AN INVESTIGATION OF THE FACTORS INFLUENCING INFORMATION QUALITY: FROM THE EXPECTATION-PERCEPTION PERSPECTIVE

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Abstract

Information quality is a key factor in the information systems success research. Although the impact of information quality on information system success is frequently examined, the factors which influence information quality are seldom studied. To fulfill this research gap, we try to investigate three types of factors, including personal, organizational and contextual factors, to study their influences on information quality. The personal factors include a person's gender and age; the organizational factors include the size, the number of IT staffs, and the industry of the organization which the person belongs to; the contextual factors, which mean the "context" of the person in the organization, include the person's department, position and work experiences. Furthermore, to thoroughly understand the influence of the proposed factors on information quality, we define information quality as the discrepancy between the expectation and perception, and study the influences on expectation and perception separately. We conduct a survey, and collect 145 valid responses to verify our model. A multi-way ANOVA is used in examining the relationships between the proposed factors and the expectation and perception of information quality. The findings of this study may contribute to the information quality literature, and provide managerial insights for practitioners.

Keywords: Information quality, personal factors, organizational factors, contextual factors, expectation, perception.

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1. INTRODUCTION

Information quality is a critical issue in information systems adoption and deployment (English 1999). It may affect the effectiveness of organization, and ultimately affect cost and profit (English 1999). Poor information quality may cause low productivity, for example, information of poor representational quality needs employees to spend more time to interpret; more seriously, if the inaccurate information is used, it may cause serious result, and even failure of enterprise. Furthermore, poor information quality may cause employee's dissatisfaction. On the contrast, improving information quality may help improving productivity, reducing cost, and increasing profit (English 1999).

As information quality is critically important, a lot of research has been done on this topic in the last few years. For example, information quality is a key dimension of information systems success evaluation. Information quality is also an important construct in the prediction of information system adoption, usage and reuse. Information quality errors are big concern in medical events, but this has not received much attention by many researchers (Pipino & Lee 2011). Higher information quality may reduce liquidity risk, and thus significantly reduce the cost of equity capital (Ng 2011).

Although there is a lot of research about information quality, there is few research about information quality itself and factors that may influence information quality. Besides, in academic research, when investigating the antecedents or dependent variables of information quality, it is necessary to compare information quality before and after changes. It is important to measure information quality with same background, which may reduce the effect of human factors. There is not such kind of research so far. Information quality refers to the degree of "fit for use" by information consumers (Wang & Strong 1996). It is a subject concept. Sometimes maybe the actual information quality is good; however, different people may have different opinions. Literature finds that information quality refers to the comparison between customers' expectations and perceptions. There are many factors that may have influence on people's expectations and perceptions, such as age, gender and experience (Soriano 2002). Losonci et al. (2011) divide these factors into three categories, internal factors, external factors and contextual factors. We make a little change to the three categories. We use personal factors, organizational factors, and contextual factors. The personal factors include a person's gender and age; organizational factors include the size, the number of IT staffs, and the industry of the organization which the person belongs to; the contextual factors, which mean the "context" of the person in the organization, include the person's department, position and work experiences. We want to find out if these factors may affect expectations or perceptions of information quality.

We reexamine the information quality literature and make clear what information quality means, the dimensions of information quality, the method to measure information quality and literature about the proposed factors that may have influence information quality. Then we conduct a survey and do data analysis to find out if the proposed factors may indeed influence the expectation or perception of information quality. Based on the result, we get the conclusions.

This study may have several implications. First, this study proposes a new way to measure information quality. Information quality is measured by the gap between expectation and perception of information quality. Second, this study extends the information quality literature by finding out factors that may affect information quality. These factors may be the control variables in academic research. Third, this has interesting practical implications for business. For example, if we find that gender has influence on information quality through expectations and perceptions, organization may provide different strategies for male and female.

The remainder of this paper is organized as follows: The next section reviews previous literature about information quality and factors that may have influence on information quality, including the definition of information quality, the dimensions of information quality and the method to measure information quality. Section 3 presents the survey we conduct and the basic information of respondents. Section 4 presents data

analysis, including confirmatory factor analysis and multi-way ANOVA. The final section concludes with the results, contributions, limitations and the future research.

2. RELATED LITERATURE

2.1 Definition of Information Quality from Expectation/Perception Perspective

Information quality has several definitions. Information quality refers to the degree of "fit for use" by information consumers (Wang & Strong 1996). Some researchers also call information quality as data quality. Information quality may be seen as a kind of quality. A lot of research has concluded that quality is based on a comparison between the expectations of customers and the actual perceptions (Parasuraman et al. 1985). Conrath& Mignen (1990) report that user satisfaction refers to the match between actual IS service and user's expectations. Thus information quality may be measured by the gap between expectations and perceptions of quality level for a series of quality characteristics. Expectation refers to the quality level that customers expect the information to be. For example, customers expect the completeness level of information to be 95%. Perception refers to the actual quality level that information providers provide and is perceived by consumers. For example, consumers perceive the completeness level of information to be 90%. The gap between expectation and perception is a measurement of information quality.

Information quality is a multi-dimensional concept (Knight & Bum 2005). One of the most comprehensive, remarkable and popular information quality frameworks is Wang & Strong's information quality framework, which is shown in Figure 1 (Wang & Strong 1996). In their framework, there are four dimensions of information quality; intrinsic information quality, contextual information quality, representational information quality and accessibility information quality.

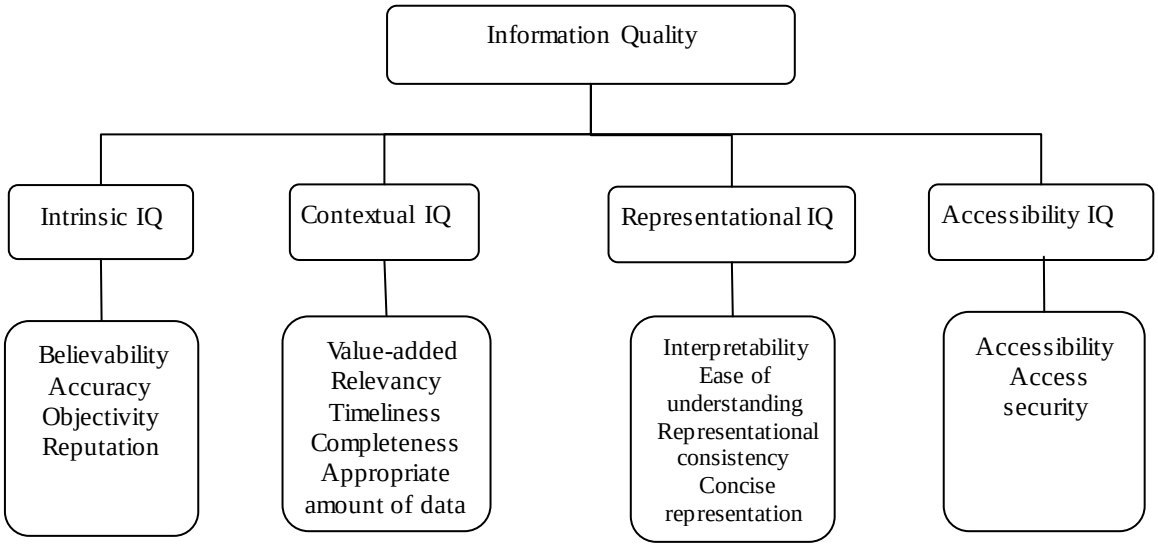

Figure1. Four dimensions of Information Quality

2.2 Factors Influencing Information Quality

As is discussed above, information quality is a subject concept, and it refers to the comparison between customers' expectations and perceptions. There are many factors that may affect people's expectation and perception. For example, organizational environment is found to have influence on middle managers' perceptions of usefulness of hospital data (Ginsburg 2003). Vong (2008) investigates that personal demographic characteristics may have influence on gaming impact perceptions. These factors may be divided

into three categories, external factors, internal factors and contextual factors (Losonci et al. 2011). We adopt their classification and use terms as "personal factors", "organizational factors" and "contextual factors". The personal factors include a person's demographical factors; the organizational factors include situation of the organization; the contextual factors means the "context" of the person in the organization. In this paper, we choose eight important factors from literature and adopt the three categories. They are gender and age of personal factors, size of organization, number of IT staff and industry of organizational factors, department, position and experience of contextual factors.

Not only may gender status make a big difference and bring much significance for dress, but also gender may affect the skills cultivated, the functions performed in family life, the occupations pursued, and the nurture of one's social relationships (Ndhlovu & Senguder 2002). Women and men have different beliefs of usefulness and ease of use, but not actual use of e-mail (Gefen & Straub 1997). Males and females have different understanding towards customer service (Christine 2011). So male and female have different expectations and perceptions.

Age may have effect on perception of people. Older managers may be more ethical in their perception of various business practices (Deshpande 1997). As age increases, their ethical attitudes become more conservative. Age has an effect in the ability to perceive hierarchical structure in continuous activity (Kurby & Zacks 2011). So people with different ages have different expectations and perceptions.

Size of organization mainly refers to the number of staff in an organization. Size of organization may have an influence on teamwork productivity and effectiveness (Tohidi 2011). Organizations with different size have different ways to construct their information system. For small size organization, they may use Excel/VBA to construct an information system, which is easy to maintain and has low cost (Jung & Kim 2007). The success of innovation depends on maintaining totally open communications in all directions throughout the organization, which is not easy in big organization (Bingham 2003). So, people in different sizes of organization have different expectations and perceptions.

This is an information age, and information technology is important everywhere. The establishment of a strong alignment between organizational objectives and information technology is a big concern for information system managers (Reich & Benbasat 2000). With the use of information technology, less human resources are needed, which can improve efficiency (Fung 2008). So, people in organizations with different number of staff in charge of information technology have different expectations and perceptions.

There is more and more competition in the financial service industry (Soriano 2002). For manufacture industry, it is important to improve efficiency among all the stakeholders (Adewole 2005). As to transportation industry, there is a significant difference between perceived and expected service quality (Hopkins 1993). Different industries have different practice and regulations, so people in different industries are supposed to have different expectations and perceptions.

In an organization, R & D department may increase its influence by fostering innovativeness and connecting with customers (Engelen & Brettel 2012). Human resource department is at the heart of organizational success (Wang & Niu 2010). Marketing department has played an important role in supporting management science research (Morrison & Raju 2004). Different departments play different roles in an organization, thus people in different departments may have different expectations and perceptions.

Usually there are three kinds of employees in an organization. They are the junior staff, middle managers and senior managers. Junior staff is responsible for basic production (Bradfield 2010). As to middle managers, they play an important role in an organization, such as managing the feedback systems and mediating conflict (Dew 2000). Senior managers are responsible for overall strategy of an organization and play an important role in building effective R & D teams (Harris & Lambert 1998). So people in different positions have different expectations and perceptions.

Research finds that there is correlation between experience and performance (QUIŃONES et al. 1995). Work experience has a moderating effect on the relationship between organizational socialization and organization identification (Yi & Uen 2006). People with different experience have different expectations and perceptions.

2.3 Research Model

Through the analysis above, the research model of this paper is proposed as Figure 2.

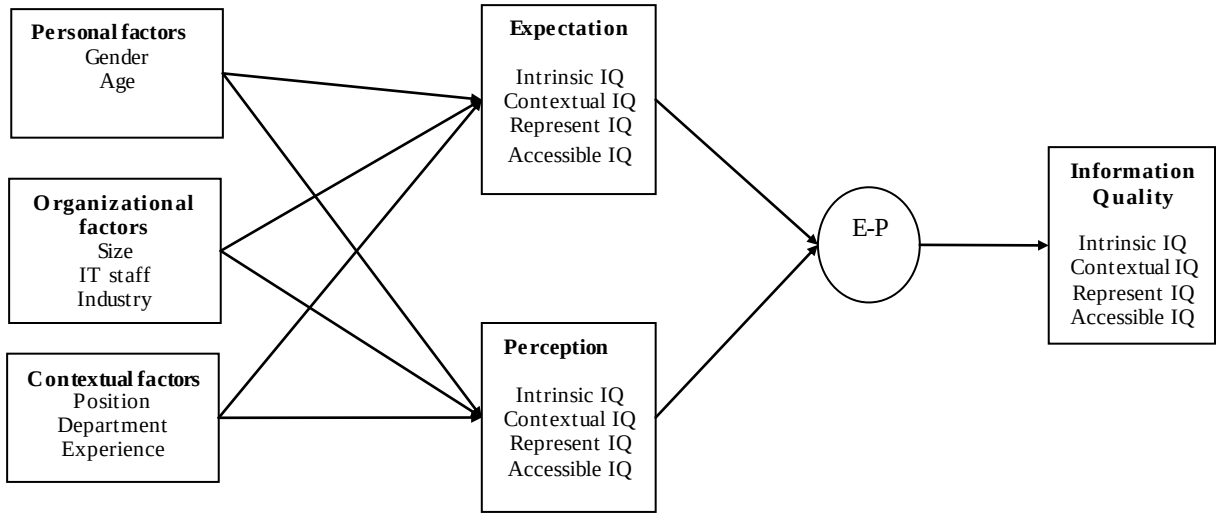

Figure 2 Research Model

3. RESREARCH METHOD

We use questionnaires to test our theoretical model. Questionnaires have advantages over some other types of surveys in that they are cheap and do not require as much effort from the questioner as verbal or telephone surveys, and often have standardized answers that make it simple to compile data. By analyzing the collected data applying the partial least squares (PLS) method and multi-way ANOVA, we examine the validity of information quality instrument, and the effect of proposed factors on information quality.

3.1 Questionnaire Development

We use a questionnaire with four parts to test our theoretical model. The first part examines the usage of information systems of respondents. The second part measures the constructs in the research model, with the expectation aspect. The third part measures the constructs in the research model, with the perception aspect. The fourth part investigates demographic situations about the participants. Each item corresponding to the constructs is measured using a seven-point Likert scale, with answer choices ranging from ‘‘disagree strongly” (1) to ‘‘agree strongly” (7). These items are adopted from Lee et al. (2002), which includes 65 items for 15 dimensions. As we focus on the four big dimensions - intrinsic IQ, contextual IQ, representational IQ and Accessible IQ, we pick 3-4 items per big dimension. This results in 15 items that we should examine. Since we measure information quality by the gap of expectation and perception of information quality, we make some change to Lee’s questions. For example, in Lee’s questionnaire, believability is measured by the question “This information is believable”. In our research, for expectation of information quality, it is measured by the question “The information should be believable”. As for perception

of IQ, it is measured by the question "The information is believable". Table 1 shows a visual description of our questionnaire. Several experts, including information system users, information quality researchers and IS professors, are invited to preview the questionnaire first to check that the questionnaire covers the dimensions and does not have overlap. Also they check that the items are meaningful to respondents. According to their comments and suggestions, items are revised and several wordings have been modified. This process of reviewing and editing is repeated until we have a proper questionnaire. These items are listed in Table 1.

Dimension	Item
Expectation of believability	The information should be believable. 1 2 3 4 5 6 7
Perception of believability	The information is believable. 1 2 3 4 5 6 7

Table1 Example of Items of Dimensions

Backward translation, including translating questionnaire from English to Chinese, then back to English, comparing versions, resolving discrepancies, was conducted to ensure the instrument consistency between the Chinese version and the original English version.

3.2 Pilot Test

The questionnaire is pilot-tested by convenient sampling. The first questionnaire version is then sent to information systems users in a company in Qingdao, China Mainland. 22 responses are collected. Since the instrument will be examined and refined in the following survey, the purpose of our pretest is to refine the wordings and format of the questionnaire. Thus, an unstructured question which request suggestions about the questionnaire itself is also asked in the end of the questionnaire. According to suggestions from information system professionals, several wordings and the introduction of the questionnaire are changed to be more detailed. Another important change is that, we reorder the whole questionnaire to make sure all the items in same dimensions are not nearby, for the sake of increasing the reliability of the instrument.

3.3 Data Collecting

The final version of questionnaire is used to collect data from IS users in Chinese companies. These IS users are enrolled in a MBA classes in the weekend in a Chinese university. 194 survey questionnaires are sent out and the IS users fill the questionnaire. After filling, they get a little gift for thanks. Returned questionnaires with incomplete or invalid answers are eliminated, and a total of 162 valid responses are received (84%). In the 162 returned responses, ten of them are uncompleted and seven answer all the questions with "6", i.e. "agree". After abandoning these seventeen responses, 145 valid responses are used in the further data analysis. The responders' information is shown in Table 2 and 3. Among the responders, more than 80% of them claim they are familiar with the information systems they choose in the questionnaire; 54.5% of them use the information systems every day, and 87% of them use at least weekly. The responders are also interested in the survey result: 45% of them offer E-mails for they are "interested in the results" and 33% of them answer the open question to express their opinion to the concept of information quality.

4. DATA ANALYSES

In analyzing the collected data, we follow two-step procedure. First, we examine the measurement model to measure convergent and discriminant validity. We then use multi-way ANOVA to examine the strength and direction of the relationships among the theoretical constructs

We perform confirmatory factor analysis (CFA) using LISREL 8.8 to assess reliability and the convergent and discriminant validity of the constructs, with maximum likelihood estimation for the covariance matrix.

First, we will give the descriptive statistics of data, which includes mean, variance, skewness and kurtosis. This may measure the lack of bias in the measured model. Also the correlations for the four dimensions will be showed. Then we will test the model fit. There are many indices that may explain overall goodness of fit. We choose five different indices. root mean square residual (RMR), Chi-square/d.f., comparative fit index (CFI), non-normed index (NNFI), goodness of fit index (GFI) and GFI adjusted for degrees of freedom (AGFI). Their thresholds are 0.10, 5.00, 0.09, 0.90, 0.90, 0.90 and 0.90 respectively. We will compare the scores and threshold for each indicator.

Items	Freq.	Percent	Items	Freq.	Percent
IS System Chosen			Level of Understanding		
MIS	28	19.3%	100%	10	6.9%
CRM	3	2.1%	80%	65	44.8%
DSS	4	2.8%	60%	43	29.7%
SCM	0	0%	40%	14	9.7%
OA	89	61.4%	20%	9	6.2%
ERP	12	8.3%	0%	3	2.1%
Others	9	6.2%	Missed	1	0.7%
Last Using			Using Freq		
Today	30	20.7%	per day	79	54.5%
in 3 days	37	25.5%	per 3 days	15	10.3%
in a week	18	12.4%	per week	33	22.8%
in a month	15	10.3%	per month	7	4.8%
in 1/2year	22	15.2%	per 1/2year	1	0.7%
>1/2year	22	15.2%	>1/2year	9	6.2%
Missed	1	0.7%	Missed	1	0.7%

Table 2 Usage of Information Systems of Respondents

Items	Freq.	Percent	Items	Freq.	Percent
Gender			Age		
Male	102	70.3%	<20	0	0%
Female	42	29%	20-29	67	46.2%
Missed	1	0.7%	30-39	72	49.7%
			40-49	6	4.1%
			>49	0	0%
			Missed	0	0%
Position			Work Experience		
Staff	70	48.3%	<=1	17	11.7%
Dep. Manager	31	21.4%	2-3	14	9.7%
Dep. Executive	19	13.1%	4-6	37	25.5%
Senior Manager	6	4.1%	7-8	21	14.5%
Missed	19	13.1%	9-10	19	13.1%
			>10	36	24.8%
			Missed	1	0.7%

Organization Size			IS Staff		
<=50	26	17.9%	<2	26	17.9%
51-100	38	26.2%	2-5	41	28.3%
101-500	36	24.8%	6-10	24	16.6%
501-1000	8	5.5%	11-15	12	8.3%
>1001	18	12.4%	>15	22	15.2%
Missed	19	13.1%	Missed	20	13.8%
Business			Department		
Industry	18	12.4%	Purchase	1	0.7%
Commerce	8	5.5%	Produce	10	6.9%
Service Industry	16	11.0%	Sale	16	11.0%
Finance Industry	7	4.8%	HR	6	4.1%
Transportation	5	3.4%	R&D	16	11.0%
Others	74	51.0%	Finance	10	6.9%
Invalid	0	0%	Others	66	45.5%
Missed	17	11.7%	Missed	20	13.8%

Table3 Respondents' Characteristics

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