Research

An examination of the IT satisfaction of small-business users

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Abstract

Although there are many articles in the MIS literature which address small-business computing, in effect the organizations represented in these studies are, in many ways, similar to medium- and large-sized organizations. In this article, we focus on businesses that are truly small: they have very few employees and there is no formal MIS department. In this environment, the small business owner/manager is the principal user and has to perform most of the IT functions. For such an environment, an IT satisfaction construct and measurement instrument are presented. A survey, using the measurement instrument, of a representative sample of small businesses was conducted to identify user satisfaction patterns. Key areas of IT dissatisfactions are: training and education (the most important), software maintenance, documentation, and vendor support. These deficiency areas can be appropriately addressed by software vendors and consultants. Finally, a contingency analysis of IT satisfaction based on business-related factors and owner characteristics was performed. A general observation was that the owner attributes have a greater impact on IT satisfaction than any of the business factors. The ones that stood out the most were the gender and the age of the owner. © 1999 Published by Elsevier Science B.V. All rights reserved

1. Introduction

While the use of information technology (IT) is steadily on the rise in small businesses, it still pales in comparison with IT applications in large- and medium-sized organizations. Estimates of small business use of computers over the years have ranged from below 30% to about 80 percent, depending on the location, size, and nature of the business [1, 13, 24].

While the trend appears to indicate an increased use of IT, this is mainly for operational and administrative tasks, rather than for strategic or decision-making purposes [5, 11]. Specific small-business computing areas, where past studies have been conducted, include: computing usage patterns [9, 10, 25, 27], contributing factors to IS success [7, 21, 22], contributing factors to IT use [6, 14, 18], IT attitudes and concerns [2, 17, 20, 23], and user satisfaction [15, 16, 22]. Fuller [11] also provides a comprehensive and insightful examination of IT issues in small businesses.

It is important to note that, in practically all small-business studies cited here, the companies are in many

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ways similar to medium- and large-sized organizations. The U.S. Small Business Administration (SBA) classifies a firm as small if it has up to 500 employees. This allows considerable latitude. The organizations reported in past studies have a formal MIS department, and even a community of end-users, similar to their larger counterparts. Articles about 'truly' small businesses are rare in academic and professional journals; a possible explanation is that such businesses are quite rudimentary in their IT implementation. Nevertheless, a serious investigation of IT's impact on small businesses is warranted as these businesses are extremely important to the US and the world economy. As Carnevale [4] points out, five out of every six paychecks in America come from firms with less than 1000 employees and two-thirds of these persons work for firms with less than 100 employees.

In order to focus on truly small businesses, we have restricted the size of businesses in this study to a maximum of 100 employees, following the example of Nazem [16]. The purpose of this article is to examine the impact of IT on such businesses and to further evaluate the impact based on several contextual factors. Ideally, one would like to evaluate IT impact based on direct measures, such as costs and benefits, productivity improvements, impact on decision making, and competitive advantage. In view of difficulty in measurements, IS researchers have used surrogate measures. A common one is 'user satisfaction' with technology [3, 8, 12]. The 'user satisfaction' measure has received widespread acceptance, and we use it in our study. However, current satisfaction measures are not directly applicable to small-business computing. The authors, therefore, conducted a study with a dual purpose: to develop a new measure and instrument for 'small-business user satisfaction with information technology', and also to measure and report IT satisfaction among small-business users. Details of the new measure and instrument have been reported in a previous article [19]. In this article, we concentrate on satisfaction results along with an examination of the factors related to satisfaction.

2. The small-business user IT satisfaction construct

For the small-business user, IT satisfaction is a multi-dimensional construct. At the same time, it is significantly different from the construct needed in a traditional DP environment or the general end-user computing environment. It should be noted that measurement instruments for these two environments have been available for some time, but not for the small-business IT environment. In essence, the small-business construct can be characterized as containing three distinct components: the first is similar to that in end-user computing, the second has elements of the traditional DP environment, and the third is made up of special small-business computing factors. The small-business computing environment is different primarily because of the small-business limited resources. Under such circumstances, the small business owner/manager is the principal user who often has to perform other IT functions in a somewhat makeshift manner (e.g. operations, analysis and programming, contacts with vendors, etc.)

A 12-variable, 23-item instrument was developed to measure the small-business user satisfaction. Three additional items were included for overall satisfaction evaluation. The instrument was completed after extensive refinement and validation; details of this process can be found in Ref. [19]. The instrument itself is reproduced in Appendix A. The entire instrument, as well as the individual variables, achieved high levels of reliability, as shown in Table 1.

The inclusion of one variable, namely 'productivity', in the instrument is somewhat contentious. There was some debate: Is productivity a subdimension of satisfaction, or is it another, higher level construct, distinct from satisfaction (though obviously related to it)? To us, it appears to be a higher level construct; however, we retained it in the instrument due to this controversy. Our advice for specific organizations/users is to make their own judgment about its inclusion. Here, we excluded the productivity variable; thus, we have eleven variables and twenty-one items to consider.

3. A contextual model of small-business user IT satisfaction

Relevant small-business computing literature, as cited earlier, was reviewed in order to identify factors that might be related to IT satisfaction. Particularly, some articles provided specific factors for inclusion

Table 1
Cronbach's α coefficients for the 23+3 item instrument (Number of items for each variable shown in parentheses)

Variables	Cronbach's α
1. Software adequacy (2)	0.72
2. Software maintenance (1)	—
3. Information content (2)	0.81
4. Information accuracy (1)	—
5. Information format (2)	0.78
6. Ease of use (4)	0.90
7. Timeliness (2)	0.77
8. Security and integrity (2)	0.58
9. Productivity (2)	0.91
10. Documentation (2)	0.64
11. Vendor support (1)	—
12. Training and education (2)	0.74
13. Overall evaluation – global items (3)	0.87
Entire instrument (23 group items)	0.91

[6, 7, 9, 15, 18, 21]. An exploratory model[2] of factors contributing to IT satisfaction is shown in Fig. 1. The dependent variable in the model is the 'IT satisfaction'. We consider two categories of variables that may be related to satisfaction: business-related factors and owner characteristics. The first category has four variables and the second five, making for a total of nine variables.

3.1. Business factors

Many of the user-satisfaction studies conducted for medium- and large-businesses focus on business-related factors. Once again, the very small businesses have not received such scrutiny. Most of our citations, therefore, are indicative but not directly applicable. Here, we examine four factors.

3.1.1. Type of business
The level of penetration of IT in different sectors of small business shows some variability, although consistent and significant differences have not been found in the literature. There is some evidence that retailers and wholesalers are the most sophisticated users in the

USA. There are also known differences in computing between the manufacturing and the service industries. Accordingly, businesses were classified into four groups: manufacturing, service, wholesalers/retailers, and other.

3.1.2. Business size
Size is a variable of considerable importance. Larger organizations are heavier users of information technology. Some of the previously cited studies have examined size as a factor in small business computing. It would be interesting to examine the proposition that smaller businesses have lower levels of satisfaction and vice-versa. This variable was operationalized, using the number of employees in the firm; it has three levels: 1–2 employees – suggesting a mom and pop operation; 3–5 employees – still a very small operation; and more than five employees for the 'larger' firms.

3.1.3. Profitability
Lack of resources is a prime factor inhibiting small businesses' use of information technology. The profitability of the business is an indicator of resource availability. A positive relationship between profitability and computer utilization in small businesses was found by Alexander [1] and Palvia et al. [18]. In examining the impact of profitability on satisfaction, two levels were used: those that are profitable, and those that are not (i.e. just breaking even or losing money.)

3.1.4. Location
The location of a small business may pose obstacles to the availability of hardware, software, and supporting resources. Raymond [21] examined this variable and postulated that businesses that are in less remote regions will have higher satisfaction than those in more remote regions. Location is operationalized in this study as a binary variable with two values: urban and rural location.

3.2. Owner characteristics

Besides organizational characteristics, owner characteristics have a particularly significant influence on small businesses compared to larger companies, as the owner (who is also likely to be the manager) has a

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[2]The model is purposely parsimonious, where independent variables are directly related to IT satisfaction. The main argument in favor of a one-stage model is that we are exploring relationships in a segment of small business, which has been rarely addressed before.

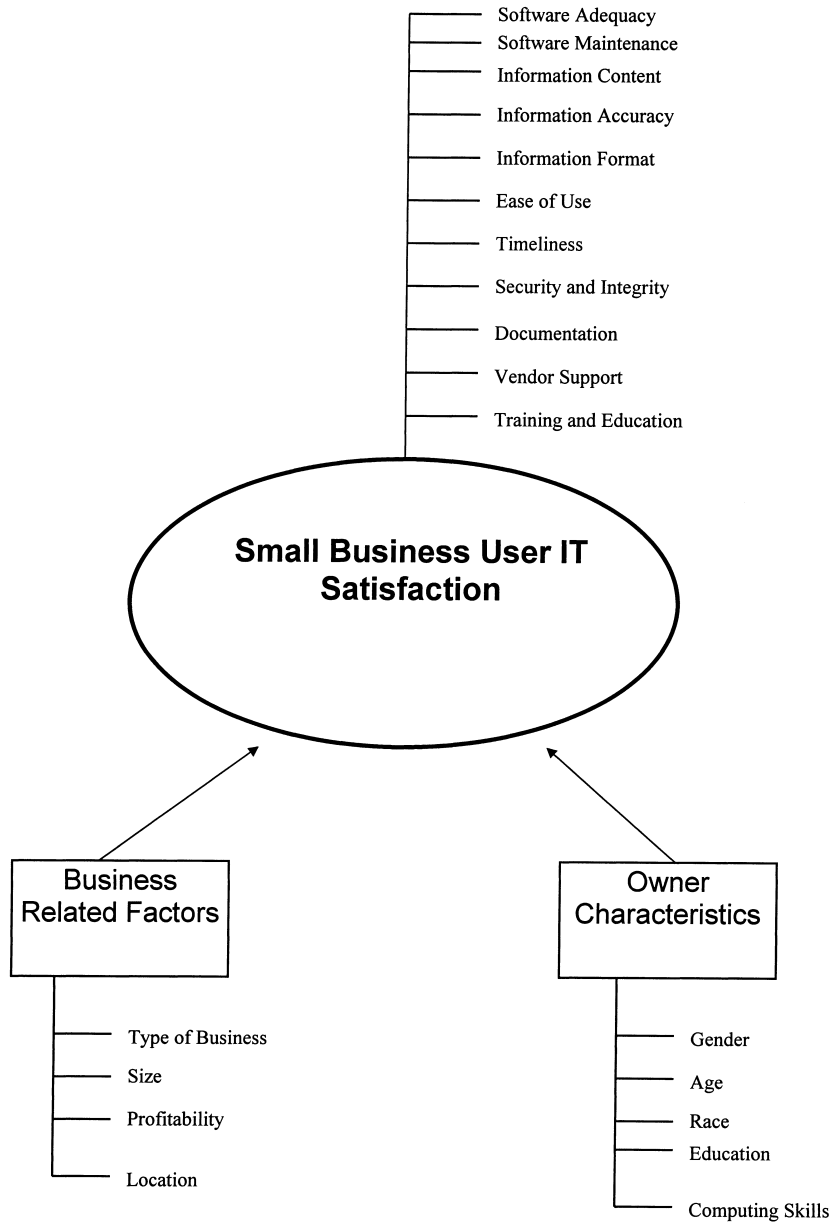## A Model of Small Business User IT Satisfaction

Fig. 1. A Model of Small Business User IT Satisfaction.

dominant role in the functioning and the very existence of the business. Not only does the owner makes decisions about IT investments, but also may be the primary user. Five owner-related factors have been examined.

3.2.1. Gender

Differences between men and women in terms of computer attitudes, computer use and computing practices are widely reported. However, this variable has seldom been examined in larger or smaller organiza-

tions with respect to IT satisfaction. As the owner has so much influence in small-business computing, we decided to examine this variable; its two levels are male and female.

3.2.2. Age

Older people are more likely to have fear of technology; also they were generally educated and trained without the benefit of computer technology [26]. By contrast, younger generations were often introduced to computer technology in their high school years, or even earlier. It is, therefore, postulated that older owners will have less satisfaction with information technology. For the purpose of this article, owner's age was classified into two categories: ages 20–40 and over 40.

3.2.3. Race

Race is a politically sensitive variable to examine; nevertheless, there are many economic and demographic differences among the various races, and these may be frequently reported in the social sciences literature, as well as the popular press. Again, given the importance of a single individual in running the business, this variable's effect on IT satisfaction was examined. The variable levels[3] are: white and African Americans.

3.2.4. Education

The owner/manager's education as an explanatory variable in small-business computing has been examined in select studies. The obvious hypothesis is that owners with more formal education will tend to use computers more and will have greater IT satisfaction. Education was operationalized by the years of formal education, and had four levels: high school or less, some college education, college degree, and education beyond college.

3.2.5. Computing skills

This variable seems to be the most examined among small-business computing studies. It is intuitively evident that a higher level of the owner's computational skill will lead to greater use of computers by all members of the business, as well as result in lesser

frustration and greater IT satisfaction. The variable has been operationalized in different ways in the past, e.g. as years of computer experience, fascination/interest in technology, level of computer literacy, amount of computer training, and self-reported skill level. In this study, we operationalized it as a self-reported measure with three levels: poor, average, and good skills.

3.3. Research methods

Considerable effort was made in initial instrument preparation and pilot testing. The 43-item instrument, packaged as a questionnaire along with questions on exogenous variables, was administered to a random and representative sample of small businesses in the state of Tennessee. This sample was provided by the local Small Business Development Center[4] (SBDC.) The businesses were located in both, rural and urban settings, providing a balanced spectrum. The owner/manager or the person responsible for operating the computers was asked to complete the questionnaire; it was to be completed only if the business owned any computers. A self-addressed, stamped return envelope was included with the mailing. The mailing went to 1460 small businesses, who had been in contact with the SBDC in the past three years. In order to improve the response rate, a follow-up letter was sent after four weeks to those who did not respond.

Small businesses are known to have a high failure rate. Thus, it is not surprising that 107 questionnaires were returned undelivered, in effect reducing the number surveyed to 1353. Of these, 108 were returned completed, i.e. an eight percent response rate. This response rate is misleading, as only those owning computers were asked to complete the instrument. Estimates for small businesses using computers are between 30 and 80 percent; therefore, our response rate is effectively between 10 and 27 percent. In any case, the sample size is adequate for analysis.

Finally, as we wished to limit our analysis to businesses with no more than 100 employees, eight more companies were eliminated, bringing the sample

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[3]Other races were not included as they were not adequately represented in our target population.

[4]The SBDC is funded and operated under a cooperative agreement with the US Small Business Administration, the state government, and participating colleges and universities.
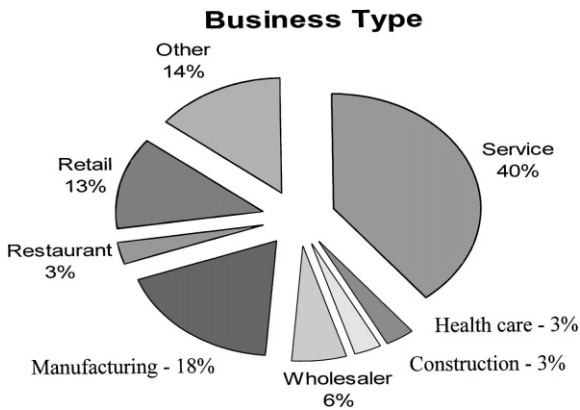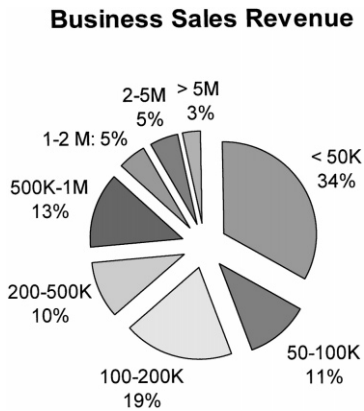
Business Type

Other 14%
Retail 13%
Restaurant 3%
Manufacturing - 18%
Wholesaler 6%
Construction - 3%
Health care - 3%
Service 40%

Fig. 2. Profile of Respondents by Business Type.

Business Sales Revenue

2-5M 5%
> 5M 3%
1-2 M: 5%
500K-1M 13%
200-500K 10%
100-200K 19%
50-100K 11%
< 50K 34%

Fig. 3. Profile of Respondents by Business Sales.

Table 2
Small business user IT satisfaction

IT Component	Median	Mean
Total	2.409	2.441
Software adequacy	2.500	2.626
Software maintenance	3.000	2.869
Information content	2.000	2.371
Information accuracy	2.000	1.898
Information format	2.000	1.995
Ease of use	2.000	2.083
Timeliness	2.000	2.067
Security and integrity	2.500	2.393
Documentation	3.000	2.905
Vendor support	3.000	2.780
Training and education	3.000	3.072

size to an even 100. The businesses in the final sample were indeed small, with the median number of employees being four. They represent a broad cross-section in terms of type and location. As shown in Fig. 2, 39 percent of the businesses are in the service industry. The next largest groups are in manufacturing and retail. Of these, 70 percent are located in urban areas, and 30 percent in rural areas. The annual sales range from less than $50 000 to over five million; the median is in the $100 000–$200 000 range (Fig. 3).

4. Analysis and results

By conducting extensive reliability and validity analysis, the instrument was reduced to 23 items.

However, by removing the 'productivity' variable, results were based on the eleven variables composed of the 21 items. Note that, based on the Likert scale, a satisfaction score can range between one and five, where one represents the highest satisfaction and five the highest dissatisfaction. Total IT satisfaction is obtained by simply averaging the scores of the 21 items; component satisfaction is obtained by averaging the items contained in the component.

4.1. IT satisfaction of small-business users

The mean and median values of satisfaction scores are reported in Table 2. Note that smaller values represent higher levels of satisfaction. Scores greater than or equal to three represent lack of satisfaction or negative satisfaction, and scores less than three represent positive levels of satisfaction. Thus, the overall IT satisfaction is positive. The satisfaction is also positive for seven out of the 11 IT components, based on median scores.

Taking the positive results first, and based on the mean scores, the five highest satisfaction areas are in the following order: information accuracy; information format; timeliness; ease of use; and information content. Except for ease of use, the remaining four are associated with the characteristics of information itself. In other words, the small-business users are generally satisfied with the information they are provided by use of the technology.

The highest area of dissatisfaction is 'training and education'. Small businesses have been traditionally

neglected by training firms and consultants; they generally find it more profitable to address larger clients. Many authors have repeatedly emphasized the need for IT training and education of small businesses. Furthermore, inadequate resources and limited education about IT further handicap the small-business users. Other dissatisfaction areas are: documentation; software maintenance; and vendor support. All of these are related to software, its quality, and the need for support.

4.2. Effect of business-related factors on IT satisfaction

The four business factors were examined in relation to their impact on IT satisfaction. An ANOVA test was conducted, with each factor as the independent variable, and total IT satisfaction and each component satisfaction as the dependent variables. The p values for all of the ANOVA tests are shown in Table 3. Apparently, the business-related factors only have a mild effect on IT satisfaction; i.e. there are no major differences in IT satisfaction among the various types of businesses. The p values for total IT satisfaction by any of the business characteristics are not significant.

4.2.1. Type of business

The two areas where the business type had a significant impact ($p < 0.05$) were ease of use, and training

and education. For ease of use, service-oriented firms had the highest level of satisfaction and manufacturing the least. The wholesaler/retailer firms were in-between. For training and education, service firms again had the highest satisfaction, followed by wholesalers/retailers and manufacturing firms. A plausible explanation for our findings may be that service firms are more IT-dependent; therefore, they have probably received more attention from software companies, trainers, and consultants.

4.2.2. Business size

Business size had no perceivable effect on total IT satisfaction. This is contrary to our expectation, as organizational size has been shown to have a direct bearing on computing, both quantitatively and qualitatively, in other studies. Perhaps the small range of size here (1–2, 3–5, over 5) prohibited us from observing a wide range of differences. Nevertheless, there was a significant impact of business size on information accuracy and security and integrity at the 0.10 significance level, and on vendor support at the 0.05 significance level. The information-accuracy results were mixed and perplexing, with firms having one-to-two employees and more than five employees exhibiting more satisfaction than firms with three-to-five employees. Satisfaction with security and integrity, and vendor support were in the anticipated direction; larger firms showed more satisfaction than the smaller ones.

Table 3
ANOVA tests of IT satisfaction by business related variables p values

IT component/variable	Type of business	Business size	Profitability	Location
Total	0.309	0.546	0.515	0.801
Software adequacy	0.672	0.733	0.026 [b]	0.744
Software maintenance	0.236	0.941	0.512	0.100 [a]
Information content	0.338	0.918	0.122	0.983
Information accuracy	0.993	0.069 [a]	0.092 [a]	0.633
Information format	0.773	0.133	0.192	0.899
Ease of use	0.030 [b]	0.491	0.904	0.948
Timeliness	0.531	0.702	0.440	0.735
Security and integrity	0.405	0.090 [a]	0.426	0.480
Documentation	0.284	0.621	0.525	0.425
Vendor support	0.841	0.014 [b]	0.927	0.968
Training and education	0.016 [b]	0.811	0.718	0.934

[a] Significant at the 0.10 level.
[b] Significant at the 0.05 level.

4.2.3. Profitability

There was no discernible impact of business profitability on total IT satisfaction. However, on an individual component basis, there was an impact on software adequacy at the 0.05 level, and on information accuracy at the 0.10 level. In both components, companies that were not profitable were less satisfied. Obviously, economic factors inhibit IT growth in small businesses, resulting in inadequate hardware and software.

4.2.4. Location

There was no association between business location and total IT satisfaction, consistent with observations from past studies. The one area, where there was some impact of location, is in software maintenance (significant at the 0.10 level). As expected, rural businesses were less satisfied than their urban counterparts.

4.3. Effect of owner characteristics on IT satisfaction

Similar ANOVA tests were conducted to examine the impact of owner attributes on IT satisfaction (see Table 4). Contrasted with business factors, the owner's background seems to have a greater impact on IT satisfaction. Two of the five owner factors (i.e. gender and age) have an impact on the total satisfaction. This finding is particularly noteworthy, as the small-business owner has almost total control

over the business, and his/her dispositions and attitudes are expected to have a major bearing on IT use and satisfaction.

4.3.1. Gender

Gender was significantly related to total IT satisfaction ($p = 0.0253$). Gender's impact is also significant on the following components: software maintenance and ease of use at the 0.05 level; information content; information format; and training and education at the 0.10 level. In all cases, females exhibit a higher level of satisfaction than males. This finding is somewhat surprising, as most magazines and press reports suggest that males are more dominant in the use of computer technology. In light of our results, this issue may need more rigorous investigation. We speculate the following probable reasons: first, small businesses use computers largely for operational tasks, and females are more associated with such tasks; and second, females are less likely to be dissatisfied than men.

4.3.2. Age

Age had a significant association with total IT satisfaction at the 0.05 level. On individual components, it had significant associations with software maintenance and ease of use at the 0.05 level, and with documentation and training and support at the 0.10 level. All ANOVA tests confirmed our hypothesis, namely that younger owners have greater satisfaction than older ones (those over the age of 40). As

Table 4
ANOVA tests of IT satisfaction by owner characteristics p values

IT component/variable	Gender	Age	Race	Education	Computing skills
Total	0.052 [a]	0.030 [b]	0.703	0.414	0.346
Software adequacy	0.438	0.100	0.772	0.616	0.439
Software maintenance	0.028 [b]	0.012 [b]	0.593	0.129	0.682
Information content	0.087 [a]	0.232	0.321	0.601	0.839
Information accuracy	0.655	0.811	0.769	0.169	0.076 [a]
Information format	0.075 [a]	0.603	0.452	0.362	0.005 [b]
Ease of use	0.002 [b]	0.016 [b]	0.793	0.812	0.065 [a]
Timeliness	0.689	0.448	0.469	0.635	0.881
Security and integrity	0.622	0.474	0.352	0.350	0.885
Documentation	0.492	0.075 [a]	0.877	0.281	0.896
Vendor support	0.714	0.459	0.856	0.355	0.346
Training and education	0.058 [a]	0.089 [a]	0.866	0.878	0.217

[a] Significant at the 0.10 level.
[b] Significant at the 0.05 level.

the first PCs were essentially available at the beginning of the eighties, most of these 'older' people probably missed the PC revolution and may have developed cyberphobia. Training and education may be the key to the acceptance of computers by older people.

4.3.3. Race

No association was found between owner's race and IT satisfaction, or any of its components. However, our sample was severely limited in its race classification. First, only two races were represented. Second, there were only six African American businesses represented in the sample (6 percent of the sample). While this number may be reasonable in terms of population representation, it limits the sample size for race comparisons.

4.3.4. Education

Again, no association was found between education and total IT satisfaction or any of the components. We expected that higher education would lead to greater computer use. However, here the independent variable was 'IT satisfaction' and not 'computer use'. Also, the independent variable was general education and not IT-specific education.

4.3.5. Computing skills

While no association was found between computing skills and total IT satisfaction, there were significant associations at the individual component levels. Satisfaction on information format stood out ($p=0.0051$): owners with higher computing skills were significantly more satisfied than those with inferior skills. This finding is consistent with prior observations about expert and novice users. Other components significantly impacted by computing skills are information accuracy and ease of use, both at the 0.10 level: owners with higher levels of computing skills are more satisfied.

5. Conclusions

Current models of user satisfaction are targeted toward the traditional data-processing environment or the end-user environment. We contend that the small-business computing environment departs sig-

nificantly from these two. In this study, we first described a new construct and measurement instrument for the small-business user satisfaction with information technology. We then embarked on an investigation of the satisfaction patterns of small-business users.

Our results show several areas of IT dissatisfaction among small-business users. These are: training and education (the most important cause of dissatisfaction), software maintenance, documentation, and vendor support. The 'training and education' issue represents a dilemma, as the owner may be so involved in the day-to-day operations that he/she cannot afford to go to training, or even free training. No wonder, it has been suggested in the literature that on-site consulting advice (perhaps even subsidized consulting, as in the case of Singapore) may be the way to approach training and education for small businesses. We also conducted an analysis of IT satisfaction and its components by various business-related and owner-related factors. The owner attributes seem to have a greater impact on IT satisfaction than any of the business factors. The factors that stood out the most were the gender and the age of the owner.

As a final note, the 'small' segment of business has largely been neglected in MIS research. While there are many articles that carry the words 'small business' in their title, they do not represent the very small businesses discussed here. We hope there will be more MIS research reported on this important segment of the economy.

Appendix A

An instrument for measuring small-business user satisfaction with information technology

Scale: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree. Indicate your level of agreement with the following statements:

I. *Software Adequacy* (SA)
  SA1. The software that you have meets your needs.
  SA2. The software is adequate to handle your processing needs.

II. *Software Maintenance* (SM)
  SM1. The software can be easily modified, corrected or improved.

III. *Information Content* (IC)

IC2. The information from the computer system meets your needs.

IC3. The system provides reports that are just about what you need.

IV. *Information Accuracy* (IA)

IA2. You are satisfied with the system's accuracy.

V. *Information Format* (IF)

IF1. The output (e.g. reports) are presented in a useful format.

IF2. The presented information is clear.

VI. *Ease of Use* (EU)

EU1. The system is user friendly.

EU2. The system is easy to use.

EU3. The system is easy to learn.

EU4. The system is easy to access.

VII. *Timeliness* (TM)

TM1. You get the needed information in time.

TM2. The system provides up-to-date information.

VIII. *Security and Integrity* (SI)

SI1. The system provides for the security of data.

SI2. The system includes features for preventing and reducing user errors.

IX. *Productivity* (PR)

PR1. The system has improved your productivity.

PR3. The system lets you do more work than was previously possible.

X. *Documentation* (DC)

DC1. Good manuals/procedures exist to aid in running and using the system.

DC2. Good manuals/procedures exist to fix the system if it breaks down.

XI. *Vendor Support* (VS)

VS2. There is help available from vendors in case of software errors.

XII. *Training and Education* (TE)

TE3. The quality of training has been superior.

TE4. There is easy access to training and education facilities to help in utilizing the system.

XIII. *Overall Evaluation* (OE)

OE1. The system is successful.

OE3. You are satisfied with the system.

OE7. The system has met your expectations.

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