria and parameters (including CMIN/DF, NFI, RFI, IFI, TLI, CFI, RMSEA) change little in comparisons of gender and age, which suggests that the age model and gender model have a good fitting model. However the experience models do not have a good fitting model since experience models are apparently inconsistent with comparison models.

Conclusion: from Figs. 2 and 3 and Tables 5–7 we can see that gender and age have little influence to usefulness value, ease of use value, symbolic value and acceptance intention, while experiences do. Through multiple model regression analysis the same conclusion can be obtained.

5. Discussion, Implications and Future Research

5.1. Discussion

The study constructs consumers’ acceptance and purchase decision making models for cloud service intelligent terminals. In this section we propose hypothesis

Table 8. Hypothesis validation results.

No.	Hypothesis	Results	
		Chromebook	MacBook
H1	Usefulness V, positive influence to acceptance intention	Supportive	Supportive
H2	Ease of use V, positive influence to acceptance intention	Supportive	Supportive
H3	Symbolic V, positive influence to acceptance intention	Supportive	Supportive
H4	Symbolic V, positive influence to purchase behavior	Supportive	Supportive
H5	Cost, positive influence to acceptance intention	Supportive	Supportive
H6	Symbolic V, positive influence to purchase behavior	Supportive	Unsupportive
H7	Acceptance intention, positive influence to purchase behavior	Supportive	Supportive
H8-1	Age influence to acceptance intention	Not supportive	Not supportive
H8-2	Gender influence to acceptance intention	Not supportive	Not supportive
H8-3	Experience influence to acceptance intention	Supportive	Supportive

validations by analyzing structural equations of Chromebook and MacBook (see Table 8). Criteria such as function value, symbolic value and cost are concerned.

By comparing the two models, we can get the following conclusions:

“Usefulness value”, “use of ease model”, “symbolic model” and “cost” have the positive influence to acceptance intentions, indicating that functional value, symbolic value and cost are all the important factors consumers should consider.

“Symbolic value” has the positive effect to the purchase of Chromebook and MacBook, suggesting that symbolic value is the key factor the consumers should consider when buying cloud service intelligent terminals. “Cost” only has the positive effect to purchase of Chromebook, which means the MacBook does not have the cost feature while Chromebook have both symbolic feature and cost feature. “Symbolic value” has a more significant effect to MacBook model, which indicates that the symbolic feature of MacBook is greater than that of Chromebook.

By multiple regression comparisons, we find that when consumers are choosing cloud service intelligent terminals, the experienced consumers have stronger acceptance intentions than the inexperienced consumers. The age and gender factors have little effects to acceptance intention.

5.2. Theoretical contributions

When consumers are selecting cloud service intelligent terminals, since the techniques are provided by cloud service providers remotely, apart from the functional values, we need to consider the symbolic values of products. This study explores the effects of functional values, symbolic values and cost to acceptance intentions of cloud service intelligent terminals. From the perspective of individual users’ subjective perceptions, it extends and improves the technique acceptance theory.

From the perspectives of functional value, symbolic value and cost, this paper constructs the cloud service intelligent terminal acceptance and purchase decision making models of consumers. Then choosing the cloud service intelligent terminals, it

is not only a process of system technique acceptance, but a process of terminal purchasing. Functional value, symbolic value has effects on the acceptance intention and purchase decision making directly.

By employing the composite value appraisal method it studies the purchase motivation from multiple technique acceptance intentions to single purchase decision making. The symbolic value and cost have importance effects.

From the perspective of “consumer” instead of “user”, it researches the technique acceptance. The concept of “user” refers to the ease of use and efficiency of new techniques, so the functionality is the main factor of technique acceptance. The decision making process of cloud service intelligent terminals need to concern more factors, such as symbolic values, cost. This paper investigates the technique acceptance problem from the perspective of consumers, which break through the conventional framework.

5.3. *Practical implications*

Under the background that the cloud services are more and more accepted by consumers, this paper provides the practical guidance to the design, location and marketing of cloud service intelligent terminals, which is beneficial to the popularizing of cloud services.

From the perspective of company design, since the cloud service intelligent terminals change the purchase process of conventional information products, functional features is provided by cloud server provider remotely. The influences of technical functions to different consumers are almost the same, so the intention of technology acceptance is not the key factor to influence the purchase behavior. When the company is designing the cloud service intelligent terminals, the symbolic values should be paid much more attentions, such as brand, appearance, hardware details, or even the image speaker.

From the perspective of consumers, they are not only the recipients of new techniques, but also the new service purchasers. Similarly, the key factors from multiple acceptance intentions to single purchase behavior are symbolic values and cost perception. So in the process of marketing, we should group the consumers from the symbolic dimension and cost dimension. This is an innovation to the conventional technical products, which regard the techniques as the standard to group consumers. Based on the different requirements, to provide different kinds of cloud services and proportion the symbolic perceptions and cost perceptions of cloud service intelligent terminals, will expand the market quicker and better.

5.4. *Limitation and future research*

This study has some limitations. First, we only take samples in Beijing, Shanghai. Sample categories, population and size are insufficient, which restricts the universality of conclusions. In the further research we will increase sampling locations, enlarge sample categories and size. Secondly, we select Chromebook and MacBook as

the research objects. The consumers' acceptance intention and purchase behavior to all kinds of cloud service intelligent terminals are not illustrated comprehensively. Further research will select more objects to testify the conclusions. At last this study only concentrates from the perspective of cloud service intelligent terminals, and ignores the subjective factor of consumers. Consumers' values and life styles will be introduced in the future research.

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Appendix A

Appendix A. Exploratory factor analysis.

	Factor loading	Eigenvalue	Reliability (Cronbach α)	Explanatory variable (%)	Cumulative explanatory variable (%)
Usefulness importance		2.123	0.709	63.556	63.556
PU1: cloud service intelligent terminals provide me with richer software resources.	0.845				
PU2: cloud service intelligent terminals provide me with help to solve problems.	0.808				
PU3: the products and services provided by cloud service intelligent terminals can improve the working efficiency.	0.735				
Ease of importance		1.431	0.451	47.688	47.688
PE1: it is easy for me to download software from cloud service intelligent terminals.	0.696				
PE2: I can quickly be familiar with cloud service intelligent terminals.	0.693				
PE3: cloud service intelligent terminals have user-friendly interface and it is easy to use.	0.683				
Symbolic importance		1.655	0.592	55.160	55.160
PS1: different cloud service intelligent terminals represent different personalities.	0.777				
PS2: the cloud service intelligent terminal I have choose accord with my personality.	0.756				

Appendix A. (Continued)

	Factor loading	Eigenvalue	Reliability (Cronbach α)	Explanatory variable (%)	Cumulative explanatory variable (%)
PS3: cloud service intelligent terminals will change my appearance in others' eyes.	0.610				
Cost importance		1.741	0.638	58.030	58.030
PC1: the price of cloud service intelligent terminal is the main factor I will consider.	0.778				
PC2: I will purchase the cloud service intelligent terminal with good price-performance ratio.	0.775				
PC3: I pay close attention to the pre-sale and post-sale service cost of cloud service intelligent terminals.	0.731				

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