

**DIGITAL DIVIDE: IMPACT ON
HISPANIC-OWNED SMALL BUSINESSES**

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ABSTRACT

Information inequity creates a major gap between minority and non-minority businesses in the areas of business opportunities, communication, and information technologies. The purpose of this study is to survey the technological potential of Hispanic-owned small businesses (HSBs) to engage in e-commerce, specifically in e-procurement. The names of the HSBs were requested from the Office of Small Business Administration, which provided a national database of 9,800 businesses. A total of 1,200 businesses were randomly selected to receive the survey. Results indicate that small businesses have issues of concern regarding the process to access the Internet. HSBs find limitations in gaining access to e-commerce and its elements. Some limitations relate to financial constraints to buy computers; other limitations relate to Internet access methodology and ability to hire information technology personnel. Assisting HSBs to gain access to financial resources is crucial towards narrowing the digital divide and therefore reducing/eliminating its effects on the long-term survival of Hispanic small businesses. Government agencies and non-profit and private business organizations should develop financial and outreach opportunities to enhance participation of Hispanic-owned small businesses.

INTRODUCTION

Information inequity creates a major gap between minority and non-minority businesses in the areas of business opportunities, communication, and information technologies. The technological gap or "digital divide" defines the disparity between people or communities that are able to effectively utilize information technology and those who do not have that ability (Benton Foundation 2001a). More recently, a new term, "business divide" was introduced to refer to the issues in the technology inequity debate. A study of minority-owned small businesses reported by PR Newswire (2002) shows that only two percent of African American small businesses and six percent of Hispanic small businesses have an e-commerce strategy, compared with that of 35 percent of non-minority small businesses.

Today, e-commerce (which is defined by Chan and Swatman (1999) as one that involves the undertaking of normal, commercial, government, or personal activities by means of computers

and telecommunications networks; and includes a wide variety of activities involving the exchange of information, data or value based exchange between two or more parties) is one of the fastest growing segments of the economy. Concerns have evolved over the infrequent participation and use of e-commerce by minority-owned small businesses. These concerns are not unfounded. Ferguson (2000) reported that more communications are being conducted over the Internet than over the telephone. He states that 50 percent more mail is being delivered via a private online carrier, America Online, than via the U.S. Postal Services everyday. Ferguson cites that 65 percent of all medium size businesses use the Internet, and 41 percent of businesses have a web site. The numbers of electronic transactions through e-commerce by businesses and individuals have increased by more than 100 percent since the year 2000. This trend is continuing mainly due to rapidly changing business markets and a decrease in procurement and operating costs (Manor, Rioli-Saltzman & Luthans, 2001; Robson & Benett, 1999; Hecht, 2001). However, Brush (2000) states that businesses that employ less than 100 people are more likely to have little or no use of the Internet as part of their business operations.

The Tomas Rivera Policy Institute (TRPI) reported that 31 percent of Hispanic adults have never used a computer; 71 percent of these who have never had the opportunity to connect to the Internet had a household income below \$25,000, and 84 percent did not have a college education. Nevertheless, some researchers also believe that the issue of information inequity is not so much about physical or financial capability as it is about education and Internet access (The Economist, 1998). This issue has been also addressed in research by Cutler (2001), Ong (2001), and Nute (2002).

The situation of infrequent participation and use of e-commerce by minority-owned businesses might be attributed to a complex combination of factors. These factors are explored by Wallace (1999), La Noue (2000), Kennard (1999), Krasnow (1999), Twist (2001), Yudowsky (2001), Borgida, Sullivan, Oxendine, Jackson, Riedel & Gangl (2002), Black, Robison & Schweitzer (2001), and Benton Foundation (2001a, 2001b). According to these authors, some of the factors/problems preventing a small business from participating in e-commerce include the lack of:

- Knowledge and manpower to take on the scope of changes that the Internet and e-commerce bring to a business.
- Capital to invest in costly systems that allows them to be ready for participation in e-commerce.
- Trust in the security of the method - uncertainty about the transaction process, especially the security of personal information on the Internet.
- Direct access to products and opportunities available only through costly Internet systems.
- Administrative and technical support that can assist in the development of e-commerce.
- Friendly systems with language-specific content on the Internet to accommodate non-English speaking communities.

A few researchers (Garcia, 2001; La Noue, 2001; Lorek, 2002) found that the digital divide appears to be closing for Hispanics. Their views are based on the Hispanic population that is logging on to the Internet. However, the studies show neither the percentage from this group with their own Internet access or the type of users. Nevertheless, these studies recognize the complaints from Hispanic users regarding language-specific content on the Internet that is not addressing the Hispanic population's needs. This brings to light the core issue of lost opportunities for Hispanic-owned small businesses and the lack of Internet access for Hispanic customers.

The objective of this research is to explore the perceptions of Hispanic-owned small businesses, HSB hereafter, regarding the impact of the digital divide on their ability to maintain a competitive business position and to actively participate in government procurement, which is significantly conducted through the Internet – electronic procurement. The article is organized as follows: in section one, literature review of the digital divide and of the financial issues that relate to minority-owned businesses is presented. The methodology and survey sent to Hispanic-owned small businesses is presented in section two. Results from this study are discussed in section three. Based on these results, section four provides conclusions and recommendations to private businesses, government, and communities to develop strategies that can decrease the digital divide of Hispanics-owned small businesses.

LITERATURE REVIEW

Digital Divide

Small businesses are the backbone of the U.S. economy; they are the ones that help keep productivity, creativity, and employment flowing (Twist 2001). However, potential of small businesses, especially Hispanic-owned small businesses, is being undermined by the problems created by the digital divide. Kennard (1999) indicates that the *digital divide is not only about inequality in access to technology but also about the unequal access to opportunities to participate in the ownership and management of these vital companies*. The Benton Foundation (2001a) has defined the digital divide as *the disparity between people or communities who are able to utilize information technology effectively and those who do not have that ability*. More recently, *business divide has been defined as the disparity between minority-owned small businesses that use technology at rates far lower than non-minority small businesses* (PR Newswire 2002). In spite of these divides in the state of information access in the U.S., there is a general myth that all Minority-Owned Businesses (MOB) know about the Internet. But in reality, many MOBs have no experience with the Internet and do not have financial and technical resources for full access.

Even though the Internet can help MOBs provide consumers with better service, create faster productivity, and keep track of business interactions, many Hispanic-owned small businesses face additional problems of access and education. These businesses are struggling to stake a claim on technology while the challenges they face are unique to the underlying technology and its rapid changes (Ford-Livene, 1999). Among the issues related to the underlying technology and its rapid changes, three core items are:

- The technical aspects of the Internet such as means of access, equipment (hardware), and specific software for development of applications.
- The human resources to support the technical aspects of e-commerce, e-procurement, and other items as they relate to the fast and constant technological changes.
- The financial resources to gain and maintain Internet access.

It can be argued that any business must address these core problems when it comes to the digital divide; however, entrepreneurs who own small businesses and are minorities face even more problems when it comes to the digital divide. Not only do they struggle to get customers, raise capital, and comply with government regulations, but they also struggle to learn new computer skills and to become e-commerce literate. Ford-Livene (1999), Twist (2001), Hecht (2001), Cutler (2001) and Chaston, Badzer, Mangles & Sadler-Smith (2001) pointed out that MOBs must also realize the potential of the Business-to-Business (B2B) and the Internet. It is difficult for business owners to pursue opportunities if their business operations absorb most of their cash inflows and leave them with a little or no surplus

resources. Additionally, the digital divide has not been narrowed due to community/cultural and logistics/methodology reasons (Wallace 1999, Borgida et al. 2002, Kennard, 1999, Black et al., 2001). Dodge (2000) recognizes that the impact of the digital divide on the ability of minority citizens to compete and operate a successful business is interconnected to class inequality. Minorities (African American and Hispanics) are about 35 percent less likely to have Internet access at home than other Americans, and Hispanics seem more resistant to the Internet use due to the lack of a technology access-friendly culture (Hecht, 2001).

Many small businesses are struggling to capitalize on the emerging opportunities of an Internet based economy. They lack the time, money, expertise, and Internet access needed to develop their information technology (IT) capacity in a timely and strategic manner (Twist, 2001; Hecht, 2001; Robson & Benett, 1999). According to the U.S. Census Bureau, minority groups have \$1.3 trillion in annual buying power. This will continue to grow over the next 45 years. Most business transactions will be more likely to happen over the Internet. But little more than half of minority-owned businesses use computers, and of this half, less than half use e-mail, and fewer than that use it to conduct business (Benton Foundation, 2001b). Therefore, for minority-owned businesses, the digital divide is expected to remain a problem in the near future.

E-commerce activity is estimated to increase, but numbers show that MOBs are going in the opposite direction (Cutler, 2001). This is because many MOB owners believe that they do not need the technology; there are no business opportunities on the Internet; and/or small profits do not justify Internet investments to stay in business. On the other hand, MOBs need to understand that in order to survive and stay in business, they must get on to the Internet, not only to obtain a competitive edge, but also to help other MOBs stay afloat (Chaston et. al. 2001). Some of these important issues are the result of economic circumstances and the negative predisposition to the status quo, which may have been caused by cultural sentiment or past experiences (Twist, 2001; Dodge, 2001). Research by Hecht (2001), Benton Foundation (2001b), *The Economist* (1998, 2000) indicates that Internet access is more than a convenience. It is about opportunities for businesses and education and training for those having electronic access.

Financial Issues

Every business owner has to take into account her/his access to capital; specifically, funding limits or liquidity constraints. Liquidity constraints impact businesses with respect to their start-up and their performance following the inception period and thereafter. Reacting to funding constraints, small business owners supplement insufficient funds with funds from informal sources (personal funds and/or family loans) as well as formal sources (bank loans, government loans, and trade credits). Suppliers occasionally extend trade credit to preferred businesses when their personal funds are not sufficient. Huck (1999a) conducted a study about financial issues for Hispanic-owned small businesses and found that only 57.6 percent of Hispanic business owners were offered trade credit and only 44.4 percent of Hispanic business owners took it. However, this percentage value was based on a pool of Hispanic business owners who were offered trade credit. On the other hand, Martinez (1999) suggests that Hispanics are less inclined to loan money within their own communities, be it out of distrust or lack of adequate collateral.

Another source of formal funding available to MOBs and small businesses is the U.S. Small Business Administration (SBA). SBA provides loan guarantees and other help programs to small businesses. These programs have been specifically designed to improve access to capital by small and disadvantaged businesses. However, information channels regarding these funding opportunities serve to only accentuate the gap. Some businesses have the knowledge

and skills necessary to access the information while other businesses, especially HSBs, lack of both to access this information (Huck, 1999a, 1999b; La Noue, 2000). As a result, small businesses continue to face difficulties in obtaining the sufficient capital necessary for operating in their particular industries, some of which are capital intensive (Ford-Livene, 1999). Minority-owned businesses represent 12 percent of all the nation's businesses, but they receive only 2 percent of all private equity investments. Discrimination by banks and other financial institutions and the lack of research on the economic potential of minority-owned businesses are some of the challenges faced by many Minority Owned Businesses (Benton Institute, 2001a; Black et. al., 2001).

Additionally, recent court decisions have eliminated some crucial economic assistance programs, which once helped small businesses obtain additional capital. One of the most recent and most devastating decisions was the congressional ruling to eliminate the Federal Communication Commission's Minority Tax Certificate Program. Before its elimination in 1995, the program sought to create opportunities for minority ownership in the communication industry by, among other things, allowing sellers of ownership interest in a minority-owned firm to defer the payment of capital gains taxes. The elimination of tax breaks, and other forms of assistance, has contributed to the continuing barriers faced by minority-owned businesses in accessing supplemental capital (Krasnow, 1999). On the other hand, there are non-profit as well as private groups advocating for tax incentives to MOBs that want to make investments in Internet and e-commerce technology and training (Borgida et al., 2002; Brush, 2000; Ferguson, 2000; Manor et. al., 2001; Robson & Benett, 1999).

RESEARCH AIMS AND METHODOLOGY

The main objective of this research is to explore the perceptions of Hispanic-owned small businesses regarding the impact of the digital divide on their ability to maintain a competitive business position and to actively participate in electronic procurement. The term electronic procurement is also used as electronic commerce, in this paper. Two main research questions are formulated.

Research conducted by Nute (2002); Benton Foundation (2001a, 2001b); Cutler (2001); Chaston et al. (2001); Ford-Livene (1999); Robson & Benett (1999), and Ferguson (2000) facilitated the formulation of the first research question:

Q1 - Hispanic-owned small businesses believe that the digital divide has an effect on their ability to stay competitive.

Proposition 1: Increased additional capital to satisfy bid requirements by Hispanic-owned small businesses should lead to an increased level of accessibility to e-procurement opportunities.

Proposition 2: Increased personnel training to access electronic information by Hispanic-owned small businesses should lead to an increased level of accessibility to e-procurement opportunities.

Proposition 3: Obtaining and improving internet access by Hispanic-owned small businesses should lead to an increased level of accessibility to e-procurement opportunities.

Research issues explored by Borgida et al. (2002), Dodge (2000), Benton Foundation (2001a, 2001b), Cutler (2001), Chaston et al. (2001), Twist (2001), La Noue (2000), Ford-Livene (1999), and Huck (1999a, 1999b) led to the formulation of the second research question:

Q2 - Hispanic-owned small businesses believe financial constraints impair their ability to participate in electronic procurement and electronic commerce.

In order to accomplish the main objective of this research data was gathered from interviews with the U.S. Department of Agriculture, USDA hereafter, and other government personnel as well as Hispanic-owned small business owners already engaged in businesses with the USDA. This data was used to develop the survey instrument to be sent to HSBs across U.S. The names of HSBs were requested to the Office of Small Business Administration (SBA) through the USDA, who supported part of this study. The USDA request criterion to SBA was on Hispanic-owned small business from US continental states and with special emphasis on California, Texas, Florida, Midwestern states, the East coast and the commonwealth of Puerto Rico. We received a database with over 9,800 HSBs names. From this population of HSBs, we selected the sample to receive the survey. A simple random selection process was used for the selection to ensure an adequate sample population. A total of 1,200 businesses were selected from the database received from the USDA.

In the survey, the questions used were mostly objective and multiple-choice. Some questions required a selection from a five-point Likert scale. See Appendix 1 for a sample of questions sent out to HSBs. Once the form and structure of the survey were established, we solicited critiques and comments from various groups, including faculty who specialize in statistics, survey development, and issues pertaining to procurement programs. Graduate students also contributed with suggestions regarding the structure and content of the survey. A subset of Hispanic-owned small businesses was also selected to provide input on the survey instrument. After several revisions, the final survey was mailed out through U.S. Postal Service to the randomly selected HSBs. The span of elapsed time between the mail-out date and the due-back date was three weeks.

The rate of response remained generally constant throughout the three weeks scheduled period of time. A follow-up message with a reminder regarding the due-back date of the survey was sent a week and a half after the survey had been mailed. This follow up was done by an e-mail message to everyone who was sent the survey and who had an e-mail address. HSBs participating in the study and without an e-mail address were sent the message via U.S. Postal Services. The message was identical for both groups; the ones who were reached by e-mail and the ones contacted by regular US Postal Services. The response rate for the survey was approximately 22.33 percent. Since there were 220 surveys returned due to erroneous addresses, the final and adjusted response rate was 27.55% (~28%).

Several barriers were present throughout the course of the development and administration of the surveys. In the developmental stage, feedback from various groups was delayed due to schedule conflicts. The most commonly encountered problem seemed to be the time constraints people and businesses had to respond to our inquiry. Other limitations were related to logistics in the process of administration of the surveys. For instance, some business addresses drawn from the database provided by the Small Business Administration were not current. Consequently, 220 surveys were returned due to non-existing or invalid addresses. Also, some of the selected businesses refused to return the survey due to negative feelings with one of the sponsoring government organizations, as stated in the business call of these businesses to the authors. There were about 12 calls of this type. No adjustment was incorporated for this situation.

Data received were processed in a spreadsheet format, and analysis was performed using SPSS™ data analysis program. Data entries were checked twice for each returned survey to ensure accuracy and diminish error in coding. The analyses were performed using

frequencies, means, correlations, analysis of variance, and regression. The results of these analysis are discussed next.

RESULTS

The responses from the states surveyed were distributed as follows: California (22%), Texas (17.2%), Florida (9.3%), and New Mexico (7.8%). The responses from midwestern states, the East coast, and Puerto Rico accounted for 36.6 %. There were 7.1% responses with no state declared.

The most widely represented industry in the sample was the construction industry with 28.7% response. The manufacturing of food and machinery industry was represented by a combined value of 4.5%. The remaining 66.8% responses were from a variety of businesses, such as printing, translation, consulting in a variety of technical and business fields – meaning software, hardware, advertising – janitorial services, and waste management design/services. A consistent combination of two-industry type was reported by nine (3.27%) businesses that participated in the survey. The combination was construction and engineering services.

The businesses' annual revenue and the type of additional funds used to supplement capital were requested in the survey instrument. Table 1 reports the distribution of each category. This distribution indicates that about two fifths of the companies have less than \$0.5 million in annual revenues, and businesses with \$0.5-1.0 million as well as \$1.0-5.0 million represented about one fifth, respectively. Those in larger annual revenue brackets (> \$5.0 million) represented a small percentage of the sample population (12.7%).

Businesses that needed additional funds to supplement capital - see Table 1 - used bank loans (67.5%), personal funds (47.5%), trade credit (16%), and government loans (14%). By Pearson's correlations and statistical counts, it was observed that 35% of these businesses supplemented capital with two different types of funds, and 12% of these businesses supplemented capital with three different types of funds. The most favored combinations of types of funds are bank loans-government loan, and trade credit-government loans. The Pearson correlations were significant at a $p < 0.01$ (1-tailed). Nevertheless, Hispanic-owned small businesses (HSBs) that used personal funds were less likely to pursue government loans; the Pearson correlation was significant at $p < 0.01$ (1-tailed).

Information regarding electronic commerce (e-commerce capacity) and its components was requested from HSB. Electronic commerce components (Kennard, 1999; Yudowsky, 2001; Benton Foundation, 2001b) include owning computers; access to personnel trained in computers, electronic commerce and Internet use; direct Internet access; and other items that could be business specific. Responses indicated that these businesses have access to Internet (85%), knowledge about Internet usage (70%), and trained personnel (50%).

Businesses that owned computers (90.3%) were also more likely to have knowledge on Internet usage, Internet access and trained personnel. This was assessed by Pearson correlations, which were significant at a level of 0.01 (1-tailed). Almost 50% of the respondents indicated that they did not have trained personnel in electronic commerce and its components due to cost issues. Thus, small and disadvantaged Hispanic businesses seem to lack necessary financial resources to take full advantage of e-commerce opportunities.

It was observed that small business owners listed equipment such as computers as part of their personal possessions and part of their businesses as well. It was also observed that a large number of businesses in printing, manufacturing, and construction had more computer

equipment and elements of e-commerce than business in other industries. The first research inquiry is discussed next.

Table 1: Hispanic Small Business Collected Data

Categories	Frequency (%) ¹
A. Industry type	
Construction	28.7
Food Manufacturing/Machinery	4.5
Other	66.8
Construction-Engineering Services	3.27
B. Average Annual Revenue	
Less than \$500,000	40.7
Between \$0.5-1.0Million	20.5
Between \$1.0-5.0Million	26.1
More than \$5.0Million	12.7
C. Type of Additional Funds	
Bank loans	67.5
Government loans	14.2
Trade credit	15.7
Personal funds	47.5
Others (Line of credit, credit cards, personal funds, etc.)	6.3
Not applicable (have not pursued them, etc.)	11.9
D. Electronic commerce components	
Own computers	90.3
Trained personnel	50.4
Internet access	85.1
Know-how Internet usage	70.3
No component	4.9

¹ Percentages do not add up to a 100% because respondents were allowed to choose more than one answer.

Q1 - Hispanic-owned small businesses believe that the digital divide has effect on their ability to stay competitive.

HSBs were asked to rate from very important to less important issues related to the Internet, its components and access to the Internet to conduct business with the government and private businesses. The government and private businesses have moved a significant portion of procurement to an electronic mode (Ursery, 2003; Dillehay, 2002; Norris, Fletcher & Holden, 2001; Mitchell, 2000; Anonymous, 2000b), which is also known as e-procurement. A sample of some of the items queried include: Making the right contacts, learning the procedures to access information, attaining additional capital to satisfy bid requirements, having trained personnel to access electronic information, obtaining and/or improving Internet access, and improving computer hardware. The complete list of survey items is presented in Appendix 1. The responses indicate that 86.6% of the participants believe that making the right contacts to conduct business with the government is very important, and 76.9% believe that learning the procedures, usually on the websites of government and private businesses, is also very important. The issue of attaining additional capital to satisfy bid requirements is believed to be very important by 69% of the respondents and the remaining respondents indicated it was moderately important (18%) or unimportant (12%). Results for training personnel to be able

to access e-information for doing business was reported as very important by 79% of the respondents. The issue of improving computer hardware shows that 55.9% of the respondents believe this dimension is very important in the process of enhancing their ability to do e-business. The category of obtaining/improving of Internet access is considered as very important by 53.3% of the respondents.

Stepwise multiple regression was conducted to determine which independent variables (Contacting the appropriate offices/agents, finding out/learning basic requirements and procedures, locating/receiving bid solicitations, attaining sufficient capital to satisfy bid requirements, making the right contacts, learning the procedures, attaining additional capital to satisfy bid requirements, training personnel to access USDA information, improving computer hardware, obtaining/improving internet access) were the predictors of level of accessibility of e-procurement opportunities to HSB. The dependent variable, *level of accessibility*, was defined as the ability of HSB to conduct electronic procurement with the government. The equally weighted average of four main items - gaining access to a computer, gaining access to Internet, conducting Internet research, and improving Internet skills, determine level of accessibility (Dillehay, 2002; Norris et al., 2001; Benton Foundation, 2001a; Anonymous, 2000b). These items all have a significant correlation at a $p < 0.01$ (1-tailed) and were consistently rated by the respondents as very important. For each item, frequencies of very important responses were obtained in the range of 70% to 90%. Level of accessibility composite measure has an internal consistency measured by the Cronbach's alpha of 0.835 at a significance level less than 0.000, and an average inter-item correlation of 0.601 (Garson, 1999; Nunnely, 1978). The scales of related questions as well as the composite measure of Level of Accessibility were mapped to an interval-scale measure by frequency analysis of the variable. Items were recoded to reflect very accessible = 5, accessible = 4, moderately accessible = 3, rarely accessible = 2, and inaccessible = 1. The composite variable Level of Accessibility was mapped as low = less than 2.20, low-medium = 2.21 - 2.90, medium = 2.91 - 3.59, medium-high = 3.60 - 4.12; high = above 4.13.

Models were developed with criterion of Probability-of-F-to-enter 0.050, and Probability-of-F-to-remove 0.100. The model that better explained the overall variance of the level of accessibility of e-procurement opportunities to HSB is a model of three predictors (Obtaining/improving internet access - *Obt/ImplntAccess*, Attaining additional capital to satisfy bid requirements - *AttainingAddCapital*, Training personnel to access USDA information - *HavingTrainedPersonnel*). Model 3 from Table 2 has an $R^2 = .688$, i.e. model 3 accounted for 68.8% of variance in the level of accessibility explained by the independent variables.

Table 2: Model Summary

Model	R	R ²	Std. Error of the Estimate
1	.799 ^a	.639	.4036
2	.822 ^b	.675	.3845
3	.829 ^c	.688	.3790

a Predictors: (Constant), *Obt/ImplntAccess*

b Predictors: (Constant), *Obt/ImplntAccess*, *AttainingAddCapital*

c Predictors: (Constant), *Obt/ImplntAccess*, *AttainingAddCapital*, *HavingTrainedPersonnel*

Results from the regression analysis are presented in Table 3. The overall model - $F(3, 105) = 77.094$ at $p < 0.001$ – indicates that the probability of determining the level of accessibility of e-procurement opportunities for HSB could be determined at least by one of the predictors (Obtaining/improving internet access, attaining additional capital to satisfy bid requirements, training personnel to access USDA information).

Table 3: Regression Analysis (ANOVA)

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Sig. P<.001
Regression	33.218	3	11.073	77.094	.000
Residual	15.081	105	.144		
Total	48.298	108			

Table 4a presents the coefficients of the final model. The coefficients of the independent variables are significant at $p < 0.001$ and $p < 0.05$ when evaluated together.

Table 4a: Coefficients^a of the model.

Source	Coefficient	Std. Error	t	Sig.	95% Confidence Interval for b	
					Lower Bound	Upper Bound
(Constant)	.707	.263	2.684	.000	.185	1.229
Obt/ImpIntAccess	.677	.049	13.821	.000	.580	.774
AttainingAddCapital	.113	.030	3.742	.004	.053	.172
HavingTrainedPersonnel	.0689	.034	2.101	.033	.002	.136

^a Dependent variable: Level of Accessibility.

Table 4b: Individual Contributions of the Study Variables to the Dependent variable

Source	DF	Part Corr	SSE	MSE	F
(Constant)	-	-	-	-	-
Obt/ImpIntAccess	1	.754	27.458	27.458	190.68*
AttainingAddCapital	1	.204	2.010	2.010	13.96*
HavingTrainedPersonnel	1	.117	0.661	0.661	4.59*

* Significant at $p = 0.001$; ** Significant at $p = .05$

The Level of Accessibility intercept b_0 , computed as .707, estimates the expected Level of Accessibility in a given time if the predictors did not exist. However, these values of the predictors are outside the range of Obt/ImpIntAccess, AttainingAddCapital, HavingTrainedPersonnel, and are nonsensical. The value of b_0 (.707) has no practical interpretation.

Assessment of the individual contribution of the independent variables on the Level of Accessibility is performed by the part correlation and F test (see Table 4b). For the predictor Obt/ImpIntAccess, the partial F-test statistic (190.68) is significantly greater than the critical value $F(.005, 1, 105) \sim 8.18$. The expected Level of Accessibility is expected to increase by .677 units for each unit of Obt/ImpIntAccess (b_1 computed as .677) for a given amount of the

other two independent variables, which supports *Proposition 3*. For the second predictor, *AttainingAddCapital*, the partial F-test statistic (13.96) is much greater than the critical value (~8.18) and then the predictor (*AttainingAddCapital*) significantly improves the Level of Accessibility model already containing the other two predictors. The value of b_2 is .113 and this means that for a given amount of the other two predictors, the expected Level of Accessibility is estimated to increase by .113 units for each unit change in *AttainingAddCapital*, which does support *Proposition 1*. The partial F-test for the other predictors - *HavingTrainedPersonnel* - indicates that adding this independent variable also improves the model ($4.59 > 3.92$ at $p = 0.05$). The slope of *HavingTrainedPersonnel*, $b_3 = .0689$ indicates that increases in this predictor will also increase Level of Accessibility, which supports *Proposition 2*. Each of the three independent variables significantly contributes to improve the model after the other independent variables have been included. The Level of Accessibility model should include all three variables *Obt/ImpIntAccess*, *AttainingAddCapital* and *HavingTrainedPersonnel*.

The level of accessibility to e-procurement opportunities for HSB can be expressed as:

$$\text{Level of Accessibility} = .707 + .677 \text{Obt/ImpIntAccess} + .113 \text{AttainingAddCapital} + .0689 \text{HavingTrainedPersonnel}$$

For a HSB reporting that Obtaining and/or Improving Internet Access (*Obt/ImpIntAccess*) was unimportant (= 1), Attaining Additional Capital to Supplement a Bid (*AttainingAddCapital*), and Having Trained Personnel to Access Internet information (*HavingTrainedPersonnel*) were unimportant (= 1) respectively, the composite Level of Accessibility of e-procurement opportunities will yield a LOW level of Accessibility of 1.5659. However, for a HSB reporting that Obtaining and/or Improving Internet Access (*Obt/ImpIntAccess*) was important (= 5), Attaining Additional Capital to Supplement a Bid (*AttainingAddCapital*) and Having Trained Personnel to Access Internet information (*HavingTrainedPersonnel*) were unimportant (= 1) respectively, the composite Level of Accessibility of e-procurement opportunities will yield a HIGH level of Accessibility of 4.2739.

The analysis performed on the regression model as well as the contribution of individual independent variables to the dependent variable assist in supporting *that the digital divide has an effect on HSB's ability to stay competitive*. HSBs are well aware of the importance and impact of the digital divide on their long-term success. If HSBs have adequate level of Internet access and/or the ability to improve their existing Internet access and have access to trained personnel, then HSBs have the opportunity to access critical information from the government and private companies. Government and private companies have moved their procurement to Internet base (Ursery, 2003, Dillehay, 2002, Norris et al., 2001, Mitchell, 2000, Anonymous, 2000b). Additionally, once the opportunity is located, small businesses need additional capital to support bid requirements and adequate trained personnel not only to navigate the websites, but also to facilitate the bidding process, which also has become an Internet based process. HSBs want to increase their ability to participate in e-procurement with the government and private businesses.

The issue of opportunities to HSBs and their financial constraints is developed on the second research issue.

Q2 - *Hispanic-owned small businesses believe financial constraints impair their ability to participate in electronic procurement and electronic commerce.*

Analysis of the data through cross tabulations of each type of financing (bank loans, government loans, trade credit, personal funds, others) and the annual average revenue were performed. Also, similar analysis was conducted with each component of electronic commerce (computers, trained personnel, Internet access, knowledge about computers) and

the annual average revenue. Results show the following: Bank loans are the largest type of financial funds used by HSB (67.8%). A contingency table of 2 x 4 on HSB that used bank loans and the HSB's annual average revenue (AAR) indicates that businesses with an AAR of less than \$0.5 million are very likely to use bank loans (expected count is 73.2 out of a total count of 108 HSB that have such AAR). Table 5a shows the results of the 2 x 4 contingency table. HSBs with annual average revenue of \$1 to \$5 million, \$.5 to \$ 1.0 million, and \$5 to \$10 million were also likely to pursue bank loans as additional source of capital (41 out of 71, 38 out of 56, and 17.6 out of 26 respectively). The value of Chi-Square is 15.273 at a $p < .005$.

It was also observed that HSB's preferred choice to pursue additional capital is personal funds. Businesses with average annual revenue of less than \$1 million seem to be the most inclined towards personal funds as source of additional funds. This was not significant at $p < 0.10$.

Table 5: Relationships of Annual Average Revenue of HSB
a. Type of funds vs. AAR

Bank Loans		<\$0.5 M	\$0.5 - 1.0 M	\$1.0 - 5.0 M	> \$5.0 M	Total
Yes	Count	64	33	58	22	177
	Expected Count	73.24	37.98	48.15	17.63	
No	Count	44	23	13	4	84
	Expected Count	34.76	18.02	22.85	8.37	
	Total	108	56	71	26	261

$\chi^2 (.005, df=3)$ Critical < 15.273

Personal Funds		<\$0.5 M	\$0.5 - 1.0 M	\$1.0 - 5.0 M	> \$5.0 M	Total
Yes	Count	58	30	29	9	126
	Expected Count	52.14	27.03	34.28	12.55	
No	Count	50	26	42	17	135
	Expected Count	55.86	28.97	36.72	13.44	
	Total	108	56	71	26	261

$\chi^2 (.1, df=3)$ Critical > 5.416

b. E-commerce components vs. AAR

Having Trained Personnel		<\$0.5 M	\$0.5 - 1.0 M	\$1.0 - 5.0 M	> \$5.0 M	Total
Yes	Count	43	27	43	22	135
	Expected Count	55.77	29.19	36.49	13.55	
No	Count	64	29	27	4	124
	Expected Count	51.23	26.81	33.51	12.45	
	Total	107	56	70	26	259

$\chi^2 .000, df=3$ Critical < 19.880

HSB's e-commerce capacity components and the AAR were also cross tabulated, Table 5b. Results indicate that HSBs with an AAR of \$1.0 to \$5.0 million and above \$5.0 million are the ones with the highest capacity as it relates to trained personnel. Their relative advantages are 61.4% and 84.6%, respectively. HSBs with AAR below \$0.5 million and \$0.5 to 1.0 million seem to be at a significant disadvantage (40.2% and 48.2% respectively). Each pair had statistical significant at $p \leq 0.001$.

It appears that HSBs with smaller AAR have a more difficult time attracting qualified and knowledgeable employees to assist with issues related to electronic procurement and therefore opportunities with the government.

Although all surveyed HSBs used primarily bank loans, it seems that the HSB with annual average revenue of less than \$0.5 million tends to rely more on personal funds. Furthermore, other types of funds (government loans, trade credit, and others such as line of credit, etc.) are not being utilized as much by HSBs to supplement capital. It should be noted also that the need for additional capital to supplement bid requirements was one of the dependent variables complementing the model for Level of Accessibility to e-procurement opportunities. Claims of Research Issue 2 should be rejected. This is further supported by the fact that a significant number of HSBs participating in the survey have an AAR of less than \$0.5 million (40.7% - from Table 1b) and these HSBs are the ones with less access to trained personnel. These are also issues reported as barriers to participate in e-commerce by La Noue (2000), Kennard (1999), and Benton Foundation (2001a, 2001b). This situation seems to produce a cycle such that if HSBs have financial constraints then they cannot improve the digital divide disparity and effectively utilize technology to take advantage in e-procurement opportunities.

CONCLUSIONS AND RECOMMENDATIONS

Responses from HSBs indicate issues of concerns regarding effective deployment of information technology to pursue e-procurement opportunities with the government as well as with private companies. A complex scenario develops when the digital divide and HSB's financial resources interplay. Hispanic small businesses have difficulties to secure additional sources of capital. These businesses have limited financial resources to pursue the hiring of qualified personnel. HSBs are in a disadvantage to keep pace with the constant technological changes and therefore to keep afloat with e-commerce opportunities.

Hispanic small businesses are well aware of the importance of bridging the gap of the digital divide. HSBs want to be part of the technology wave and are making efforts to diminish the effects of the digital divide; nevertheless, more assistance to these businesses is necessary to speed up the process. For instance, a Hispanic Internet study (Lorek, 2002) finds that just over 50 percent of Hispanics in the United States are on line. Consequently, vendor programs need to strategically plan outreach activities using Hispanic or minority databases in order to increase participation rates. Geographically, the outreach should focus on California, Texas, and Florida. These states were reported in the 1997 economic census as having the largest revenues generated by Hispanic businesses. Responses from our survey were also higher in these three states.

Agency contractors need to disseminate their requirements on their own home pages to minority databases. If agencies are seriously going to increase HSBs participation in e-commerce, these agencies need to proactively increase their outreach by Internet and by sharing information with the membership of national organizations such as the National Hispanic Chamber of Commerce. Direct contact with the National Hispanic Chamber of Commerce and its state affiliates, who have national databases stratified by services, would be an effective mean for improving outreach services.

Private and government agencies need to hold small business fairs throughout the country. The business fairs should facilitate workshops that emphasize how to do business and e-procurement with the government. Private and federal agencies could partner with state and local Hispanic Chambers of Commerce that are located in states and communities throughout the country to promote the business fairs. In addition, national organizations like the Hispanic Chamber of Commerce, National Council of La Raza and the League of United Latin America Citizens could also facilitate Internet related workshops during their annual national meetings. Hispanic small business organizations and small business organizations should collaborate with foundations and corporations that have funded website development for some inner city businesses. HSBs could strengthen their e-commerce capacity and access to opportunities by creating and/or enhancing their websites with the assistance of such foundations, but also other sources such as institutions of higher education with Small Business Development Centers should be explored for such endeavors. University business students, small business assistance centers, and corporate staff on loan at Universities should be able to assist in enhancing the utilization of information technology of HSBs.

A joint effort among government, businesses (large, medium and small size) and communities should be initiated. Such efforts will develop partnerships that could increase access to technology training and small capital to buy and build HSBs technical capacity (Technical Personnel, Attaining Capital to enhance e-commerce technology related issues as well as bid requirements) as well as to respond and access external markets and opportunities.

Collaboration with non-profit as well as private groups advocating for tax incentives to HSBs that want to make investments on Internet and e-commerce technology and training should be strategically explored and developed. Mutual partnerships between large corporations and small businesses, once identified, should enhance the technological capacity of HSBs and provide technical support to HSBs.

Reducing the digital divide will determine the participation level of minority businesses in e-procurement/e-commerce opportunities. Hispanic small businesses need to enhance their technical capacity in order to access and compete for contracts that are being solicited by government agencies. Technology is critical to access information and to partner with business organizations with similar interests. Thus, government intervention is critical to enhance the opportunities of Hispanic small businesses and therefore HSBs level of accessibility to government e-procurement.

Assisting HSBs to gain access to financial resources is crucial towards diminishing the digital divide and its effects on the long-term existence of Hispanic small businesses.

The model developed to assess Level of Accessibility of HSBs to e-procurement opportunities indicates that minority small businesses' capacity is significantly impacted by the business' ability to obtain/maintain Internet access, by their ability to attain additional resources to support bid requirements, and by their difficulties in accessing trained personnel. This empirical investigation places in perspective a combination of factors and also provides a better understanding of the causes of the digital divide for Hispanic owned small businesses. Having a better understanding of these issues facilitate policy and strategy development by a wide array of interested parties – government, private organizations, small business owners, and non-profit organization. Since financial resources impact HSBs ability to secure trained personnel and to increase e-procurement opportunities, a comprehensive program to diminish the digital divide should account be developed by government agencies and private corporations seeking to increase small business participation.

These findings should be the beginning point of collaborative efforts that can effectively address the specific needs of HSBs and MOB at large towards narrowing or completely bridging the gap in the effective use of information technology.

REFERENCES

- Anonymous. (2000a). *Minority Owned Businesses Show Steady Growth*. Jacksonville: Free Press.
- Anonymous. (2000b). A guide to government and e-commerce: the digital future of government. *Public Management*, 82, 1-8.
- Benton Foundation. (2001a). *Digital Divide Basics*. Retrieved April 7, 2001, from <http://www.digitaldividenetwork.org/content/sections/index.cfm?key=2>.
- Benton Foundation. (2001b). *The Digital World of Hispanics in the United States*. Retrieved from <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=11>.
- Black, H., Robinson, B., & Schweitzer, R. (2001). Do lenders discriminate against low-income borrowers? *Review of Black Political Economy*, 28, 73, 22.
- Borgida, E., Sullivan, J. L., Oxendine, A., Jackson, M. S., Riedel, E., & Gangl, A. (2002). Civic culture meets the digital divide: The role of community electronic networks. *The Journal of Social Issues*, 58, 125-142.
- Brush, K. (2000). *New Study Finds that Small Business Missing Out on Internet Opportunities*. Retrieved July 25, 2000, from <http://www.businesswire.com>.
- Chan, E. & Swatman, P.M.C. (1999). *Electronic commerce: a component model*. 3rd Annual Collector Conference on Electronic Commerce. Retrieved from <http://citeseer.nj.nec.com/chan99electronic.htm>.
- Chaston, I., Badger, B., Mangles, T. & Sadler-Smith, E. (2001). The Internet and e-commerce: An opportunity to examine organizational learning in progress in small manufacturing firms. *International Small Business Journal*, 19, 13-20.
- Cutler, R. (2001). Tomas Rivera Policy Institute's Digital Steppingstones. Retrieved from <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=125>.
- Dillehay, B.H. (2002). E-government as Virginia's vision. *Spectrum*, 75, 24-29.
- Dodge, R. (2000, October 15). Minority Businesses tackle Digital Divide, I Learn to use Internet. *Dallas Morning News*, p. 1H.
- Ferguson, K. (2000). SBA and Cisco Systems link up to Bridge the Digital Divide. *Las Vegas Business Press*, 17, 29-30.
- Ford-Livene, M. (1999). The Digital Dilemma: Ten Challenges Facing Minority-Owned New Media Ventures. *Federal Communications Law Journal*, 51, 577-608.
- Garcia, K. (2001). Crossing the Digital Divide. *Hispanic Magazine*, 80-82.
- Garson, G.D. (1999). Retrieved from <http://www2.chass.ncsu.edu/garson/pa765/reliab.htm#intraclass>.
- Haves and Have-nots. (2000, June 22). *The Economist*, 355, 23-26.
- Hecht, B. (2001). Bridging the digital divide. *Journal of Housing and Community Development*, 58, 14-18.
- Huck, P. (1999a). How Do Minorities Fund Small Business Start-ups? Two Chicago Neighborhoods Offer Insight. *The Region, Minneapolis*, 13, 10-15.
- Huck, P. (1999b). Small Business Finance in Two Chicago Minority Neighborhoods Economic Perspectives. *Chicago*, 23, 46-63.
- Kennard, W. (1999). Equality in the Information Age. *Federal Communications Law Journal*, 51, 553-557.
- Krasnow, E. G. (1999). The FCC's Minority Tax Certificate Program: a Proposal for Life after Death. *Federal Communications Law Journal*, 51, 665-680.
- La Noue, G. R. (2000). To the Disadvantaged go the Spoils? *Public Interest*, 138, 91-99.

- Lorek, L. A. (2002, June 12). More Hispanics log on to Internet. *San Antonio Express News*, p. 8E.
- Manor, B., Riolli-Saltzman, L., & Luthans, F. (2001). After the bubble Burst: How Small high-tech firms can keep in front of the wave. *The Academy of Management Executive*, 15, 114-124.
- Martinez, T. (1999). Can We Bridge the Gap?: Discrepancies Between Hispanic Businesses and the Poor Hispanic people. *Ethics of Development in a Global Environment Journals*. Retrieved August 10, 2000, from <http://www.stanford.edu/class/e297c/>.
- Mitchell, K. (2000). Instituting e-procurement in the public sector. *Public Management*, 82, 21-26.
- Norris, D., Fletcher, P. & Holden, S. (2001). Is your local government plugged in? Highlights of Electronic Government Survey 2000. *Public Management*, 83, 4-10.
- Nunnally, J. C. (1978). *Psychometric Theory* (2nd Ed.). New York: McGraw Hill.
- Nute, D. (2002). Net eases government purchasing process. *American City & County*, 117, 8-10.
- Ong, P. (2001). Set-Aside Contracting in SBA's 8(A) Program. *Review of Black Political Economy*, 28, 59-63.
- PR Newswire. (2002). National Journalists and Technology Experts Examine the Digital Divide. Retrieved May 5, 2002, from <http://www.Newscom.Com/Cgi-Bin/Prnh/20000822/Msflogo>.
- Robson, P. J. & Benett, R. J. (1999). Central Government support to SMEs compared to business link, business connect and business shop and the prospects for the small business service. *Regional Studies*, 33, 779-787.
- The Keenest Recruits to the Dream. (1998, April 23) (1998). *The Economist*, 346, 25-29.
- Twist, K. (2001). Small Business slowly adjusts to an expensive and complex new economy. Retrieved from <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=195>.
- Ursery, S. (2003). Online system makes bid process smoother. *American City & County*, 118, 14-19.
- Wallace, S. L. (1999). Minority Procurement: Beyond Affirmative Action to Economic Empowerment. *Review of Black Political Economy*, 27, 73, 26.
- Yudkowsky, C. (2001). Digital divide is larger than previously thought. Retrieved from <http://atlanta.bcentral.com/atlanta/stories/2001/07/10/smallb2.html>.

(Biographies and Appendix on following pages)

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Jaime Chahin, Dean of the College of Applied Arts and Associate Professor at Texas State University-San Marcos, has over twenty-six years of varied experiences in education. He received the "Ohili" award from the Secretary of Exterior Relations of Mexico in July 2002. He was executive producer of a documentary, The Forgotten Americans, a film about colonias in the U.S. Mexico border, which premiered at the Smithsonian and on PBS on December 14, 2000. The documentary received a First Place Award from the National Council of Families. His principal research interests involve cultural and public policy issues that impact access and equity in Higher Education. His most recent publications include the following articles: "Las Colonias, Entre dos Mundos" (2003); "Latino Demographics and Education in the U.S. Southwest" (2003); "The Educational and Occupational Aspirations of Colonia Children" (2002); "Reflections of a Migrant Farmworker" (2000); "Lessons Learned in the Development of Human Capital" (1999). Dr. Chahin received his Ph.D. in Education Administration in 1977 and his M.S.W. in 1975 in Administration and Policy from the University of Michigan. His B.A. degree in Sociology and Political Science was awarded in 1974 from Texas A & I University.

(Appendix on following pages)

APPENDIX

Sample of Survey sent to Hispanic-owned Small Business (HSB).

1. What type of products/services do you offer? (mark all that apply with an X)

Fruits/Vegetables

Food manufacturing

Construction

Other (specify): _____

Machinery manufacturing

If you have a Specific Industrial Code (SIC), please specify _____.

2. What is your average annual revenue in dollar amount?

less than \$500,000

\$500,000-1,000,000

\$1,000,001-5,000,000

\$5,000,001-10,000,000

more than \$10,000,000

3. If you have needed additional funds to supplement your capital, what type of funds have you pursued? (mark all that apply with an X)

Bank Loans

Personal funds

Government Loans

Trade Credit

Other (specify): _____

N/A

4. How many employees does your business currently have?

less than 100

101-400

401-700

701-1,000

More than 1,000

5 a. Have you tried to acquire USDA contracts?

Yes No

b. If yes, were your attempts successful?

Yes

No (briefly describe the problems): _____

6. Indicate all essential components of electronic commerce that you and your business possess. (mark all that apply with an X)

Do not possess any

Internet access

Computer(s)

Knowledge about Internet usage

Trained personnel

Other(specify): _____

For questions 7 & 8, mark with an X the box that indicates your rating for each category/factor within each of the questions.

7. Indicate the level of accessibility you have in doing the following:

Category	Very Accessible	Accessible	Moderately Accessible	Rarely Accessible	Inaccessible
Gaining access to a computer					
Gaining access to internet					
Conducting Internet research					
Improving your internet skills					

8. Indicate the level of difficulty you have encountered in the process of contracting with the USDA.

Category	Very Easy	Easy	Slightly Difficult	Difficult	Very Difficult
Contacting the appropriate offices/agents					
Finding out/learning basic requirements and procedures					
Locating/receiving bid solicitations					
Attaining sufficient capital to satisfy bid requirements					

9. Indicate how important each of the following factors is in enhancing your ability to do business with the USDA?

Factors	Very Important	Important	Moderately Important	Barely Important	Unimportant
Making the right contacts					
Learning the procedures					
Attaining additional capital to satisfy bid requirements					
Training personnel to access USDA information					
Improving computer hardware					
Obtaining/improving internet access					