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Measuring satisfaction with business-to-employee systems

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Abstract

Marketing the products of other companies within an individual company Intranet can benefit both employees and the company itself. Understanding what constitutes a satisfying experience on the part of the employees is crucial for developing successful business-to-employee systems. While end-user computing satisfaction has been studied extensively, new aspects such as purchasing convenience, product prices in the system and product delivery have to be included. This study develops an instrument for reliably and accurately measuring business-to-employee success. Test–retest reliability and construct validity are examined. The results of this study show that convenience, delivery, interface, accuracy, price and security influence employee assessments of satisfaction. Managers can use the instrument developed here to assess the success of their business-to-employee systems.

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1. Introduction

Advances in information technology have profoundly altered the business processes between a firm and its employees. Internet technology has brought e-training (Kendler, 2000) and e-benefits (Mitchell, 2000). Moreover, a trend has also arisen towards exhibiting the products of other companies within the Intranet of a company. For example, GM and Delta are developing “business-to-employee” strategies that offer discounts on products and services to the employees of their partners. Cummins Engine, which has 25,000 employees in North America, allows employees

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access to such things as employee entertainment and travel discounts from airlines that Cummins contracts with (Schwartz, 2000). Company employees may be able to rent a car, book a hotel, reserve a restaurant and order books and other products via their company's Intranet, and obtain a substantial discount in doing so. This type of reciprocity benefits both the employees and the company.

For companies that ally themselves with partner firms, this practice can greatly expand sales channels to include thousands of highly qualified customers. Employees get significant discounts on products and services that they would generally not be able to obtain elsewhere. This type of benefit allows employers to provide more with less, meet the needs of a diverse employee group, attract and retain a committed workforce and encourage citizenship behavior.

A business-to-employee system is part of a corporate Intranet, of which the development and management requires caution and sound planning. Wachter and Gupta (1997) discussed various management strategies and argued that intranets are a form of end-user computing and must be managed accordingly. In other words, employee needs and preferences are important considerations in designing and managing a business-to-employee system. Consequently, constantly gauging user satisfaction is essential to the success of business-to-employee systems, just as for other computer systems.

User computing satisfaction is probably the most widely used measure of the success of information systems (Delone & McLean, 1992). The measure usually only encompasses the computer-related activities required or necessary to accomplish a particular job. Typical end-user computing tasks include word processing, spreadsheet applications, database management, data analysis, graphics, and communications. Various studies have examined user satisfaction with general computing (Doll & Torkzadeh, 1988), as well as with specific computer applications such as decision support simulation systems (McHaney & Cronan, 1998), data warehouse (Chen, Soliman, Mao, & Frolick, 2000), and so on (Hiltz & Johnson, 1990; Moor & Benbasat, 1991; Palvia, 1996). One measurement that is used widely is measure of End-User Computing Satisfaction (EUCS) developed by Doll and Torkzadeh (1988). Past research has demonstrated instrument validity and reliability (Harrison & Rainer, 1996; McHaney & Cronan, 1998; Torkzadeh & Doll, 1991).

For a business-to-employee system to continue growing in value, a better understanding of the elements that constitute successful implementation of business-to-employee systems must be developed. While quality of intranet software (Leung, 2001) has been examined and EUCS has been studied extensively, past research does not include purchasing convenience, product variety, product pricing, and product delivery. As Nunnally (1978) pointed out, one validates not a measuring instrument but rather some use to which the instrument is put. With the broadening use of computer systems, measurement instruments have to reflect change. Clearly, a new instrument is required for business-to-employee systems.

The purpose of this study is to develop an instrument for providing a reliable and valid measurement of business-to-employee success. We examine and document factors in employee business-to-employee satisfaction assessments. We rely on qualitative evidence gathered through literature review and focus group interviews to

develop the questionnaire items and conceptual model. We then test the model, examine the test–retest reliability and construct validity, and discuss the findings.

2. The system

UMC, the world's second largest semiconductor foundry firm, is located in Taiwan and has more than 9000 employees. According to the regulations in the country, a small percentage of revenue has to be set aside for employee benefits. A benefit committee has been set up to deal with benefit issues, including the uses to which this benefit fund is put. While the committee can simply distribute the benefit fund directly to individual employees, this approach is not the most effective use of the money. Instead, the bulk procurement of products and services for employees can obtain substantial discounts from suppliers and greatly increase the value of the benefits. Moreover, this approach also allows employees who purchase the products involved using their own money to achieve the same discount. The net result is to greatly increase employee purchasing power. However, individual employees have different desires concerning fund use and personal spending. For example, while some would like oversea trips, others would like to buy products from local department stores. Meanwhile, the procurement process and record keeping place a significant demand on committee time and manpower.

A system has been set up to offer choices of products and services on the company's Intranet with payments being deducted directly from the funds allocated to the employees. If employee spending exceeds their allocated funds, money can be deducted directly from employee salaries. This approach significantly reduces the concerns of many Internet shoppers, since the employees do not need to give out their credit card information. Moreover, record keeping can be done by the system automatically, greatly reducing the workload of the committee members.

Products currently in the system include books, products that can be purchased at the local convenience stores and coupons for local department stores. The books are delivered to a bookstore operated within the company, while products from the convenience stores are delivered by the stores' delivery units. If employees wish to shop at a local department store, the business-to-employee system allows them to purchase discount coupons, which will be delivered to them directly via the internal mail system.

Other than offering opportunities to shop, the business-to-employee system includes a few other functions, such as a travel section where employees can organize trips and vote on preferred destinations. Using the business-to-employee system, employees can also organize communities in which they are interested in participating. Finally, allowing employees to log into the Intranet at home means that they do not need to spend valuable work time shopping, significantly reducing employer concern that the business-to-employee system will distract employees from work.

The system had been up and running for 5 months when this research was conducted. Employees must use the system to spend the funds allocated to them, and thus almost all company employees knew about the system and had the experience in using it.

3. Conceptual model

A qualitative phase of this study reported here was conducted to identify possible causes and consequences of business-to-employee system satisfaction. A focus-group interview was conducted with three members of the benefit committee who were in charge of outsourcing the system and had been obtaining constant feedback from users. Another focus-group interview with six users of the systems followed. The interviews were designed to elicit information on employee opinions, preferences and satisfaction with shopping on the company's business-to-employee system. Literature on Internet shopping and end-user computing satisfaction was also reviewed in this phase.

A conceptual model depicted in Fig. 1 is advanced. This model is similar to the second-order factor model of the end-user computing satisfaction proposed by Doll and Torkzadeh (1988). First-order factors of satisfaction, including convenience, product assortment, delivery, product information, interface, price, accuracy, and security, provide a framework for explaining the EUCS construct by identifying the underlying components. The second factor is interpreted as EUCS. Doll, Xia, and Torkzadeh (1994) tested four plausible alternative models of factor structure and recommended that researchers use this second-order factor model.

3.1. Convenience

One important aspect of Internet and Intranet shopping is convenience. Employees can shop at home or in the office, avoiding hassles of traffic jams and parking. Finding items on the Intranet may be easier than visiting stores to physically search for items. Furthermore, on-line shopping can be done 24 h a day, 7 days a week. Convenience has been identified as one of the main advantages of Internet shopping (Alba et al., 1997; Szymanski & Hise, 2000), and shopping on a corporate business-to-employee system share this quality.

3.2. Product offerings

It seems reasonable to expect that employee satisfaction would increase when business-to-employee systems offer an increased range of products. However, during the focus group discussion, some employees expressed the opinion that since their company is not in the retail business, it does not need to provide such a large range of products to employees. Despite different opinions about the assortment of products, the company's business-to-employee system must carry sufficient products and services to satisfy employees' needs and attract repeat patronage. A business-to-employee system carrying millions of titles of books sounds excellent in theory, but in practice a smaller selection focus on technical books suggested by employees may be easier to implement and equally attractive.

3.3. Delivery

Research shows that on-line retailers often experience low satisfaction and order fulfillment rates due to poor demand forecasts and inadequate fulfillment systems

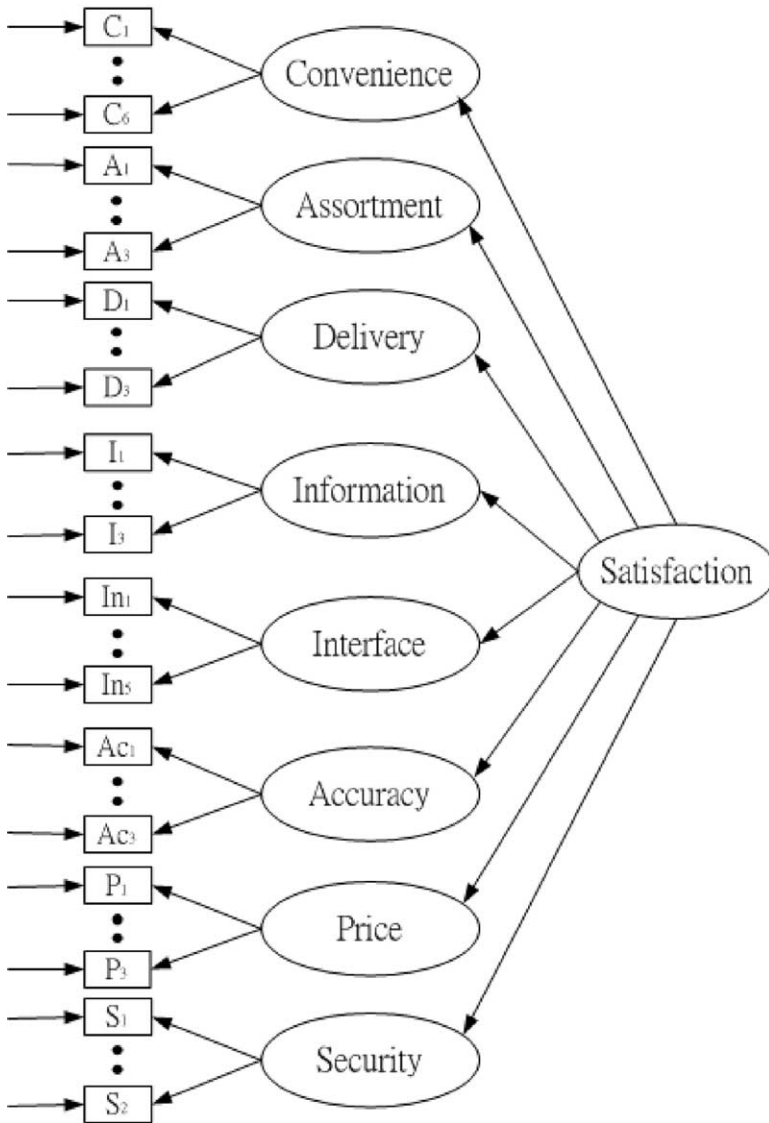


Fig. 1. Proposed model of satisfaction with business-to-employee systems—eight first-order factors, one second-order factor.

(Jedd, 2000). Shoppers desire prompt and reliable product delivery. Consequently, delays are likely to cause anxiety and dissatisfaction.

3.4. Product information

The amount of product information in a business-to-employee system will influence employee willingness to shop on the system and their evaluations of the shopping

experience. Factors related to product information include: the quantity and completeness of information supplied on the system, the reliability of the information, and the efficiency and convenience in retrieving the information that employees want (Alba et al., 1997; Fram & Grady, 1997).

3.5. *Interface*

Consumers preferred fast, uncluttered, and easy-to-navigate sites (Eighmey & McCord, 1998; Smith, 2001). These characteristics are similar to pleasurable shopping experiences which will enhance overall satisfaction. Information quality, response time and system accessibility are considered important variables for measuring information system success (Delone & McLean, 1992; Lin & Lu, 2000; Seddon, 1997). Moreover, ease of use has been used as a criterion to evaluate Websites (Smith, 2001).

3.6. *Accuracy*

Accuracy is one of the five factors in Doll and Torkzadeh's (1988) EUCS. Business-to-employee systems, like other information systems, must be accurate to satisfy users. Error-prone systems create dissatisfied users and turn them away.

3.7. *Price*

Price influences shopper satisfaction with their shopping experiences. On-line bookseller Amazon charges much lower prices for books than brick-and-mortar bookstores do, which is one of the important reasons why it continues to attract new customers and repeat buyers. Price influences shopper willingness to shop on the Internet (Liao & Cheung, 2001).

3.8. *Security*

Many consumers are concerned about the security and privacy of personal information such as credit card numbers and personal data. Consumers who perceive these problems as serious are less likely to shop on the Internet. Shopping on a company system means that individuals do not need to give out any personal information, significantly reducing security concerns. However, the issue of security may still exist and influence employee satisfaction with the overall shopping experience (Liao & Cheung, 2001; Smith, 2001; Szymanski & Hise, 2000).

4. **Research procedures**

A literature review was conducted on topics related to EUCS and satisfaction with Internet shopping. This literature review identified 27 potential research items for measuring eight factors of satisfaction. These items were incorporated into a preliminary

questionnaire, which was sent out for review by a number of academics and company employees. The respondents to the pretest were asked to answer the questions and examine the relevance of the items in terms of end-user satisfaction with the business-to-employee system.

After refining the existing items and adding some new ones, a total of 28 items were obtained. These items along with items related to the consequences of satisfaction, including future intentions, perceived organizational support, citizenship behaviors, and questions on Internet usage, system usage and demographic information, were put into a questionnaire. The items were measured with the Likert-type scale ranging from 1 to 5. The questionnaire was conveniently distributed to company employees along with a small gift to show our appreciation for the efforts of the employee in answering the questionnaire. After eliminating poor quality responses, e.g. questionnaires in which the same responses were given to all questions, a total of 266 responses were obtained. About 12% of respondents had not logged into the system in the past month. The responses of these individuals were removed from the analysis, leading to a total of 234 usable responses.

Table 1 lists the experience of using the Internet and of using the system, as well as the gender, age, job classification, education and time spent using the Internet per week. Over 60% of respondents had experience of Internet shopping and around 60% of respondents also had experience of shopping on the business-to-employee system during the past month. Females and males each account for about one-half of the respondents. Over 85% of the respondents are aged between 26 and 40. Approximately half of the respondents are engineers, and over 60% of the respondents have university degrees.

5. Results

5.1. Reliability

The internal consistency reliability (α coefficient) should be the first value calculated to assess instrument quality (Churchill, 1979). Table 2 lists the α coefficients of the measurement scores. The α coefficients all exceed 0.75, above the conventional acceptable level of 0.7 (Nunnally, 1978), and thus are adequate.

5.2. Exploratory factor analysis

Because this is the first study on business-to-employee systems and many of the scales are new, an exploratory factor analysis was performed to ascertain the underlying dimensions of employee satisfaction. After a few items which load on more than one dimension are deleted, the results clearly show that there are eight dimensions. These eight factors explain 78% of the variance in the data, all items load heavily onto one of the factors, and all of the factors correspond with the originally intended dimensions (Table 3).

Table 1

Experience of using the Internet and using the system, gender, age, job classification, and education of the respondents

	Frequency	Percent
<i>Shopping experience on the Internet (not including the company's Intranet)</i>		
Shopping on the Internet at least once a month	27	11.5
Shopping on the Internet less than once a month	119	50.9
Do not have experience in shopping on the Internet	88	37.6
<i>Shopping experience on the company's System</i>		
Shopping on the company's system at least twice in the past month	33	14.1
Shopping on the company's system once in the past month	107	45.7
Browsing on the company's system, but did not shop in the past month	94	40.2
<i>Sex</i>		
Male	109	47.0
Female	123	53.0
<i>Age</i>		
16–25	25	10.8
26–30	95	40.9
31–40	105	45.3
41–50	6	2.6
Over 50	1	0.4
<i>Job classification</i>		
Engineer	113	50.7
Administrator	59	26.2
Section Head	20	8.9
Technician	32	14.2
<i>Education</i>		
High School	31	13.4
Community College	56	24.1
University	68	29.3
Graduate School	77	33.2

5.3. The structural equation model

Doll and Torkzadeh (1988) proposed a second-order factor model of end-user computing satisfaction that consists of five first-order factors: content, format, accuracy, ease of use and timeliness. The five first-order factors, measured by 12 items, provide a framework for explaining the EUCS construct by identifying underlying components. This model has been confirmed (Doll et al., 1994) and used in other studies (Harrison & Rainer, 1996). Following the structure of the model, Fig. 1 displays the current hypothesized model, which is used for a second-order confirmatory factor analysis. In the process of running Lisrel, some items are further deleted for simplicity, clarity and to enhance the fit of the model with the data. Finally, only two items are retained for each of the eight first-order factors.

The results of a confirmatory factor analysis with all of the dimensions in the model show that the chi-square statistic is 177.53 with 96 degrees of freedom ($P < 0.001$), as shown in Table 4. A low chi-square value is desirable and indicates good fit between the data and the model. However, since chi-square is sensitive to

Table 2
Coefficient alpha for scores of system satisfaction measures^a

Item	Coefficient α
<i>Convenience</i>	0.86
*1. B2E system can save my shopping time	
2. B2E system helps me to avoid traffic jams and parking trouble	
*3. That shopping on the B2E system can be done any time is very convenient.	
4. I can find the products I want easily on the B2E system	
5. The purchasing process on the B2E system is very expedient	
6. Purchasing on the B2E system is very efficient	
<i>Product assortment</i>	0.84
7. The B2E system offers a sufficient assortment of products	
8. There are many choices for each category of product	
9. The products offered on the B2E system suit my needs	
<i>Delivery</i>	0.87
10. The products on the B2E system are delivered at the promised time	
*11. The promised delivery time for the products on the B2E system is not long	
*12. Getting the products I purchased on the B2E system is very convenient	
<i>Information</i>	0.86
13. The B2E system offers enough product information	
14. The B2E system offers accurate product information	
15. The product information on the B2E system suits my needs	
<i>Interface</i>	0.87
*16. The design of the Web pages of the B2E system is excellent	
*17. The design of the Web pages of the B2E system can pull me toward purchasing products	
18. The Web pages of the B2E system display information clearly	
19. It is easy to use the B2E system	
20. The B2E system shows Web pages quickly	
<i>Accuracy</i>	0.83
*21. The B2E system records and processes data accurately	
*22. I am satisfied with the accuracy of the B2E system	
<i>Price</i>	0.78
*23. The prices of the products on the B2E system are low	
*24. I will purchase coupons on the B2E system before I go to purchase products on the retail stores	
25. The most important value that the B2E system offers is low prices for products	
<i>Security</i>	0.82
*26. I feel secure about the transactions when shopping on the B2E system	
*27. It is safer to shop on the B2E system than to shop on the Internet	

*Items selected in the final model of satisfaction.

^a Items are measured with a Likert-type scale with 1 being strongly disagree, and 5 strongly agree.

sample size, adjusted chi-square value (χ^2/df) is a better indicator. Adjusted chi-square values close to 1 indicate a well-fitting model, with values less than 5 being considered acceptable (Hair, Anderson, Tatham, & Black, 1998). The adjusted chi-square for this study is 1.85, indicating that the fit is reasonably good.

The Goodness-of-Fit Index (GFI) indicates the overall degree of model fit. The index ranges from 0, indicating a poor fit, to 1, indicating a perfect fit. The AGFI differs from the GFI only in that it adjusts for degrees of freedom, thus addressing

Table 3
Results of exploratory factor analysis

	Convenience	Delivery	Assortment	Information	Interface	Price	Accuracy	Security
Save time	0.777	0.124	-0.027	0.043	0.121	0.171	0.140	0.138
No parking	0.822	0.072	0.016	0.122	0.083	0.024	-0.003	0.109
Anytime	0.811	0.163	0.198	-0.014	0.042	0.106	0.137	0.069
Find easily	0.740	0.032	0.222	0.117	0.170	0.222	-0.022	0.025
Efficient	0.531	0.456	0.050	0.157	0.236	0.087	0.158	0.252
Many products	0.187	0.215	0.774	0.160	0.252	0.043	0.027	0.209
Selection	0.075	0.212	0.776	0.259	0.215	0.145	0.100	0.085
Meet needs	0.164	0.114	0.656	0.419	0.031	0.277	0.203	0.131
On time delivery	0.140	0.824	0.194	0.171	0.139	0.134	0.122	0.171
Delivery cycle	0.157	0.853	0.138	0.165	0.135	0.110	0.160	0.110
Get products	0.166	0.620	0.242	0.239	0.037	0.139	0.363	0.113
Enough information	0.098	0.289	0.341	0.686	0.326	0.078	0.041	0.075
Accurate information	0.129	0.201	0.198	0.676	0.298	0.173	0.257	0.213
Needed information	0.107	0.190	0.246	0.797	0.173	0.152	0.161	0.072
Excellent Design	0.228	0.109	0.126	0.234	0.749	0.201	0.178	0.161
Attractive Design	0.187	0.141	0.222	0.247	0.755	0.261	0.122	0.127
Clear Design	0.149	0.159	0.231	0.207	0.621	0.235	0.326	-0.041
Accurate	0.062	0.215	0.086	0.178	0.248	0.144	0.816	0.157
Satisfied with accuracy	0.179	0.276	0.112	0.156	0.200	0.144	0.738	0.248
Low prices	0.074	0.212	0.198	0.034	0.317	0.674	0.170	0.171
Purchase coupons	0.191	0.233	0.144	0.209	0.131	0.698	0.196	0.162
Important value	0.242	-0.004	0.047	0.120	0.167	0.809	0.020	0.077
Feel secure	0.146	0.178	0.221	0.182	0.081	0.267	0.152	0.778
Safer than Internet	0.225	0.181	0.114	0.069	0.115	0.093	0.195	0.833
Eigenvalues	3.262	2.654	2.318	2.312	2.265	2.187	1.874	1.768
% of Variance Explained	14%	11%	10%	10%	9%	9%	8%	7%

Table 4
Indices for the full model and models without certain factors

Factors eliminated	Chi-Square	d.f.	P-value	GFI	AGFI	RMR	Standardized RMR	NFI
No factors eliminated	177.53	96	0.000	0.92	0.88	0.027	0.047	0.91
Convenience	140.66	70	0.000	0.92	0.89	0.026	0.045	0.92
Assortment	118.64	70	0.000	0.94	0.90	0.024	0.043	0.93
Delivery	121.37	70	0.000	0.93	0.89	0.025	0.046	0.93
Information	97.44	70	0.017	0.95	0.92	0.021	0.039	0.94
Interface	124.63	70	0.000	0.93	0.89	0.026	0.046	0.93
Accuracy	136.50	70	0.000	0.92	0.89	0.027	0.048	0.92
Price	140.62	70	0.000	0.92	0.88	0.027	0.050	0.92
Security	140.32	70	0.000	0.93	0.89	0.027	0.047	0.92
Assortment and information	58.45	48	0.14	0.96	0.93	0.019	0.035	0.96

the issue of parsimony. The GFI and AGFI for this study are 0.92 and 0.88, exceeding the acceptable values of 0.9 and 0.8, respectively, and indicating that the model fits the sample data reasonably well.

The Root Mean Square Residual (RMR) represents the average residual value between the observed and estimated input matrices. However, residuals are related to the sizes of the observed variances and covariances, and thus are difficult to interpret. Consequently, the standardized RMR is a better indicator, and ranges from zero to 1.00. In a well-fitting model, this number would be small, perhaps 0.05 or less (Byrne, 1998). The standardized RMR in this study is 0.047, indicating that the model fits the sample data well.

The Normed Fit Index (NFI) measures the fit of the proposed model against the null model (Bentler & Bonet, 1980). The NFI ranges from 0, indicating the null model, to 1, indicating a perfect fit with the data. The NFI for this study is 0.91, exceeding the acceptable value of 0.8, once again indicating that the model fits the sample data well.

Overall, these goodness-of-fit indices indicate a good fit between the model and the data. Furthermore, all path coefficients in the model are significant at $P < 0.001$. However, to examine whether any dimension of measures exists that makes only a marginal contribution to the overall satisfaction and to further improve the model, a succession of models are run with one factor deleted in turn. Table 4 lists the results. Clearly, if the model does not include the assortment or information factors, the model fit improves significantly. Subsequently, a model without these two factors was run, with the results being shown on the last line of Table 4. The χ^2 , GFI, AGFI, RMR, standardized RMR, and NFI improve significantly and all exhibit good fit. Consequently, the factors that this study considers to influence satisfaction which are included in the model comprise: convenience, delivery, interface, accuracy, price and security. The items used to measure these six factors are marked with an * in Table 2. Table 5 lists standard structural coefficients, corresponding t -values and R^2 -values for the final model.

6. Test–retest reliability

Test–retest reliability measures instrument stability. Torkzadeh and Doll (1991) examined the short- and long-term stability of the EUCS Instrument. The results of

Table 5
Structural coefficients, t -value and R^2 for the final model

Factor	Standard structure coefficient	t -value	R^2
Convenience	0.64	6.45	0.41
Delivery	0.79	6.70	0.63
Interface	0.76	7.53	0.58
Accuracy	0.82	6.97	0.68
Price	0.84	5.58	0.71
Security	0.74	7.38	0.54

their study suggest that their instrument is stable. McHaney, Hightower, and White (1999) concluded that the EUCS instrument is psychometrically sound and valid under testing and retesting when applied to decision support system users. To test the stability of the current instrument, 85 new respondents were recruited to answer the questionnaire. After 2 weeks, the respondents were given the same questionnaire. A short duration between two tests is likely to produce more consistent results than is justified by their attitude. A very long duration is likely to produce unstable results since people's attitude may change. Two weeks is an interval recommended by many researchers (Churchill, 1979; Nunnally, 1978). Again, individuals who had not used the system in the past month were excluded, resulting in a final total of 73 that could be used for analyzing test–retest reliability.

To examine test–retest reliability, the *t*-test of the difference between the means of items, subscales and global score, correlations of items, subscales and global score for the two tests, factor analysis and confirmatory factor analysis are examined.

Table 6 lists the results of the *t*-test for the differences in means, subscales and global scores. The accuracy subscale shows significant result at the $\alpha=0.05$ level. Other subscales and all individual items are not significant at the $\alpha=0.05$ level. The overall *t*-test was not significant ($P<0.56$).

Table 6
Difference in item means between the test and retest

Variable	Paired difference		<i>t</i> -value	d.f.	P-value (2-tailed)
	Mean	Standard deviation			
Save time	0.11	0.83	1.13	72	0.26
Anytime	0.07	0.79	0.74	72	0.46
Delivery cycle	0.03	0.83	0.28	72	0.78
Get products	-0.03	0.62	-0.38	72	0.71
Excellent Design	0.07	0.67	0.87	72	0.39
Attractive Design	0.11	0.76	1.24	72	0.22
Accurate	0.11	0.59	1.59	72	0.12
Satisfied in accuracy	0.15	0.70	1.84	72	0.07
Low prices	-0.03	0.91	-0.26	72	0.80
Purchase coupons	-0.11	0.91	-1.03	72	0.30
Feel secure	-0.11	0.59	-1.59	72	0.12
Safer than Internet	0.00	0.91	0.00	72	1.00
Subscale					
Convenience	0.062	0.60	0.877	72	0.38
Delivery	0.000	0.62	0.000	72	1.00
Interface	0.089	0.63	1.216	72	0.23
Accuracy	0.130	0.55	2.011	72	0.05
Price	-0.089	0.79	-0.966	72	0.34
Security	-0.055	0.60	-0.782	72	0.44
Overall					
Global	0.023	0.34	0.585	72	0.56

Table 7 lists the correlations between the two tests for each item, subscale and global score. Some of the correlations are low compared with the previous study by Torkzadeh and Doll (1991). Some of the shared variances represented by the correlations for individual items are low. Low correlation scores can be explained by the nature of the applications evaluated (Hendrickson, Golrfeld, & Cronan, 1994; Torkzadeh & Doll, 1991). While previous studies examined work-related systems, this study looks at a system that is related to benefits. Respondents in this study spend minimal time using the system each day. The low involvement of the respondents in the system creates difficulties in obtaining reliable scores. Correlations for subscale and global scores are better and are acceptable.

Data were examined using factor analysis, and as expected, six distinct dimensions are revealed. Finally, a confirmatory factor analysis using the model obtained in the previous analysis is tested using the new data. The model fits the data reasonably well, as shown in Table 8. The chi-square value is 55.92 with 48 degrees of freedom, the P -value is 0.2, GFI=0.89, AGFI=0.83, RMR=0.038, standardized RMR=0.059, and NFI=0.87. The results of the above analysis show that the satisfaction model advanced here has acceptable test–retest reliability.

Table 7
Item correlations between the test and retest

Variable	Correlation	P -value
Save time	0.362	0.002
Anytime	0.347	0.003
Delivery cycle	0.422	0.000
Get products	0.501	0.000
Excellent Design	0.543	0.000
Attractive Design	0.556	0.000
Accurate	0.660	0.000
Satisfied in accuracy	0.474	0.000
Low prices	0.431	0.000
Purchase coupons	0.531	0.000
Feel secure	0.716	0.000
Safer than Internet	0.384	0.001
<i>Subscale</i>		
Convenience	0.503	0.000
Delivery	0.494	0.000
Interface	0.610	0.000
Accuracy	0.632	0.000
Price	0.532	0.000
Security	0.664	0.000
<i>Overall</i>		
Global	0.780	0.000

Table 8
Structural coefficients, *t*-value, *R*² and goodness-of-fit measures for the second sample

Factors	Standard structure coefficient	<i>t</i> -value	<i>R</i> ²
Convenience	0.68	8.10	0.46
Delivery	0.68	6.61	0.46
Interface	0.71	9.68	0.50
Accuracy	0.92	12.03	0.85
Price	0.79	7.88	0.62
Security	0.64	8.27	0.41

$\chi^2_{48} = 55.92$, *P*-value = 0.2, GFI = 0.89, AGFI = 0.83, RMR = 0.038, StandardizedRMR = 0.059, NFI = 0.87.

7. Construct validity

To assess construct validity, a proposed final step is to show that the scale behaves as expected in relation to other constructs (Churchill, 1978). To test the validity of the satisfaction measure developed here, it is correlated with intentions, perceived organizational supports, and citizenship behaviors.

7.1. Intentions

Researchers are interested in identifying the evaluative constructs that can most accurately predict future consumer intentions. Satisfaction with a system would lead to favorable behavior intentions, while dissatisfaction with a system would lead to unfavorable behavior intentions. Favorable intentions include saying positive things about the company to others, recommending the company or service to others, willingness to pay a premium price to the company, and remaining loyal to the company. Unfavorable behavior intentions include complaining, reducing purchase amounts, or exiting (Zeithaml & Berry, 1996). If our measure of satisfaction is accurate, it should be related to intentions positively.

7.2. Perceived organizational support

Social exchanges entail unspecified obligations; favors are given with the expectation of some future return, though exactly when it will occur and in what form is often unclear (Gouldner, 1960). Social exchange theory has been employed to examine the organizational exchange processes between an employee and employing organization (Hutchison, 1997; Rousseau, 1990). The more an employee is satisfied with the business-to-employee system, the more likely his perception of organizational support will be positive.

7.3. Citizenship behavior

A good business-to-employee system has the benefit of promoting organizational citizenship behaviors. Traditional models of motivation based on the mechanisms of

economic exchange cannot effectively explain well the relationship between workers and employers, and in promoting prosocial behavior, organizational citizenship behavior, and extrarole performance (Wayne, Shore, & Linden, 1997). Lambert (2000) draws on developments in social exchange theory and proposed that a relationship exists between workers' experiences with a work-life package and organizational citizenship behavior. Social exchange theory indicates that people feel obligated to reciprocate when they benefit from the actions of some entity. Significant, positive relationships have been found between worker assessments of the usefulness of work-life benefits and organizational citizenship. If the measure of satisfaction with a business-to-employee system has construct validity, it would be related to organizational citizenship behavior. Researchers have also found that perceived organizational support is a mediating variable for organizational citizenship behavior (Eisenberger, Huntington, Hutchison, & Sowa, 1986; Moorman, Blakely, & Niehoff, 1998; Wayne et al., 1997).

Our original questionnaire included items measuring respondents' intentions, perceived organizational supports and citizenship behaviors (Table 9). Those measures were taken from the previous literature. The Cornbach alpha's for scores from the current sample are 0.8976, 0.8781, and 0.8773 for intentions, perceived organizational supports and citizenship behaviors, respectively.

A structural equation model was run to test the relationships between satisfaction and future intentions, perceived organizational support and citizenship behaviors, as postulated in Fig. 2. The model results show that chi-square value is 402.97 with 220 degrees of freedom, P -value < 0.01, $\chi^2/df = 2.01$, GFI = 0.88, AGFI = 0.84, RMR = 0.026, adjusted RMR = 0.048, NFI = 0.88, indicating that the model fits the

Table 9
Coefficient alpha of measurements for intentions, perceived organizational support and citizenship behaviors

Items ^a	Coefficient α
<i>Intentions</i>	0.90
1. B2E system is my first choice for shopping	
2. I will purchase more products on the B2E system	
3. I will talk to my friends about the benefits of the B2E system	
4. I will recommend my colleagues to shop on the B2E system	
5. I will be a loyal patron of the B2E system	
<i>Perceived organizational support</i>	0.88
7. The company does its best to take care of different needs of colleagues	
8. The company appreciates the contribution of every colleague	
9. The company is proud of the contribution of its employees	
10. The company will not replace me with someone else at a lower salary	
<i>Citizenship behaviors</i>	0.88
10. I will do something to enhance the company's image even if not asked to do so	
11. I will not waste time complaining to the company if I am not satisfied	
12. I will help my colleagues even if the company does not ask for it	
13. I will follow the company's rule as much as possible	

^a Items are measured with a Likert-type scale with 1 being strongly disagree, and 5 strongly agree.

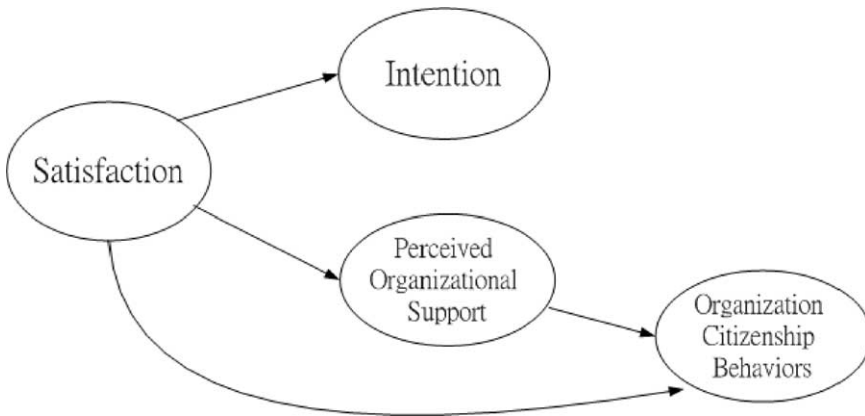


Fig. 2. Intentions, perceived organizational support and citizenship behaviors as consequences of satisfaction.

data well. Table 10 lists the relationships between satisfaction and intentions, perceived organizational supports and citizenship behaviors. As hypothesized, those equations show that increased satisfaction leads to greater future intentions and better perceived organizational support. Moreover, higher satisfaction, mediated by perceived organizational support, leads to better citizenship behaviors.

8. Discussions and conclusions

This study shows that satisfaction with a business-to-employee system which sells products is a multifaceted construct consisting of six dimensions: convenience,

Table 10
Equations representing the relationship among constructs

Intention	=	0.88	×	Satisfaction,	$R^2 = 0.78^\dagger$			
		(0.11)						
		7.97**						
POS ^a	=	0.75	×	Satisfaction,	$R^2 = 0.56^\dagger$			
		(0.10)						
		7.47**						
CB ^b	=	0.55	×	POS ^a	+ 0.2	×	Satisfaction,	$R^2 = 0.51^\dagger$
		(0.13)			(0.11)			
		4.32**			1.81*			

^a POS = perceived organizational support.

^b CB = citizenship behaviors.

* *t*-value, significant at $\alpha = 0.05$ level.

** *t*-value, significant at $\alpha = 0.01$ level.

† Significant at $\alpha = 0.01$ level.

delivery, interface, accuracy, price, and security. The values of the goodness-of-fit indices obtained from the original confirmatory factor analysis indicate that the second-order model of the instruments presented in this study provides a reasonable fit with the data. Moreover, further examinations of the instruments indicate that the instruments have adequate test-retest reliability and construct validity.

Accuracy and ease of use are two dimensions in the EUCS. The accuracy dimension is significant in this study, while interface design, similar to ease of use, is also significant. These significant results are also consistent with the technology acceptance model (Davis, 1989), which postulates that perceived usefulness and perceived ease of use have great relevance to technology acceptance behaviors. Other dimensions in EUCS, including content, format and timeliness, are not directly related to this study. As the system's function changes, the measurement instruments must reflect the change. The current study is a progress toward including new dimensions into measurements of user computing satisfaction.

Two of the initially specified dimensions, product assortment and information, were eliminated during data analysis. Although product assortment may be important for attracting customers to brick-and-mortar stores and virtual stores on the Internet, its relationship with satisfaction in a business-to-employee system appears weak. Possibly, employees may feel that since the company is not in the retailing business, it does not need to offer a large range of different kinds of products as part of the business-to-employee system. Moreover, employees may feel that if the company devotes too much effort in increasing the assortment of the products available on the business-to-employee system, the resources left available to them may be reduced. The relationship between the amount of product information and satisfaction with the business-to-employee system is also weak. This weakness may arise because employees are busy working, and tend to make decisions on making purchases on the business-to-employee system without spending much time and effort on processing product information. The lack of a clear relationship between these two variables and satisfaction resembles the results obtained by Szymanski and Hise (2000), who found that product assortment is not related to satisfaction, while product information is only marginally linked to satisfaction.

Security is a major concern in Internet shopping. One would think that since shopping on the company system does not involve giving out credit card numbers, security would not be a concern for employees. However, this study indicates otherwise. The higher level of security perceived by employees leads to higher satisfaction. Improving the perception of security is an issue that still has to be addressed for business-to-employee systems.

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