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Factors Affecting Information System Satisfaction from a Two-Dimensional Perspective

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Abstract

Studies evaluating information management personnel's satisfaction with IT systems tend to employ one-dimensional linear thinking before identifying the associated affecting factors. However, this method cannot clearly define the true cognition of users or confirm how the factors affect satisfaction. The present study combined Herzberg's two-factor theory and the Kano model with expectation disconfirmation theory to form a two-phase study. First, a thorough literature review and modified Delphi method were conducted to consolidate the dimensions of user satisfaction and associated variables, which found that "confirmation" in the expectation disconfirmation theory is closely related to satisfaction. Subsequently, a questionnaire was designed using the determined variables and based on expectation disconfirmation theory. The questionnaire was distributed using convenience sampling to employees at companies in Taiwan, with 369 valid responses returned. Using this innovative method, this study successfully divided the variables that affect the satisfaction of information systems into four types: motivators and hygiene, performance, and useless factors.

Keywords

Research Method, Information System Satisfaction, Two-Factor Theory, Kano Model, Expectation Disconfirmation Theory

1. Introduction

Numerous empirical studies have suggested that information managers are responsible for user satisfaction with information systems [1]. Researchers have often assumed satisfaction to be a straight line with satisfaction and dissatisfaction at opposite ends, believing that users' cognition accompanied by identified

factor affecting satisfaction fall at some point along the line. In other words, studies have considered low satisfaction to be representative of dissatisfaction; such thinking originates from the statistical process linear regression, which is used to verify the results. This research method can only identify the factors that affect satisfaction with an information system, but it cannot distinguish at what stage the factors affect satisfaction. Furthermore, linear methods may diminish the power of the factors affecting satisfaction when the effect is above or below a certain threshold.

Unlike the emerging field of information management, the concept of satisfaction has a long history in other fields, especially business management. Among relevant theories, Herzberg's two-factor model is one of the most widely recognized tools in studies related to satisfaction, and it is mainly used to explore the factors associated with satisfaction and dissatisfaction expressed by employees toward their organization. The central idea is that satisfaction is not a one-dimensional concept, but comprises two separate concepts of satisfaction and dissatisfaction. Factors that lead to employee satisfaction are called "motivators"; organizations do not necessarily require these factors, but employee satisfaction increases rapidly if these factors are present. Factors that lead to dissatisfaction are called "hygiene factors"; these factors must exist in an organization because without them employees quickly become dissatisfied [2].

Furthermore, in the field of marketing, the Kano model is often used to explore customer satisfaction. This model suggests that each of the various attributes of products provided to customers individually affect customer satisfaction. The impact of some attributes is linear; thus, customer satisfaction increases correspondingly when these attributes improve. However, the impact of other attributes is nonlinear, which indicates that their performance can lead to an increase or sharp decline in customer satisfaction in a curve [3]. In these well-known theories and models developed for studying satisfaction, personal cognition cannot be expressed using a linear distribution wherein the two ends represent two extremes; instead, layers of cognition exist between these extremes. When multiple layers exist in an individual's cognition of satisfaction, linear thinking no longer suffices, because such simplification is unable to grasp an individual's inner state. This indicates that recommendations for practice made based on linear systems are imprecise.

We believe that user satisfaction with information systems is similar to employee job satisfaction and customer satisfaction. Users have multiple layers of cognition in terms of satisfaction with information systems.

By examining the field of information management, we found that the most commonly used theory for exploring satisfaction was the expectation disconfirmation theory. Oliver believed that people's sense of satisfaction with certain things originates from confirmation after comparing expectations with perceived performance before and after coming into contact with the actual event or product [4] [5] Oliver proposed that a comparison between expectations and

perceived performance can derive three results. The first result, "confirmation," is achieved when the perceived performance matches the expectation. The second result, "positive disconfirmation," is achieved when the perceived performance is superior to the expectation. The third result, "negative disconfirmation," is achieved when the perceived performance is inferior to the expectation. We conducted the present study under the assumption that if the results of positive and negative confirmation underwent appropriate statistical analysis, we would be able to validate and determine a group of factors that affect the level of satisfaction as well as identify the multiple layers of satisfaction associated with information systems.

This study was thus designed on the foundation of Herzberg's two-factor theory and the Kano model, which were combined with the expectation disconfirmation theory to form a two-phase study. An empirical study with a large sample was implemented to explore the relationship between the disconfirmation status and satisfaction of each individual predisposing variable, thereby attempting to sort the factors that affect the level of satisfaction with information systems into multiple layers, namely motivators, hygiene factors, performance factors, and useless factors.

2. Literature Review

2.1. Information System Satisfaction

Studies examining problems related to information system satisfaction have found factors affecting satisfaction in several dimensions, including the system, interpersonal relationship, organizational management, and project development. The system dimension mainly explores user satisfaction with the attributes of an information system; for example, the quality and functions of the system and the quality of the information presented. Many researchers have found that the quality of systems and information are significant factors that affect user satisfaction with information systems [6] [7]. The most notable study on the dimensions of a system was conducted by DeLone and McLean [8], who pioneered the IS success model. They proposed that users generate personal cognition of their satisfaction with the information and system quality provided by an information system, and this perceived satisfaction indirectly affects the whole organization. Another study indicated that high information and system quality is necessary for a successful information system [8]. A decade after their 1992 study, DeLone and McLean reinterpreted the IS success model. They argued that information and system quality are insufficient for a system to achieve success; service quality is also required, and they therefore added service quality as a necessary criterion [9].

In terms of the organizational management dimension, user satisfaction is affected by whether management provides sufficient resources. When users use the information system in an organization, they may occasionally require work-related resources and support, and they may feel dissatisfied with the informa-

tion system if sufficient support or backup from management is unavailable. Furthermore, whether an organization provides education and training on the operation of its information system affects user satisfaction [10] [11] [12].

Last, for the project development dimension, researchers have found that whether users participate in the process of system development affects their overall satisfaction with the information system [13] [14] [15]. When users participate in the process of software development, they are provided with sufficient opportunities to communicate with system development personnel regarding the functions and interfaces required during system analysis, and thus the completed information system fits the users' requirements. This prevents development personnel from developing an information system that is disliked by the end users. Overall, user participation can be deemed to play an important role in the development process. In summary, system satisfaction is often discussed in the areas of organizational management, project management and information management.

2.2. Two-Factor Model

As previously mentioned, the concept of satisfaction has long been developed in fields outside information management. Among the relevant theories, Herzberg's two-factor model is one of the most widely recognized models for studies related to satisfaction. Herzberg believed that employees' satisfaction with their jobs is hierarchical, such as in Maslow's hierarchy of needs. Some factors are related to physical and security needs, which are necessary because without them, employee satisfaction would not increase. These factors are called the hygiene factors. Other factors are related to social needs and the need for respect, which increase employees' job satisfaction. These factors are called motivators [2].

Herzberg's two-factor model has been widely used in other academic areas, such as customer service, product marketing, and product design. Juran [16] used the two-factor model to study airlines' customer service, determining that the comfort of the cabin and lavatories and punctuality of flights are hygiene factors, whereas customized services such as helping passengers transfer and check in are motivators. Furthermore, the two-factor theory has been employed in studies on information management; for example, Zhang and von Dran [17] used the two-factor model to explore web design, finding that the reputation of a website, its privacy, and its entertainment factors are motivators, and its basic functions and navigation protection are hygiene factors. In addition, S. Lee, Shin, and Lee [18] proposed that system quality is a hygiene factor because low system quality prompts customers to cut down on their use of mobile data services. By contrast, information quality is a motivator because when it is higher, customers tend to increase their use of mobile data services. In terms of collation, although the two-factor theory is often applied in many fields, there is no good measurement method to make the theory more scalable.

2.3. Kano Model

The Kano model was developed to explore customer satisfaction in the field of

marketing, and it is another crucial theoretical framework for discussing satisfaction. This model proposes that the quality of any product can be divided into three qualities—must-be, attractive, and one-dimensional—and customers are more satisfied if such qualities exist [3]. Researchers in the fields of marketing and consumer psychology have used this model to identify the key attributes recognized by consumers in order to facilitate quality improvement and enhancement. This has led to a significant breakthrough in quality management [19]. In addition, such thinking has been applied to research on information management. User satisfaction in the various dimensions of each attribute of a website's design can be derived using the Kano model. Research has shown that website navigation and whether the information provided is biased are the "must-be" qualities of web design. In addition, whether the users enjoy the website (enjoyment) or acquire knowledge and skills from it are the "attractive" qualities; and the "privacy," "technical support," and "credibility" of a website are the "one-dimensional" qualities [20]. Moreover, some researchers have combined the Kano model with service quality to develop a series of service-related attributes [21]. This literature review reveals that the Kano model presents factors affecting satisfaction in a multilayered manner, and despite also containing the concept of linear thinking, it is completed by the addition of two extra dimensions.

2.4. Expectation Disconfirmation Theory

Oliver [4] [22] proposed the expectation disconfirmation theory, the main concept of which is that consumers determine how satisfied they are with a product or service by comparing their expectation before purchase with its actual performance. Notable characteristics of this process are the dimensions of "confirmation" or "disconfirmation." Most related studies have assumed that all factors triggering satisfaction-related cognition have direct effects on consumer satisfaction. However, Oliver argued that disconfirmation was the main predisposing factor for satisfaction as well as a significant mediator between triggering factors and consumer satisfaction. Consumers have initial expectations of a product that are based on experience, word-of-mouth from friends and family, and information, as well as promises provided by marketers and competitors. They are initiated from predictions of what the products or services have to offer. Oliver asserted that expectation is formed by two key elements: the probability of occurrence and evaluation of the content of the occurrence. When consumers come into contact with a product, the perceived performance is formed, which is emotional cognition generated from actual experience. Later, consumer satisfaction is formed after the consumers cross-reference the perceived performance with their prepurchase expectation.

Viewing information system satisfaction within an organization from the perspective of the expectation disconfirmation theory is similar to the aforementioned consumer expectations. Users form certain expectations before they use

the information system, particularly concerning the quality of the information system and the changes (e.g., the greater convenience that the system may bring to their work). After users experience the system first hand, they form an emotional perception. This perception may correspond to or differ from their expectations, and the result of this confirmation or disconfirmation affects users' satisfaction with the information system. Studies have confirmed that the expectation disconfirmation theory has a certain amount of interpretative power for the satisfaction dimension. Although many studies have explored information system satisfaction from this perspective, most have viewed it using one-dimensional linear thinking. Examining Herzberg's two-factor theory reveals that the multidimensional concept of satisfaction should exist in personal cognition. Therefore, this study integrated Herzberg's two-factor theory, the Kano model, and the expectation disconfirmation theory under the belief that the factors must be processed through customer disconfirmation before they can fully interpret satisfaction. Furthermore, the factors affecting information system satisfaction and user disconfirmation can be divided into the following four quadrants: Herzberg's motivators, Herzberg's hygiene factors, performance factors that are linearly correlated with satisfaction, and useless factors that have no impact on satisfaction. This four-quadrant concept is illustrated in Figure 1.

1) Motivators: When a significant correlation is found between positive disconfirmation and satisfaction, but the correlation between negative disconfirmation and satisfaction appears to be nonsignificant, the factor is a motivator. Herzberg's operational definition for a motivator is that high performance of

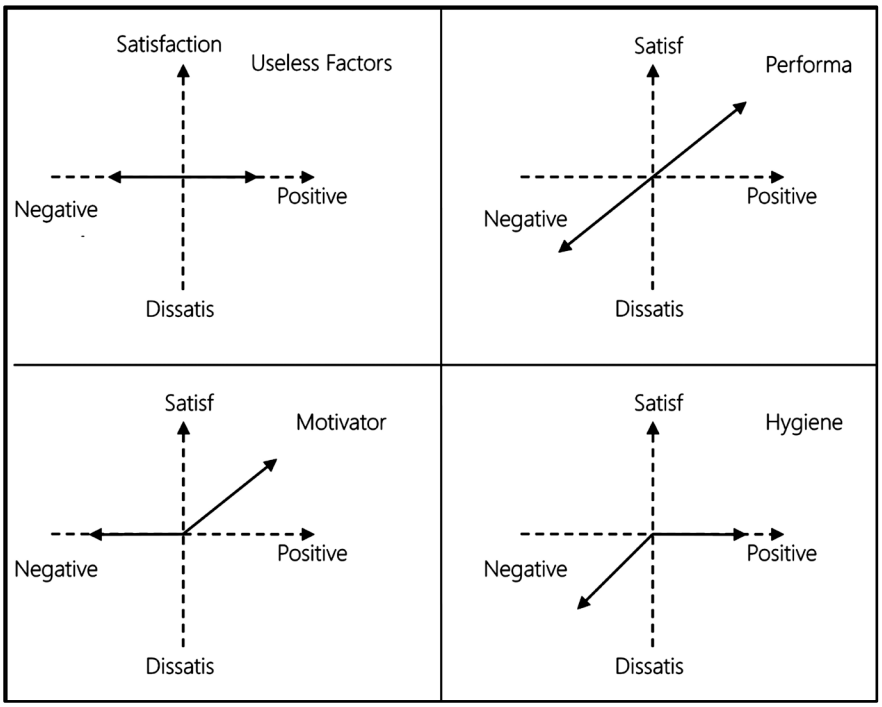

Figure 1. Multidimensional satisfaction analysis factor concept model (developed by this study).

attributes in this category delights users.

2) Hygiene factors: When the correlation between positive disconfirmation and satisfaction is nonsignificant, but the correlation between negative disconfirmation and satisfaction is significant, the factor is a hygiene factor. Herzberg's operational definition for a hygiene factor is that the performance of attributes in this category provides users with a sense of dissatisfaction.

3) Performance factors: When the correlation between positive disconfirmation and satisfaction as well as the correlation between negative disconfirmation and satisfaction is significant, the factor is a performance factor. This result has the same definition as information system satisfaction measured by the linear model; the attributes in this category are positively correlated with user satisfaction.

4) Useless factors: When no significant correlation exists between positive disconfirmation and satisfaction or the correlation between negative disconfirmation and satisfaction, the factor is a useless factor. This means that the performance of attributes in this category is not related to user satisfaction or dissatisfaction.

3. Methodology

This study adopted a series of stringent research methodologies to identify the factors affecting information system satisfaction. The study was conducted in two stages. The first stage focused on verifying the variables that affect users' satisfaction with information systems. We performed a literature review based on Herzberg's two-factor theory to categorize the dimensions. The second stage was an empirical analysis using the information satisfaction impact variables verified in the first stage to design a questionnaire based on the expectation disconfirmation theory. To establish a correct sample framework, we adopted an appropriate distribution method to obtain empirical data. Through a two-step statistical analysis, we sorted the factors affecting information system satisfaction into motivators, hygiene factors, performance factors, and useless factors.

3.1. Stage 1: Verifying Variables That Affect Information System Satisfaction

We consolidated the variables that were relevant to information system satisfaction from the literature. Because numerous studies exist on information system satisfaction, and the data are scattered across various journals, we limited our search to seven major journals. First, we collected data from the following six journals recommended by the Association for Information Systems: Management Information Systems Quarterly, Journal of Management Information Systems, Information Systems Research, Journal of the Association for Information Systems, Information Systems Journal, and European Journal of Information Systems. To prevent the omission of variables significant to information system satisfaction, we added Information & Management to the list of references for

data collection. The reason for adding Information & Management was twofold: Information & Management is a major academic journal in the field of information management, and its publications have an extensive collection of relevant articles.

After the main references were selected, we launched a keyword search in the seven international journals from the first issue until 2017 to find all articles relevant to information system satisfaction. Subsequently, we extracted all the variables identified in the essays, regardless of whether they showed significance. To target the variables for information system satisfaction, we used the modified Dephi method to ask the scholars and experts in the field of information [23]. There are 9 scholars and 20 industry experts involved in this process. After three rounds of Dephi method, they combined the variables that had similar operational definitions and categorized them into various dimensions. Finally, 28 variables were identified that affected information system satisfaction, and they were assigned to six dimensions (**Appendix A1**).

3.2. Stage 2: Collection and Analysis of Empirical Data

3.2.1. Questionnaire Development

In the second stage of the study, we developed a questionnaire based on the information system satisfaction variables derived from the literature. Spreng [24] consolidated all questionnaires based on the theory into five major categories, which can be summarized into direct measurements of "expectation" and "perceived performance," the score of "disconfirmation" derived from subtraction, and direct measurement of the differences between the scores of the respondents. Among them, the calculation of the additive difference model (ADM) is considered the most precise [24]. The ADM suggests that researchers first measure respondents' inclination toward disconfirmation; specifically, they should determine whether a respondent's inclination is toward positive or negative disconfirmation before asking their degree of disconfirmation. This mode of questioning reduces the bias from subtracting the scores attributed to expectations and perceived performance separately; thus, more information regarding the level of disconfirmation can be derived with higher precision.

In this study, we developed 41 factors affecting information system satisfaction from the 28 variables derived in the first stage, and we designed a questionnaire along the axle of the ADM based on Herzberg's two-factor theory and the Kano model complemented by the expectation disconfirmation theory to measure the multidimensional factors affecting information system satisfaction (see **Appendix A2** for the detailed questionnaire).

3.2.2. Sampling and Testing

This study aimed to determine the factors affecting information system satisfaction in organizations. Therefore, the target subjects were users of information systems. Because the sample population was large, more stringent sampling methods such as stratified sampling or cluster sampling were unsuitable for this

study. Thus, the research adopted convenience sampling to select the test subjects. Before the official questionnaires were sent out, we conducted a pretest at eight companies in Hsinchu, Taiwan, aiming to detect problems in the questionnaire and those that were likely to occur during the survey. In this stage, 18 questionnaires were returned. The 18 test subjects were interviewed to ensure that they understood the test questions clearly and to inquire about any problems during survey distribution; for example, whether company information security systems restrict transmissions of electronic file formats. After considering the pretest results, the final questionnaire survey was implemented through both online and paper-based formats. We found the paper-based format necessary because the test subjects were users of information systems in organizations, some of which have strict controls over access to external links. Furthermore, we implemented two formats to ensure the success of data collection and prevent interference caused by restrictions from a single data collection mode.

This study was implemented over 1 month. We established an online survey platform on Google and sent the questionnaire link to people we knew in various companies. They then shared the link with other employees. When someone responded that their internal information security system disallowed links to external sites or the electronic file format we used, we printed hard copies of the questionnaire and asked our contacts to distribute them. To maximize the return rate, we offered 100 convenience store gift vouchers, each worth NT$100 for a lottery draw, to those who were willing to leave their email addresses. A total of 369 questionnaires were returned, and after eliminating the incomplete or nonconforming samples, 369 were verified as valid responses. See Table 1 for details.

3.2.3. Statistical Analysis

Statistical analysis was conducted using a two-step process. The first step was a sectioned correlation analysis to compute the result's groupings of the factors affecting information system satisfaction. Linear regression was employed for the statistical analysis, and the test participants were divided into two groups for each factor by whether they identified the attribute as positive or negative disconfirmation. Each factor was then subjected to linear regression analysis. If significant correlation was found between positive disconfirmation and satisfaction, but the correlation between negative disconfirmation and satisfaction did not reach a level of significance, the factor was identified as a "motivator." If the correlation between positive disconfirmation and satisfaction did not reach a level of significance, but significant correlation was found between negative disconfirmation and satisfaction, the factor was identified as a "hygiene factor." If the correlation between positive disconfirmation and satisfaction and between negative disconfirmation and satisfaction was positive, the factor was identified as a "performance factor." If no significant correlation was found between positive disconfirmation and satisfaction or between negative disconfirmation and satisfaction, the factor was identified as a "useless factor." The grouping in step 1 is presented in Table 2.

Table 1. Demographic variables.

		Freq.	Pct.			Freq.	Pct.
Sex	Male	210	56.91%	**Age**	20 to 30	28	7.59%
	Female	155	42.01%		26 to 30	128	34.69%
	Not answered	4	1.08%		31 to 35	98	26.56%
Years of work (years)	Less than 1	81	21.95%		36 to 40	58	15.72%
	1 to 5	151	40.92%		41 to 45	20	5.42%
	6 to 10	81	21.95%		46 to 50	16	4.34%
	11 to 15	29	7.86%		51 to 56	7	1.90%
	16 to 20	15	4.07%		Not answered	14	3.79%
	21 to 30	11	2.98%	**Education**	High school/occupational high school and lower	9	2.44%
	Not answered	1	0.27%		Associate degree	19	5.15%
Industry	Information Technology	157	42.55%		Bachelor's degree	141	38.21%
	Manufacturing	90	24.39%		Master's degree and higher	195	52.85%
	Medical	47	12.74%		Not answered	5	1.36%
	Services	36	9.76%	**Professional background**	Information technology	144	39.02%
	Education	12	3.25%		Engineering	83	22.49%
	Finance & Banking	11	2.98%		Business administration	80	21.68%
	Public services	3	0.81%		Medical professional	26	7.05%
	Aviation	1	0.27%		Design	8	2.17%
	Others	12	3.25%		Education	6	1.63%
No. of employees	Less than 100	58	15.72%		Liberal arts	4	1.08%
	100 to 500	66	17.89%		Others	5	1.36%
	500 to 1000	57	15.45%		Not answered	13	3.52%
	1000 to 5000	68	18.43%	**Computer experience (years)**	5 and less	5	1.36%
	5000 to 10000	26	7.05%		6 to 10	86	23.31%
	10000 to 30000	20	5.42%		11 to 15	147	39.84%
	30000 and more	9	2.44%		16 to 20	88	23.85%
	Not answered	65	17.62%		21 to 25	20	5.42%
					26 to 30	7	1.90%
					Not answered	16	4.34%

Table 2. Multidimensional factor distribution.

		Correlation between negative disconfirmation and satisfaction	
		Significant	Nonsignificant
Correlation between positive disconfirmation and satisfaction	Significant	Performance factor	Motivator
	Nonsignificant	Hygiene factor	Useless factor

Subsequently, the factors affecting information system satisfaction were grouped into four types. However, the grouping in step 1 only analyzed the data based on the significance or insignificance of the correlation without comparing the correlation between the two groups of positive disconfirmation and negative disconfirmation. Therefore, we decided that a second step was required for comparison between the groups to achieve precise grouping of the four types of factors.

Step 2 focused on the performance factors identified in step 1, which were tested using the population regression function (function 1) proposed by [25] [26]. When a performance factor was identified in step 1 but tested with significance in the population regression test in step 2, as well as when the slope of positive disconfirmation was greater than that of negative disconfirmation, we grouped the factor as a motivator. By contrast, if the slope of positive disconfirmation was smaller than that of negative disconfirmation, we grouped the factor as a hygiene factor.

$$t = \frac{Path_{sample\_1} - Path_{sample\_2}}{\left[\sqrt{\frac{(m-1)^2}{(m+n-2)} * S.E._{sample1}^2 + \frac{(n-1)^2}{(m+n-2)} * S.E._{sample2}^2}\right] * \left[\sqrt{\frac{1}{m} + \frac{1}{n}}\right]} \quad \text{Function 1}$$

$Path_{sample\_1}$: path coefficient of positive disconfirmation on satisfaction

$Path_{sample\_2}$: path coefficient of negative disconfirmation on satisfaction

$S.E._{sample1}$: standard error of path coefficient of positive disconfirmation on satisfaction

$S.E._{sample2}$: standard error of path coefficient of negative disconfirmation on satisfaction

m: positive disconfirmation population sample size

n: negative disconfirmation population sample size

Through the aforementioned statistical analysis, we discovered that if we used the linear model, all 41 factors affecting satisfaction were significantly correlated with information system satisfaction. By contrast, the sectioned analysis elucidated the effect of each factor affecting information system satisfaction at various stages, and it also revealed more information for in-depth exploration (see **Appendix A3** for details on the statistics of each factor). After consolidating the 41 factors and the total scores of system quality, service quality, and information quality, we identified 25 motivators, 7 hygiene factors, 9 performance factors, and 3 useless factors. See Table 3 for details.

4. Conclusions and Limitations

4.1. Conclusions

This research integrated Herzberg's two-factor theory and the Kano model. Using a questionnaire survey based on the expectation disconfirmation theory and two-step statistical analysis, we successfully grouped the factors affecting information system satisfaction identified in past studies into four types: motivators, hygiene factors, performance factors, and useless factors. Regarding system quality,

Table 3. Master list of factors affecting satisfaction and their types.

Variable	Type of factor	Variable	Type of factor
System quality	Hygiene factor	Personal recognition	Motivator
System quality—accessibility	Hygiene factor	Information quality	Performance factor
System quality—reliability	Performance factor	Information quality—accuracy	Motivator
System quality—response time	Hygiene factor	Information quality—completeness	Motivator
System quality—flexibility	Hygiene factor	Information quality—currency	Motivator
System quality—integration	Hygiene factor	Information quality—format	Motivator
System quality (total score)	Hygiene factor	Information quality (total score)	Motivator
System ease of use	Hygiene factor	Perceived usefulness	Motivator
Compatibility with the experience of system use	Performance factor	Confirmation of expectation	Motivator
IT department service quality	Performance factor	Uncertainty	Motivator
Service quality—reliability	Performance factor	Complexity	Performance factor
Service quality—responsiveness	Motivator	Autonomy	Motivator
Service quality—assurance	Motivator	Feedback	Motivator
Service quality—empathy	Performance factor	Power	Useless factor
Service quality (total score)	Motivator	Role conflict	Motivator
Computer policy	Useless factor	Effectiveness	Motivator
Security policy	Motivator	Efficiency	Motivator
Training	Performance factor	Work security	Motivator
Management support	Performance factor	Work replacement	Useless factor
Customer relation	Motivator	Computer skill growth	Motivator
Supervisor relation	Motivator	Work skill growth	Motivator
Supervisor recognition	Motivator	Self-efficacy	Motivator

overall system quality and detailed attributes such as accessibility, response time flexibility, and integration were all identified as hygiene factors, except for "reliability," which was identified as a performance factor. Therefore, users believe that an organization's information system should have high quality, which includes easy accessibility, fast system responses, flexibility to meet users' needs, and the ability to integrate data from other areas. However, the reliability of an information system can affect users' satisfaction depending on the system's stability.

In addition to the identified attributes of system quality, the well-known technology acceptance model developed for the information management field proposes the ease-of-use attribute, which was identified by this study as a hygiene factor. Users believe that if they must use an organization's information system to work, it must be easy to use. If not, users feel dissatisfied. However, this attribute has now been well developed and users no longer feel satisfied by its presence. Furthermore, we identified the factor of experience compatibility

proposed by the diffusion of innovations theory as a performance factor, which means that when users use the information system in their organization, the more the operation interface or methods are compatible with their experience from operating other systems, the more satisfied they feel. By contrast, if they feel that they must learn an interface again, they feel dissatisfied.

In terms of an IT department's service quality, overall service quality was identified as a performance factor. The rate of user satisfaction with the information system operates on the perception of overall service. We examined the four attributes of service quality and found that reliability and empathy were performance factors. This indicated that user satisfaction is affected by IT personnel. Users are satisfied when IT personnel fulfill their promises to users and when users feel that IT personnel are willing to understand the difficulties they have using a system. By contrast, users feel dissatisfied if they perceive that IT personnel do not stick to their promises and fail to recognize their experiences. The two attributes of responsiveness and assurance of service quality were identified as motivators in this study, which showed that users feel satisfied if IT departments can provide immediate solutions. However, if IT departments are unable to complete relevant tasks, this does not make users feel dissatisfied.

In addition to the factors relating to IT departments and information systems, studies have determined several factors regarding organizational management. In our study, we determined computer policy to be a useless factor. User satisfaction is not affected by whether a company has a reward or punishment system for making effective use of an information system. By contrast, for information security, users feel highly satisfied if a company has a strong information security policy, but if a company does not have one, they do not feel dissatisfied. In computer training policy and management support, users are more satisfied with an information system if a company provides comprehensive computer training and if management provides sufficient resources. However, they feel dissatisfied with an information system if the training is insufficient or management does not provide support.

Furthermore, this study found users' interpersonal relationships after using an information system to be a motivator. Users feel highly satisfied with an information system if they can form strong relationships with their customers and supervisors after they start using the system. In addition, if they receive more recognition from their supervisors and feel pleased with their performance using the system, they feel highly satisfied with it. However, if none of these conditions are met, users feel dissatisfied with the information system.

Overall information quality was identified as a performance factor, which means that the quality of information provided by a system directly affects users' satisfaction. Except for complexity and power relating to working with a system, the other factors affecting satisfaction were all identified as motivators. Regarding the complexity of using a system, users were satisfied if a system makes their work easier; however, if a system does not do so, they are not dissatisfied. Therefore, this factor was identified as a performance factor. In terms of person-

al power, some researchers have argued that information systems change the power and status of employees and affect their satisfaction. However, we identified personal power as a useless factor, because it does not affect users' satisfaction or dissatisfaction with an information system. Factors relating to working with the system, such as perceived usefulness, confirmation of expectation, autonomy, feedback, role conflict, effectiveness, and efficiency were identified as motivators. We found that positive disconfirmation of these factors affecting user satisfaction but negative disconfirmation does not. Regarding perceived usefulness, users are more satisfied if they feel that an information system is useful and helpful. Moreover, users' satisfaction increases if an information system makes the content of their work clearer. For autonomy, users feel more satisfied if they are able to arrange their own work more freely after using a system. Regarding feedback, users are more satisfied if they can ascertain the effectiveness of their work through feedback from a system. Furthermore, regarding role conflict, users are more satisfied with an information system if their roles and duties are defined more clearly. User satisfaction also increases if a system improves the quality and speed of work.

In the advancement and growth category, except for work replacement, which was identified as a useless factor, all other factors were identified as motivators. Regarding work replacement, users' perception of whether they would be replaced by an information system is relevant to their level of satisfaction with the system. Consequently, regarding job security, users feel more satisfied if their jobs are more secure after using a system. As for skill growth, users feel satisfied if they can acquire knowledge and skills related to using computers and their work. Simultaneously, they feel more satisfied with an information system if it increases their confidence to complete their work independently. However, none of the aforementioned factors affect users' information system satisfaction if they are not achieved.

4.2. Contribution to Practice

In this study, we analyzed and identified the following six major impact dimensions relating to information system satisfaction: Management Information Systems (MIS) department and information systems, company computer policy and administration, interpersonal relationships and recognition, work, performance, and advancement and growth. This analysis provides managers with clarity on the factors affecting information system satisfaction and can serve as a reference for management decisions.

For the MIS department dimension, managers of organizations should attempt to make company information departments more service oriented. IT personnel are company employees, equal to other employees in an organization; however, because modern IT has become a significant asset for organizations, IT personnel should play a more active role in helping users utilize information systems. Furthermore, managers should reinforce the concept of service science

in their IT employees to promote higher information system satisfaction [27].

Users care for the stability of an information system and whether it is easy to use. Managers must ensure the stability and speed of system response at all times; specifically, they must focus on IT infrastructure, for example by establishing a database, maintaining networking facilities, ensuring an uninterrupted power supply, upgrading computer functions, and backing up data. Although these technologies are now highly mature, managers must pay extra attention to problems in these areas. Users do not allow for even temporary system breakdowns because when the system is interrupted, users' work is affected. This study found that such a situation increases user dissatisfaction [28].

Regarding companies computer policies, this study found that computer-related training courses are the basics of management policy. Several multinational technology companies in Taiwan, such as MediaTek, UMC, and Winbond, have been implementing training courses for years, and they have dedicated whole departments to managing relevant practices. However, in other industries (e.g., medical care), employees' computer skills training is insufficient, which indirectly affects employees' information system satisfaction. This is an area that managers must reinforce [29]. Furthermore, this study found that users feel more satisfied if a company provides a comprehensive information security policy. This means that information security may not be a necessary condition, but nonetheless users feel more secure if the information system is protected from attacks; this sense of security increases their satisfaction with the information system [30].

In addition, we found that users feel more satisfied if an information system benefits their work. Therefore, managers must conduct a detailed analysis on work requirements when introducing any information system to an organization. Only information systems that help users complete their work will create satisfied users. Furthermore, if an organization intends to develop their own system, managers must ensure that the system analysts collaborate with users throughout the development because only then will it be a useful system that can satisfy users and truly help them complete their work [31].

4.3. Contributions to Academic Development and Future Studies

The most critical contribution of this study is the successful integration of Herzberg's two-factor theory and the Kano model. This study used the expectation disconfirmation theory to design a questionnaire and performed statistical analysis using a logical two-step method, which rectified the defects of previous methods based on Herzberg's two-factor theory. Through this multidimensional grouping of factors affecting satisfaction in the present study, researchers can locate more information and understand how users are affected by each factor across the various cognitive layers. These groupings provide a system for verifying the factors proposed previously and facilitate understanding of which layers play more significant roles. Through future in-depth research, we will explore

the relationships among users' cognition, emotions, and behaviors, as well as the roles of the various factors in users' behaviors.

Furthermore, we believe that various factors affecting satisfaction can be derived from information systems with different orientations. Because members of an organization must use the information systems inside the organization, such systems differ in terms of design and users from the website systems of e-commerce businesses, where users are voluntary. Therefore, the motivators, hygiene factors, and performance factors derived from these two systems are distinct. Moreover, paid and free websites hosting e-commerce activities differ substantially in terms of the mentioned scenarios, and therefore, the factors affecting satisfaction derived from the systems also differ greatly. These represent viable directions for future research.

4.4. Research Limitations

Although this study used stringent research methodologies, it has some limitations that should be considered when interpreting the results. First, although we conducted a thorough search on the impact variables identified in seven international information management journals, further undisclosed variables still exist; however, because of their nonsignificant results they were omitted. Moreover, the research participants were organizational users. Because this is a large population, we were unable to use more stringent stratified or cluster sampling methods, and therefore there may have been errors when estimating the population.

In designing the questionnaire design, this study adopted the expectation disconfirmation theory, focusing on the measurement standards of positive disconfirmation and negative disconfirmation. However, we overlooked the fact that options for answers in this layer are mostly derived from discoveries from relevant studies. If the questionnaire design includes confirmation of the options at this layer, most answers will fall into this layer, and a two-step analysis can be used to apply Herzberg's two-factor theory and the Kano model to determine information system satisfaction. Furthermore, we explored 41 factors affecting satisfaction, and thus we were unable to measure each factor with three or four questions. Instead, we had to use one question for each factor, which is another limitation of this study.

Finally, the biggest limitation of this research is that we could not use the same statistical method to develop a theoretical model. This is because the positive and negative disconfirmations of the questions were inconsistent, and therefore could not be calculated simultaneously. We were only able to identify the factors that belonged to the four types and then explore the theoretical model in terms of the various factors and follow-up behaviors.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

A1. Dimensions and Variables

Name of Dimension	Definition of Dimension	Name of Variable	Definition of Variable
MIS department and information system	The support provided by the MIS department to the information system used for work and the features of the information system	System quality	Levels of accessibility, reliability, response time, flexibility, and integration of the information system currently used for work.
		Ease of use	The level of ease of use relating to the operation interfaces of the information system currently used for work.
		Compatibility	The compatibility of experiences between the system currently used for work and the system used before (e.g., similar interface operations).
		Service quality	The level of support and services provided by the company's MIS department, including the following: Reliability: The ability to fulfill the service promise without errors. Responsiveness: The enthusiasm of MIS personnel when expressing willingness to help users and ability to provide immediate services. Assurance: Professional knowledge and manner of MIS personnel that develops trust and confidence among users. Empathy: The level of care and attention given to users.
Company computer policy and administration	The policy and management mechanism implemented to manage the information system used for work	Computer policy	Whether the company has a reward/punishment system for using the information system (and level).
		Security policy	Whether the company has a security protection system for operating the information system.
		Training	Whether the company has a training system for operating the information system.
		Management support	Encouragement given by management to employees regarding the use of the information system.
Interpersonal relations and recognition	Relationships with others and their views after using the information system for work	Customer relations	Changes in the relationships with the people engaged in business transactions after using the current information system for work.
		Supervisor relations	Changes in the relationships with supervisors after using the current information system for work.
		Supervisor recognition	Recognition from the supervisor for the employees' attitude and performance regarding the use of the current information system for work.
		Personal recognition	Personal recognition of the ability to use the current information system for work.
Work	Changes in job execution or control after using the information system for work	Information quality	The level of accuracy, completeness, and currency, as well as the format of the reports provided after using the information system for work.
		Perceived usefulness	The perceived level of usefulness of the system after using the current information system for work.
		Confirmation of expectation	The perceived level of confirmation/disconfirmation for meeting expectations after using the current information system for work.
		Uncertainty	The perceived level of increase/decrease in unfamiliarity toward work after using the current information system for work.

Continued

		Complexity	The perceived level of changes in the complexity of work after using the current information system for work.
		Autonomy	The perceived level of changes in autonomy at work after using the current information system for work.
		Feedback	The perceived level of increase in the speed of gaining feedback on work status or performance reports after using the current information system for work.
		Power	The perceived level of changes in power and status after using the current information system for work.
		Role conflict	The perceived level of changes and limitations in work processes after using the current information system for work.
Performance	The changes in work effectiveness after using the information system for work	Effectiveness	The perceived level of changes in work quality after using the current information system for work.
		Efficiency	The perceived level of changes in work speed after using the current information system for work.
Advancement and growth	The security and growth gained after using the information system for work.	Work security	The perceived level of protection in work rights after using the current information system for work.
		Work replacement	The perceived level of possibility of being replaced by the information system after using the current information system for work.
		Computer skill growth	The perceived level of skills and technical abilities learned after using the current information system for work.
		Work skill growth	The perceived level of work skills learned after using the current information system for work.
		Self-efficacy	The perceived level of confidence in one's own ability to complete the task after using the current information system for work.

A2. Questionnaire

Dear Sir/Madam,

This is a questionnaire for an academic study on factors relating to information system satisfaction. The research results are expected to make significant contributions to academic development and industrial practices. Your answers will be valuable references for us, and your assistance will be of great help to this research. We sincerely invite you to complete this survey in your free time. Thank you.

There are two pages in this questionnaire, dividing the questions into two parts. Please answer the questions based on your experience of an information system you have recently started to use or the information system you have used most often. The information you provide in this survey will only be used for collective statistical analysis and will not be disclosed individually. Be assured that your information is safe with us. We would like to thank you again for your participation.

To express our appreciation for your help, we have prepared convenience store gift vouchers, each to the value of NT$100. We will randomly draw 100 winners from the respondents.

==========

Part 1: Basic Information

1. Sex: ☐ Male ☐ Female
2. Age: _____ years old
3. Education: ☐ High school/occupational high school or below
   ☐ Associate degree ☐ Bachelor's degree ☐ Master's degree or higher ☐ Others
4. Professional background: ☐ IT ☐ Engineering ☐ Business administration
   ☐ Education ☐ Design ☐ Others
5. Industry ☐ IT ☐ Finance ☐ Manufacturing ☐ Services ☐ Others
6. Size of company (no. of employees):
7. Function:_____
8. Job title: _____
9. Years of work experience: _____years
10. Years of computer experience: _____years
11. Please consider the information system you have **started to use recently** (or use **most often**) that you have designated for this survey. What are the major tasks that you use this system to complete at work?
12. How long have you been using this system? _____years
13. Are you satisfied or dissatisfied with this information system? ☐ Satisfied ☐ Dissatisfied

(If you answered "satisfied," please proceed to question 14. If you answered "dissatisfied," pleas skip to question 15)

14. How satisfied you are with this information system?
    ☐ A little satisfied ☐ Somewhat satisfied ☐ Satisfied
    ☐ Very satisfied ☐ Extremely satisfied
15. How dissatisfied you are with this information system?
    ☐ A little dissatisfied ☐ Somewhat dissatisfied ☐ Dissatisfied
    ☐ Very dissatisfied ☐ Extremely dissatisfied
16. If you wish to participate in the lucky draw, please leave your email:

Part 2

Please consider the information system you designated in question 11 of Part 1 when answering the following questions. Please tick the answer that most closely represents your perception (single choice). If you have not had the experience described in the question, please tick "unable to answer."

1	The system's quality is better/worse than I expected.
2	The data accessibility is better/worse than I expected.
3	The system's reliability is better/worse than I expected.
4	The system's response speed is better/worse than I expected.
5	The system's customizability is better/worse than I expected.
6	The system's data integration is better/worse than I expected.
7	The systems' ease of use is better/worse than I expected.
8	The similarity between the system's user interface and functions and those of systems I have experienced before is better/worse than I expected.
9	Regarding this system, the quality of the services provided by the MIS Department of my company is better/worse than I expected.
10	Regarding this system, the MIS Department's ability to fulfill the promises they made is better/worse than I expected.
11	Regarding problems with this system, the MIS Department's ability to provide instant and relevant services is better/worse than I expected.
12	My trust in the MIS personnel of my company to deal with problems with this system is better/worse than I expected.
13	The MIS personnel's attention to my personal use of the system is better/worse than I expected.
14	Regarding this system, my company's system for reward and punishment for correctly using the system is better/worse than I expected.
15	My company's security policy for using this system is better/worse than I expected.
16	My company's training and education for operating this system is better/worse than I expected.
17	Resource support for using this system provided by the managers of my company is better/worse than I expected.
18	My relationships with business colleagues and partners after using this system were better/worse than I expected.
19	My relationship with my supervisor after using this system is better/worse than I expected.
20	My supervisor's recognition of my attitude and performance exhibited for using this system is better/worse than I expected.
21	My self-recognition for using this system is better/worse than I expected.
22	The quality of the information provided by this system is better/worse than I expected.
23	The accuracy of the information provided by this system is better/worse than I expected.
24	The completeness of the information provided by this system is better/worse than I expected.
25	The currency of the information provided by this system is better/worse than I expected.
26	The clarity of the information provided by this system is better/worse than I expected.
27	The usefulness of this system for work is better/worse than I expected.
28	Overall, this system as used for work is better/worse than I expected.
29	After using this system, the clarity of my job content is better/worse than I expected.
30	After using this system, the level of job simplification is better/worse than I expected.
31	After using this system, the ability to manage my own time is better/worse than I expected.
32	After using this system, the level of feedback on the effectiveness of my work is better/worse than I expected.
33	After using this system, the increase in my power and status is better/worse than I expected.

Continued

34	After using this system, the clarity of my role and duties is better/worse than I expected.
35	After using this system, the quality of my work is better/worse than I expected.
36	After using this system, my working speed is better/worse than I expected.
37	After using this system, my job security is better/worse than I expected.
38	After using this system, my sense of being replaced by the information system is better/worse than I expected.
39	After using this system, my computer abilities and technical skills are better/worse than I expected.
40	After using this system, the level of work-related knowledge and technical skills learned is better/worse than I expected.
41	After using this system, my confidence in completing work tasks is better/worse than I expected.

A3. Regression Analysis and T Test on Each Factor

Affecting Factor		Sample Size	B Estimated Value	Standard Error	*t*
System Quality	All samples	369	1.372	0.067	20.374
	Positive disconfirmation	230	0.803	0.160	5.033
	Negative disconfirmation	127	2.066	0.374	5.531
	Unable to answer	12			
	Variance test				3.606
			Hygiene factor		
System Quality—Accessibility	All samples	369	1.196	0.074	16.232
	Positive disconfirmation	238	1.146	0.186	6.166
	Negative disconfirmation	124	2.183	0.423	5.162
	Unable to answer	7			
	Variance test				2.605
			Hygiene factor		
System Quality—Reliability	All samples	369	1.244	0.085	14.690
	Positive disconfirmation	269	1.057	0.189	5.579
	Negative disconfirmation	85	1.598	0.549	2.908
	Unable to answer	15			
	Variance test				1.191
			Performance factor		
System Quality—Response Time	All samples	369	0.966	0.083	11.593
	Positive disconfirmation	221	0.705	0.229	3.075
	Negative disconfirmation	140	2.248	0.381	5.899
	Unable to answer	8			
	Variance test				3.702
			Hygiene factor		
System Quality—Flexibility	All samples	369	1.046	0.072	14.591
	Positive disconfirmation	199	0.580	0.180	3.224
	Negative disconfirmation	154	1.920	0.341	5.623
	Unable to answer	16			
	Variance test				3.702
			Hygiene factor		
System Quality—Integration	All samples	369	1.002	0.073	13.631
	Positive disconfirmation	220	0.669	0.194	3.440
	Negative disconfirmation	137	1.651	0.352	4.694
	Unable to answer	12			
	Variance test				2.656
			Hygiene factor		
System Quality—Total Score	All samples	369	0.334	0.016	20.426
	Positive disconfirmation	233	0.205	0.029	7.062
	Negative disconfirmation	121	0.370	0.079	4.678

Continued

	Unable to answer	15			
	Variance test				2.376
			Hygiene factor		
	All samples	369	1.041	0.080	12.990
	Positive disconfirmation	254	0.933	0.206	4.521
	Negative disconfirmation	108	2.025	0.379	5.242
Ease of Use	Unable to answer	7			
	Variance test				2.731
			Hygiene factor		
	All samples	369	1.142	0.081	14.036
	Positive disconfirmation	222	0.885	0.198	4.463
	Negative disconfirmation	100	1.488	0.434	3.430
Compatibility	Unable to answer	47			
	Variance test				1.460
			Performance factor		
	All samples	369	1.051	0.077	13.620
	Positive disconfirmation	240	0.872	0.197	4.425
	Negative disconfirmation	113	0.998	0.416	2.401
Service Quality	Unable to answer	16			
	Variance test				0.312
			Performance factor		
	All samples	369	0.953	0.090	10.545
	Positive disconfirmation	223	0.944	0.224	4.223
	Negative disconfirmation	108	1.259	0.479	2.630
Service Quality—Reliability	Unable to answer	38			
	Variance test				0.682
			Performance factor		
	All samples	369	0.916	0.089	10.328
	Positive disconfirmation	250	0.967	0.225	4.295
	Negative disconfirmation	99	0.766	0.459	1.668
Service Quality—Responsiveness	Unable to answer	20			
	Variance test				
			Motivator		
	All samples	369	0.842	0.092	9.124
	Positive disconfirmation	257	1.118	0.222	5.044
	Negative disconfirmation	86	0.956	0.482	1.985
Service Quality—Assurance	Unable to answer	26			
	Variance test				
			Motivator		
Service Quality—Empathy	All samples	369	0.723	0.090	8.006

Continued

	Positive disconfirmation	191	0.660	0.261	2.524
	Negative disconfirmation	131	0.940	0.385	2.441
	Unable to answer	47			
	Variance test				0.626
			Performance factor		
	All samples	369	0.291	0.025	11.494
	Positive disconfirmation	240	0.295	0.055	5.378
Service Quality—Total Score	Negative disconfirmation	98	0.188	0.107	1.757
	Unable to answer	31			
	Variance test				
			Motivator		
	All samples	369	0.808	0.097	8.364
	Positive disconfirmation	153	0.319	0.255	1.252
	Negative disconfirmation	111	0.445	0.426	1.043
Computer Policy	Unable to answer	105			
	Variance test				
			Useless factor		
	All samples	369	0.848	0.090	9.377
	Positive disconfirmation	239	0.826	0.207	3.991
	Negative disconfirmation	88	0.309	0.522	0.592
Security Policy	Unable to answer	42			
	Variance test				
			Motivator		
	All samples	369	0.730	0.084	8.700
	Positive disconfirmation	182	0.742	0.237	3.127
	Negative disconfirmation	162	1.030	0.353	2.920
Training	Unable to answer	25			
	Variance test				0.692
			Performance factor		
	All samples	369	0.815	0.091	8.946
	Positive disconfirmation	237	0.720	0.225	3.202
	Negative disconfirmation	102	1.117	0.433	2.581
Management Support	Unable to answer	30			
	Variance test				0.894
			Performance factor		
	All samples	369	1.131	0.109	10.366
	Positive disconfirmation	234	1.066	0.236	4.517
	Negative disconfirmation	68	1.039	0.685	1.516
Customer Relations	Unable to answer	67			
	Variance test				

Continued

			Motivator		
Supervisor Relations	All samples	369	1.008	0.116	8.650
	Positive disconfirmation	199	0.902	0.270	3.338
	Negative disconfirmation	60	0.626	0.605	1.034
	Unable to answer	110			
	Variance test				
			Motivator		
Supervisor Recognition	All samples	369	0.966	0.118	8.200
	Positive disconfirmation	216	0.874	0.253	3.455
	Negative disconfirmation	57	−0.188	0.687	−0.274
	Unable to answer	96			
	Variance test				
			Motivator		
Personal Recognition	All samples	369	1.302	0.092	14.099
	Positive disconfirmation	278	1.170	0.209	5.587
	Negative disconfirmation	74	0.673	0.499	1.349
	Unable to answer	17			
	Variance test				
			Motivator		
Information Quality	All samples	369	1.344	0.077	17.427
	Positive disconfirmation	260	0.835	0.176	4.732
	Negative disconfirmation	99	1.399	0.413	3.384
	Unable to answer	10			
	Variance test				1.480
			Performance factor		
Information Quality—Accuracy	All samples	369	1.058	0.097	10.891
	Positive disconfirmation	278	1.249	0.211	5.906
	Negative disconfirmation	80	0.738	0.594	1.242
	Unable to answer	11			
	Variance test				
			Motivator		
Information Quality—Completeness	All samples	369	1.016	0.087	11.648
	Positive disconfirmation	256	0.998	0.199	5.018
	Negative disconfirmation	103	0.976	0.518	1.883
	Unable to answer	10			
	Variance test				
			Motivator		
Information Quality—Currency	All samples	369	0.926	0.093	9.940
	Positive disconfirmation	246	1.025	0.218	4.708
	Negative disconfirmation	97	0.601	0.513	1.172

Continued

	Unable to answer	26			
	Variance test				
			Motivator		
Information Quality—Format	All samples	369	1.034	0.092	11.265
	Positive disconfirmation	263	1.239	0.214	5.789
	Negative disconfirmation	95	0.632	0.496	1.273
	Unable to answer	11			
	Variance test				
			Motivator		
Information Quality—Total Score	All samples	369	0.331	0.025	13.150
	Positive disconfirmation	263	0.354	0.046	7.664
	Negative disconfirmation	81	0.235	0.126	1.865
	Unable to answer	25			
	Variance test				
			Motivator		
Perceived Usefulness	All samples	369	1.001	0.094	10.685
	Positive disconfirmation	280	1.359	0.206	6.612
	Negative disconfirmation	77	0.541	0.529	1.021
	Unable to answer	12			
	Variance test				
			Motivator		
Confirmation of Expectation	All samples	369	1.148	0.090	12.768
	Positive disconfirmation	276	1.140	0.194	5.888
	Negative disconfirmation	77	0.274	0.494	0.556
	Unable to answer	16			
	Variance test				
			Motivator		
Uncertainty	All samples	369	1.260	0.098	12.875
	Positive disconfirmation	260	1.295	0.211	6.137
	Negative disconfirmation	71	0.722	0.635	1.138
	Unable to answer	38			
	Variance test				
			Motivator		
Complexity	All samples	369	1.142	0.085	13.468
	Positive disconfirmation	243	0.833	0.200	4.174
	Negative disconfirmation	92	1.418	0.443	3.202
	Unable to answer	34			
	Variance test				1.384
			Performance factor		
Autonomy	All samples	369	1.111	0.094	11.841

Continued

	Positive disconfirmation	209	1.015	0.205	4.942
	Negative disconfirmation	87	0.796	0.503	1.583
	Unable to answer	73			
	Variance test				
			Motivator		
	All samples	369	1.183	0.096	12.277
	Positive disconfirmation	219	1.142	0.232	4.924
Feedback	Negative disconfirmation	80	0.942	0.550	1.715
	Unable to answer	70			
	Variance test				
			Motivator		
	All samples	369	0.700	0.124	5.646
	Positive disconfirmation	132	0.445	0.365	1.217
Power	Negative disconfirmation	69	-0.043	0.524	-0.081
	Unable to answer	168			
	Variance test				
			Useless factor		
	All samples	369	0.911	0.111	8.199
	Positive disconfirmation	206	1.042	0.265	3.937
Role Conflict	Negative disconfirmation	76	0.289	0.567	0.509
	Unable to answer	87			
	Variance test				
			Motivator		
	All samples	369	1.136	0.113	10.062
	Positive disconfirmation	266	1.124	0.238	4.722
Effectiveness	Negative disconfirmation	59	0.729	0.615	1.187
	Unable to answer	44			
	Variance test				
			Motivator		
	All samples	369	1.075	0.100	10.780
	Positive disconfirmation	258	1.299	0.223	5.812
Efficiency	Negative disconfirmation	68	1.022	0.529	1.931
	Unable to answer	43			
	Variance test				
			Motivator		
	All samples	369	0.981	0.120	8.179
	Positive disconfirmation	183	0.849	0.300	2.833
Work Security	Negative disconfirmation	64	0.189	0.589	0.321
	Unable to answer	122			
	Variance test				
			Motivator		