

# Empirical Study on the Impact of User Participation on Service Value

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## ABSTRACT

As enterprise systems (ES) becomes increasingly pervasive and commoditized in organizations, its service value emerges as a critical issue. Drawing on the customer value theory, this paper studies the relationship between user participation and service value of enterprise systems in the stage of enterprise system improvement. A survey of 220 employees in a large-scale industrial enterprise was taken to investigate the relationship between them. User participation has direct positive impacts on service value in the process of system improvement. Furthermore, information service quality and non-monetary sacrifice serve as mediating variables of the relationship between user participation in system improvement and service value even after controlling for individual variables such as users' age, education, and IT-related education. This paper contributes to the theory on whether user participation matters in the process of enterprise system improvement. The findings can also encourage managerial practitioners to exploit user participation in organizations, in order to enhance service value of enterprise system.

**Keywords:** Service Value; User Participation; Information Service Quality; Non-Monetary Sacrifice; Enterprise System Improvement

## 1. Introduction

Enterprise systems (ES) are large-scale, integrated application-software packages that use modern information technology including computation, data storage, and data transmission to support enterprise processes, information flows, and business analytics within complex organizations [1]. Because enterprise systems impound deep knowledge of new ways of designing and executing organizational processes, these complex software packages can cause considerable assimilation difficulties in the process of ES use [2]. As ES becomes increasingly pervasive and commoditized in organizations, some researchers are now openly questioning its value provided to users [3].

However, the deciding factor of ES value is how ES is being used as the information service platform in the organization and its service value is relative to user participation in the continual improvement of ES usage [4]. Furthermore, reference [5] presents the cumulative effects of user participation in ongoing initiatives to improve ES usage continuously will enhance the service value. How to drive the service value from the process of continual improvement in ES use has attracted more and more attention [6], especially in some companies where

IS maturity is high and enterprise systems provide the business units with continuous service platform. Hence, an important issue in today's organizations is to understand how to improve service value through user participation in enterprise system improvement.

The pioneering use of ES in modern organizations includes new activities and behaviors [7], with the aims toward continual developing/improving products and services, enhancing intra-organizational efficiency and effectiveness, and strengthening inter-organizational relationships with customers, suppliers, and partners [8]. The extant literature about user participation discuss the impact of user participation on the ES development activities (e.g., [6,9]), and little attention is paid to the user participation in ES improvement. This study seeks to address this gap by adopting the customer value theory [10] to examine effects of user participation on service value. Thus, the research questions include: 1) identify the relationship between service value and user participation; 2) identify the mediating effects of non-monetary sacrifice between service value and user participation in the process of system improvement; 3) identify the mediating effects of information service quality between service value and user participation in the process of system improvement.

## 2. Literature Review and Hypotheses

The service process in this study denotes the procedure which employees in the organization use ES as the service platform to finish their jobs. IT staffs are defined as the service provider and enterprise systems as the service facilities.

Reference [9] defines user participation as “a set of behaviors or activities performed by users in the information system development process”. User participation has also been defined as “users taking actions to get better service in a general service provision manner” [11]. Specifically, by integrating prior work on user participation in service improvement, we attempt to develop a new construct: user participation in enterprise system improvement. Drawing on this definition and the definition of enterprise system improvement [12], we define user participation in enterprise system improvement as “a set of behaviors or activities performed by ES users in the process of enterprise system improvement to get better information service”. Reference [13] describes the user participation from the perspectives of participation type, participation degree, participation content, participation formality, and influence of participation. In this research, user participation is defined from the perspective of participation contents, such as defining the improvement objects, modifying the user interface, and taking part in all the meetings to discuss the improvement activities [14].

Many marketing researchers have devoted themselves to conceptualizing and measuring “perceived service quality” [15-17]. From the customers’ perspective, service quality may include perceptions of technical care, but also such seemingly peripheral concerns as physical facilities and interactions with providers. Reflecting this understanding, [17] develops a conceptual model of service quality that includes the following determinants: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding, and tangibles. Based on the above conceptual model, information service quality is defined as ES user’s judgment about the overall excellence or superiority of the information system service which includes five dimensions, *i.e.*, tangibles, reliability, responsiveness, assurance, and empathy [18,19]. This perspective is similar to the user-based approach of [20] and differs from product-based and manufacturing-based approaches. Furthermore, all service quality is perceived by someone, information service quality in this research denotes the perceived quality, which is also different from object quality that may not exist.

In the review of the IS literature, [21] treats user participation as a special case of participative decision making. The authors provide a descriptive framework that

defines success in terms of quality, and identifies user information satisfaction as the most common outcome variable of user participation. User information satisfaction is defined as the extent to which users believe that the information system meets their requirements [22]. It is usually treated as a perceived measure of information quality but may also be interpreted as an indicator of system acceptance [21]. Thus, a basic contention of the user participation literature is that user participation in the determination of information requirements and the improvement of a logical design will enhance information service quality. Thus, we present the following hypothesis:

H1: User participation in enterprise system improvement is positively associated with information service quality.

When “working” with ES, users are inclined to enhance the degree of taking actions to information improvement, and all of these activities will save themselves more time and effort to waiting the information service only from IT function [23]. In the stage of enterprise system development, only the key users participate in the design activities, so many activities of designing the operational details, which is important to general ES users, may be neglected by the key users. Furthermore, enterprise systems integrates complex processes and data, so ES users may spend much time and effort to get the correct information from the complex systems and the non-monetary sacrifice will be high. If users participate in system improvement, they will take actions to escape the future information service failure. On the other hand, as the level of their participation increases, users will become more competent and “experienced” through participation, the non-monetary sacrifice of acquire information service reduces as well. Hence:

H2: User participation in enterprise system improvement is negatively associated with non-monetary sacrifice of ES users.

Many researchers in IS area stress service value of ES usage (e.g. [2,24]). In marketing literature, service value has been defined as: 1) overall assessment of the utility of a product or service based on what is given and what is received in the perspective of customer [25]; 2) a perceived trade-off between the positive and negative consequences of product use [26]; 3) a customer’s perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate (or block) achieving the customer’s goals and purposes in use situations [27].

Reference [25] concluded that service value emerges when users weigh their perceptions of service quality against the necessary sacrifices made to acquire the service. Reference [10] reveals how the service-profit chain functions as a whole, and this function indicates that the

service value is positively related to service quality and negatively related to sacrifice. He concludes that perceived service quality includes both final service results and the quality in the process through which those results were obtained. He argues difference between service quality not only results from general dimensions such as the reliability and timeliness of service, but also from the users' participation activities in which the service was delivered, improved, and recovered. However, as a core concept in marketing area, surprisingly little is known about what service value is in IS area. In this research, service value of ES is defined as "ES users' overall assessment of ES procedural performances and consequences arising from ES usage, which is based on what is given and what is received" [10,25,27].

As is reflected above, there has been a convergence of opinion that favorable service quality perceptions lead to improved service value [28,29]. Adapting the customer value framework to the ES service context suggests that the more cognitively-oriented service quality precede higher level of service value (e.g. [27,30]). In the process of enterprise system improvement, users who are provided with excellent quality of information service will be effective and efficient in their jobs, thereby perceive higher level of service value. The following hypothesis is presented:

H3: Information service quality is positively associated with the service value in the process of enterprise system improvement.

Researches in economics and marketing support the proposition that costs-time, effort, search, psychic are salient to consumers [31]. References [10] and [25] define sacrifice as what is given up or sacrificed to acquire a service. The sacrifice components include both money and non-monetary resources (e.g., time, energy, effort) to obtain products and services [25]. Time costs, search costs, and psychic costs all enter either explicitly or implicitly into the users' perception of sacrifice. In this paper, non-monetary sacrifice is defined as the time and effort necessary to getting the information service. To some users, the monetary sacrifice is pivotal, but less price-conscious consumers, such as ES users, will find the value of reducing non-monetary sacrifice involved in the ES usage.

Working on the complex ES platform, users often find it difficult to get the accurate information service. If ES users must expend much time and effort to acquire the information service, and if the time and effort does not provide satisfaction to the user, a sacrifice has been made. Recent researches reveal that reducing non-monetary sacrifice has become a pivotal concern of users. Reference [30] suggests that sacrifice has a negative effect on service value. Hence:

H4: Non-monetary sacrifice is negatively associated

with the service value in the process of enterprise system improvement.

Reference [32] maintains that user participation increases the likelihood that they will get what they want (*i.e.* that it will help attain their values—value attainment). Reference [33] conducted a laboratory study of 144 professional data entry clerks in which participation is manipulated. Level of participation was manipulated via a mute (where no opportunity is given for comment), voice (where there are opportunities for users to comment) or choice (where users can make comments and exercise choice to change aspects of the system) condition regarding the screen design. The authors found that users with higher participation will demonstrate greater satisfaction with the DSS than users with low participation. Reference [34] argues that users' activities in service providing contribute to users' perceived value. How to get the ES service reliably and timely depends on the users' participation in information service improvement [35].

The literature reviews also indicate that user participation is related to job satisfaction and productivity; however, this relationship is complex, *i.e.*, discussion of the psychological mechanisms linking participation to satisfaction or productivity in [32]; and discrepancy concept of participation proposed in [36]. Participation also improves users' satisfaction because it enhances understanding, ownership and commitment to the system [6]. Increased understanding, ownership and commitment are likely to lead to greater service value in the process of service improvement. However, the user participation literature is largely silent on the issues of outcomes of user participation in the enterprise system improvement process. Users, through participation in enterprise system improvement, may be able to shape better decisions in ways that deal with their concerns or make their work easier. In both traditional IS context and end-user computing environments, service value attainment might be viewed as the primary outcome for user participation. Thus, it can be speculated that service value is higher when participation is higher. Then, we present the following hypothesis:

H5: User participation in enterprise system improvement is positively associated with the service value.

To test the proposition that service value may be systematically associated with the user participation, users' variables need to be controlled, such as users' age, users' education, and IT-related education [8,37].

### 3. Research Design

Survey methodology was used to test the research model because it provides a basis for establishing generalizability, allows replicability, and has statistical power [8].

Moreover, the approach was adopted because the research questions were about identifying relationships between two variables [38].

### 3.1. Questionnaire Development

As there were many validated measures in prior studies, we adapted all measures from those validated and used in prior studies. All items of dependent and independent variables were anchored on a 1-7 Likert scale.

- **User Participation:** The variable “user participation” was adapted mainly from [6], which examined user participation in the process of system development. However, this research focused on the topic of user participation in the process of information system improvement. Hence, we made some changes. After eliminating three items closely related to the process of information system development, the scale of user participation contained seven items representing seven kinds of activities in enterprise system improvement. These activities mainly included modifying system requirements, modifying users’ information needs, identifying information source, and modifying input and output forms or screens.
- **Information Service Quality:** The variable “information service quality” was adapted mainly from [39]. Based on the definition of service quality, this variable was measured by eight items from the viewpoint of five dimensions including tangibles, reliability, responsiveness, assurance, and empathy.
- **Non-monetary Sacrifice:** The variable “non-monetary sacrifice” was adapted mainly from [40]. The construct was measured by asking users about their overall assessment on non-monetary sacrifice including time and effort to acquire the information service.
- **Service Value:** The variable “perceived service value” was adapted mainly from [40]. We modified the measurement. This construct denoted users’ overall assessment on the information service including ES capability of satisfying their requirements, improving their efficiency, and enhancing job satisfaction.
- **Control Variables:** The control variables were adapted mainly from [8]. We measured ES users’ age by asking respondents to indicate the age range to which they belong. Users’ education was measured by asking respondents to provide the highest degree they had obtained. And users’ IT-related education was measured by asking respondents to provide the experience of IT-related training.

Before implementing the field survey, a pretest was conducted to improve validity and reliability of the measurements. The pretest contains three parts: openended general discussion, semi-structured discussion, and highly structured item-by-item examination of the draft instru-

ment [41].

During the interview with 10 ES users in the library of a university and 31 IT staff, respondents were given an option to provide open-ended comments on the questions. Based on their suggestions, we made some modifications in the wording and framing of the questions, while adding one indicator measuring the overall cost of acquiring the service provided by IT staff. Other suggestions were also incorporated to improve consistency in the phrasing of the sentences.

In the second semi-structured segment, questions from the interviewers directed attention to key matters on the scales of dependent variable. Their suggestions were incorporated that two items of “the capability of enhancing perceived job satisfaction of ES users” and “the capability of enhancing job’s efficiency” should be added to measure service value. Measurements of construct “IT-related education” were also substituted by two newly designed items. To further improve validity, participants in the third segment of the interview were asked to evaluate a version of the questionnaire item-by-item. Content validity was strengthened by encouraging participants to point out obscure questions. Furthermore, two statistical were asked teachers to evaluate the layout and presentation of the questionnaire in highly structured format. We incorporated their suggestions on shorting some pages to avoid information overloading.

### 3.2. Field Survey

The participating organization, a corporation with more than 10,000 staff, was headquartered in Beijing, China with branches covering over 30 provinces including Hong Kong and Macao. The firm’s enterprise system was comprised by ERP, CRM, SCM, etc., which were quite mature and have been put in use for a few years. Questionnaire was sent to employees in each branch by managers with anonymity announcement. The firm actively solicited and encouraged staff and managers to participate, and it provided us with its staff list.

The response rate was 46.2%. Among 500 randomly preselected members, 231 responded. Respondents had diverse characteristics in terms of age and education, which could be seen in **Table 1**. Responses from 11 respondents, however, were incomplete to such an extent that it is impossible to recover the missing data and did not satisfy the requirements. Thus these 11 samples were omitted, with 220 cases remained valid.

## 4. Data Analysis and Results

Structured Equation Model (SEM) was used to test hypotheses and all statistical tests were conducted at 5% level of significance, as implemented in Amos 7.0.

### 4.1. Reliability and Validity Analysis

Before testing the hypotheses, we assessed the validity and reliability of the measurement model. The strength of measurement model was demonstrated through convergent and discriminant validity [42]. To determine item-construct loadings, an exploratory factor analysis in SPSS 18.0 was conducted. We also conducted a reliability analysis in this software to compute Cronbach’s alpha, a widely used indicator of reliability.

The Cronbach’s alpha, indicator loadings, and average variance extracted were shown in **Table 2**. There was adequate reliability because the Cronbach’s alpha of all the constructs exceeded the recommended score of 0.7 [43]. For item reliability, all indicators had loadings greater than 0.707, suggesting that more than 50% of the variance in the construct was explained. All the constructs demonstrated strong convergent validity, as indicated by higher loadings of intra-factors than inter-factor.

The correlation matrix of three dependent variables and the independent variable were shown in **Table 3** with the average variances extracted along the diagonals included. The square root of average variance extracted for a construct was larger than its correlations with other constructs, suggesting adequate discriminant validity [44]. Diagonals versus non diagonals in **Table 3** suggested that all the constructs in the research model fulfilled this criterion. Furthermore, the results of factor analyses showed that the loadings of items on their corresponding factors were much higher than cross loadings on other factors (**Table 2**). Consequently, all the constructs demonstrated adequate discriminant validity.

**Table 2. Convergent and discriminant validity assessment.**

Items	Cronbach’s α	Loadings	F1	F2	F3	F4
Service Value	0.954					
ESSV1		0.894	0.357	0.318	<b>0.737</b>	0.325
ESSV2		0.895	0.304	0.366	<b>0.769</b>	0.284
ESSV3		0.924	0.390	0.366	<b>0.673</b>	0.353
ESSV4		0.940	0.351	0.388	<b>0.692</b>	0.366
Non-monetary Sacrifice	0.935					
NMSAC1		0.987	-0.334	-0.340	-0.397	<b>-0.765</b>
NMSAC 2		0.971	-0.380	-0.332	-0.399	<b>-0.728</b>
NMSAC 3		0.922	-0.410	-0.332	-0.387	<b>-0.693</b>
Information Service Quality	0.956					
SQ1		0.892	0.332	<b>0.774</b>	0.311	0.219
SQ2		0.899	0.373	<b>0.774</b>	0.282	0.212
SQ3		0.889	0.323	<b>0.743</b>	0.287	0.318
SQ4		0.904	0.391	<b>0.719</b>	0.303	0.270
OSQ1		0.931	0.378	<b>0.739</b>	0.336	0.272
User Participation	0.946					
UP1		0.863	<b>0.671</b>	0.349	0.281	0.355
UP 2		0.876	<b>0.726</b>	0.394	0.255	0.257
UP 3		0.906	<b>0.667</b>	0.432	0.354	0.280
UP 4		0.886	<b>0.842</b>	0.288	0.265	0.227
Variance (%)			74.388	4.872	4.413	2.501
Cumulative Variance (%)			74.388	79.260	83.673	86.174

**Table 1. Demographic information of respondents.**

Question	Frequency (N = 220)	Percentage	Cumulative Percentage
Age			
26 below	12	5.5	5.5
26 - 30	36	16.4	21.9
31 - 35	57	25.9	47.8
36 - 40	52	23.6	71.4
41 - 45	30	13.6	85.0
46 - 50	16	7.3	92.3
50 above	17	7.7	100.0
Education Level			
Lower than Diploma	17	7.7	7.7
Diploma	66	30.0	37.7
Bachelor	95	43.2	80.9
Graduate	29	13.2	94.1
Doctor	8	3.6	97.7
Others	5	2.3	100.0

### 4.2. Hypothesis Testing

Structural model was examined to assess explanatory power of the constructs and significance of the paths with Amos 7.0. Hypothesis testing was performed by examining the size and the significance of path coefficients in the structural model. Information service quality, non-monetary sacrifice and service value were endogenous variables. User participation was an exogenous variable. We first ran the model with control variables and they were not significant ( $p > 0.05$ ) so that they were excluded from further analysis.

**Table 4** showed the hypothesis testing results. The fit statistics for the final structural model confirmed that it fit the data quite well (IFI = 0.990, CFI = 0.990, NFI = 0.971, TLI = 0.987, RMESA = 0.048). As to the effect of user participation, the influence of user participation on service value, information service quality and non-monetary sacrifice were supported by the evidence ( $p < 0.01$ ). H3 was supported seeing that higher level of information service quality will demonstrate higher level of

**Table 3. Correlations among variables.**

Variables	1	2	3	4
1 Service Value	(0.871)			
2 User Participation	0.883	(0.875)		
3 Information Service Quality	0.841	0.896	(0.854)	
4 Non-monetary Sacrifice	-0.900	-0.898	-0.805	(0.820)

**Table 4. Hypothesis testing results.**

Hypothesis	Loadings	Significance
H1: User Participation → Information Service Quality	0.869	Yes
H2: User Participation → Non-monetary Sacrifice	0.806	Yes
H3: Information Service Quality → Service Value	0.308	Yes
H4: Non-monetary Sacrifice → Service Value	0.448	Yes
H5: User Participation → Service Value	0.216	Yes

service value in the process of ES use. Likewise, it was also found that higher level of non-monetary sacrifice would demonstrate lower level of service value in the process of ES use, hence H4 was supported.

### 4.3. Discussion of Findings

The results of this study throw light on effects of user participation on service value of ES users empirically. Specifically, ES users with higher participation will exhibit higher service value with a regression weight of 0.216, while reducing non-monetary sacrifice with a regression weight of 0.806 and exhibiting higher information service quality with a regression weight of 0.869 in the process of enterprise system improvement. H3 and H4 are supported, in consistence with the customer value theory [10], which demonstrates that this theory can also be applied in the context of enterprise system. The results also indicate that the influence of non-monetary on service value is larger than information service quality. A possible explanation is that in the enterprise systems platform, users are likely to prefer more responsive information service at the cost of quality.

In light of the effects of user participation on information service quality, we find the result consists with what we know from IT managers and staff. Users with higher degree of participation in ES improvement are more likely to get the right information service they want, because the participating behavior is intended to sheer the result of information service process towards users' anticipation. Reference [9] reveals that as the degree of user participation increases, users are more motivated and

committed to co-creation. In light of the influence of user participation on non-monetary sacrifice, the research findings indicate that by taking actions to improve information service, users' time and effort will be saved, especially in the case of information failure.

The direct effect of user participation on service value is unexpected. Some studies in marketing research have proved this relationship. Reference [31] reveals that increased understanding, ownership and commitment are likely to lead to greater service value. How to get the ES information service reliably and timely depends on the users' participation in enterprise system improvement. This study contributes to this stream by providing empirical evidence in the context of enterprise system improvement.

## 5. Theoretical Contributions and Practical Implications

Besides addressing the limitations of this paper, there are also several theoretical contributions. This paper extends the customer service theory by providing the evidence that user participation plays an important role in determining service value. Especially, this paper stress on the importance of service quality variables or non-monetary sacrifice variables in influencing service value by demonstrating that non-monetary sacrifice variable matters more than service quality variable in explaining service value. This finding implies that observable service quality may be less alterable after ES development and implement. However, non-monetary sacrifice which denotes the perceived easiness of use can be improved through user participation. The results will significantly enrich this theory by revealing the inside mechanism of how user participation affects the service quality and non-monetary sacrifice, then enhances the service value.

In previous IS studies, user participation has been identified as critical factors to effective IT adoption, development, and implementation. This paper also contributes to the extant literature by showing the importance of an additional set of contexts in ES use, namely user participation in ES improvement, in influencing service value.

This paper has important implications for user participation in organizational activities, especially in the stage of improving enterprise systems. For organizations keen on continual improvement to gain strategic advantage, it is important that IS leaders encourage employees to participate in ES improvement. The research findings can encourage practitioners to explore user participation effects in the process of enterprise system improvement.

## 6. Limitations and Future Research

There are a number of limitations in this paper. First,

given the data collection in a Chinese company and small sample size of this study, we must be careful when generalizing the findings to other contexts. In the sample company of this study, IS maturity is high, which not only explains why the user participation has a direct impact on service value, but also gives the reasons why service value is influenced by the information service quality and non-monetary sacrifice. This paper does not investigate cases in which IS maturity is low. It would, therefore, be useful to replicate this research in other companies in which IS maturity is low.

Second, given the fact that data is collected on both independent and dependent measures through self-reporting at a single point in time, this approach might have given rise to common method bias. Especially, the dependent variable service value is measured through ES users' self-reporting response, and there could be an inherent bias in the ES users' perceptions of the phenomenon. One way to address this issue is to adopt some objective measurements of how ES is used in an organization; another way is to ask IT staff and ES managers to comment on the service value in an organization in addition to seeking similar comments from the ES users.

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