Seniors and Information Technology: Are We Shrinking The Digital Divide?

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ABSTRACT

The "digital divide" has been present in the field of information technology (IT) since the inception of the digital computer. Throughout the course of history, one group (or more) has had better access to computer and information technology than another faction. For example: rich versus poor, young versus old, advanced societies versus less developed countries, etc. This disparity has existed for a variety of reasons, among them political, cultural, economic and even class or socioeconomic in nature. This paper examines one particular component of this phenomenon, the "gray divide" pertaining to the use of IT by our elderly, or senior citizens. By utilizing census data and marketing research, we paint a portrait of a vastly underrepresented target market pertaining to IT and IT-related products: our seniors. While the elderly have more assets and disposable income than their younger counterparts, by and large the IT industry is aimed squarely away from this ever-increasing group of consumers. We offer insights into this trend and offer suggestions for future research.

INTRODUCTION

The information technology phenomenon known as the "digital divide" has been present since the inception of the computer. The divide alludes to the notion of the "haves and have nots" pertaining to ownership, availability, and use of computers and information technology related products and services. This divide can take on many forms: young vs. old, rich vs. poor, developed nations vs. less developed nations, male vs. female, and so on. Ravi and Murthy (2003; 2004) note that the uneven diffusion of internet penetration rates (i.e., the divide) exist in many countries due to technological, political, social, and even cultural reasons. While there is certainly no doubt as to the existence of the divide and the myriad of potential explanations for it, we feel that marketers of IT and IT-related products are missing out on a potential bonanza or windfall of profits by not tailoring their wares to our elderly citizens. This paper examines the current state of the art with relation to the purchasing power of the elderly, IT products and services geared toward (or not toward) them, and the implications of shrinking this digital divide between the young and old.

Impetus for the study

Many of us take for granted simple computer tasks such as opening a file, cutting and pasting some text, saving a document and e-mailing it forthwith. It is through the wonder of these electronic aides that such global mass communication can progress on a daily basis, as the world becomes more and more digital every day. However, there is a very large and prosperous segment of our society that is all but forgotten in this age of automation and computer calisthenics. This vast subpopulation is known as the elderly, or perhaps more politically correct, seniors or senior citizens.

It is indeed ironic that this oft-neglected demographic has, potentially, more assets and disposable income with which to spend on computers and information technology (IT) than any other single group in the USA and around the world. We believe that seniors would both spend more on IT, and use it more often, if they could overcome the many built-in obstacles and issues associated with the effective implementation of these tools in a senior setting. It is important that vendors of these products be aware of their offering's shortcomings if they want to cash in on this potential goldmine of opportunity.

BACKGROUND

We begin by noting that the elderly population among us continues to represent an increasing proportion of US, as well as worldwide, residents. It is estimated that almost 30% (29.4%) of American citizens are over the age of 50 (U.S. Census Bureau, 2006) and by 2030, one in five Americans (70 million) will be over 65 (U.S. Census Bureau, 2004). Furthermore, the number of people over the age of 65 is increasing worldwide with the fastest growing subgroup those aged 80+ years (Czaja & Lee, 2007). Yet scant attention has been paid to this important group in terms of access and use of information technology and IT-related products and services. In the early 1970s, Ramm and Gianturco (1973) suggested that new technology, particularly computers, could be beneficial to older adults. They believed that IT could help older adults access housing, transportation, medical information, order groceries, and even report on their daily well-being to a central source. A decade later, Hoot and Hayslip (1983) pointed out that microcomputer manufacturers had done very little to target older persons as prospective computer users. Thus the importance of this topic was recognized long ago.

If one looks at the computer systems of today, there appears to have been little real change in the attention paid to the elderly by computer hardware or software companies. Entire software industries are targeting a younger clientele. For example, the video game industry's total sales of hardware, software and accessories in 2005 rose to an all-time high of US $10.5 billion, according to research firm NPD Group (Reimer, 2006). Furthermore, music-swapping websites spring up (e.g., KaZaa.com) as soon as others are shut down (e.g., Napster), and entertainment-oriented venues are increasingly popular (e.g., Disney.com, Spiderman, Lord of the Rings, etc., with the marketing of games associated with them). Yet software tailored to the needs of the elderly is uncommon.

While one can certainly argue that many benefits have accrued to the elderly through the use of IT in areas such as health care, not nearly enough has been done to actually place the technology in their hands. Much more could and should be done. Hardware and software providers are missing out on what might best be described as a goldmine of opportunity. Seniors are missing out on opportunities to use IT in ways that could empower them to directly improve their quality of life and become more independent (Kiel, 2005; Shapiro, 1998). As Czaja and Lee (2007) note: "…not having access to and being able to use technology may put older adults at a disadvantage in terms of their ability to live independently" (p. 342). Thus, there seems to be opportunity for gain on both sides: manufacturers of hardware and software, and elderly users of such.

Information technology can play a lead role in improving the overall quality of life for this population in ways ranging from direct use that fosters independence and reduces feelings of isolation (Hendrix & Sakauye, 2001; Osei, 2001) to remote monitoring devices to supplant constant human watch (Billipp, 2001). There are IT-related products that can remind and even help dispense appropriate quantities of prescribed medicine to forgetful seniors and/or those with failing eyesight and even ambulatory problems (Henderson, 1998; Mutsuko, 2001). Other IT innovations include the use of virtual reality (VR) for memory rehabilitation among elderly with mild to moderate memory deficits (Guo, Lim, Fok & Chan, 2004), while Painter and North (2004) showed that nutrition information delivered via computer significantly improved the attitudes of elderly users toward particular food products. Finally, the use of the Internet can help mitigate problems with social isolation and foster communication with family and friends (Czaja and Lee, 2007).

While IT can play a lead role in improving the lives of the elderly, computer hardware, software and services have not evolved to the needs of senior end users (Nayak, Priest, Stuart-Hamilton, & White, 2006; Czaja &Lee, 2007). This is necessary if IT is to help seniors improve their overall quality of life. There are many opportunities for seniors to improve their standard of living by using IT directly. Most do not, however, because IT products and services are not tailored to their needs.

The purpose of this manuscript is to shed light on missed opportunities that if taken, would improve the lives of seniors through the direct use of IT. The subject will be approached by examining elderly IT use in a three-fold fashion by:

1) Highlighting the growing importance of this rapidly expanding market for IT products and services;

2) Examining the extent to which current IT related products and services are tailored (or not) to the needs of the elderly; and
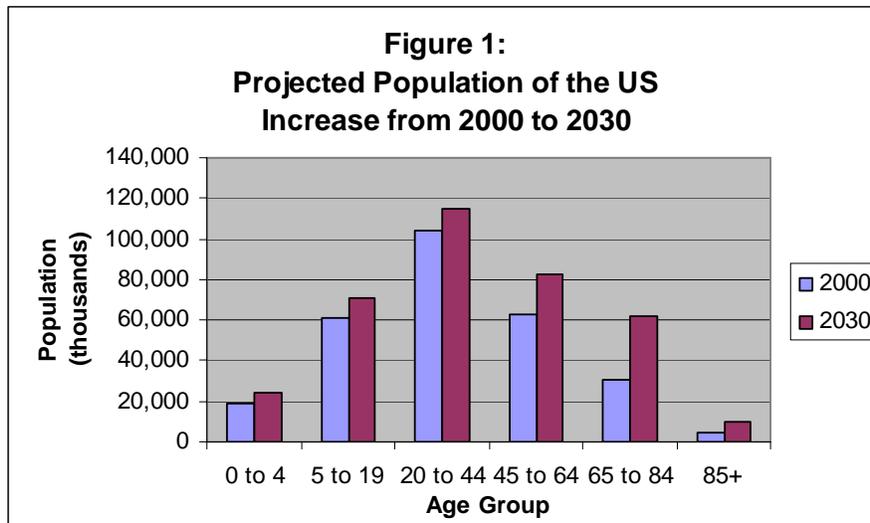
3) Prescribing directions for research as well as highlighting opportunities that IT providers should examine if they hope to benefit economically from this rapidly growing segment of the population.

We begin with an examination of the rapidly expanding senior population in the industrialized societies of the world. Next we will look at the extent to which IT is tailored to the needs of seniors, or the extent to which it is *not* tailored to their needs.   Last, we will identify areas of need among the graying population that IT has the potential to alleviate, and offer recommendations for researchers and organizations interested in this important group of IT users: our seniors.

THE GROWING SENIORS MARKET AND INFORMATION TECHNOLOGY

In the United States, people are living longer and better. Seniors over 55 have over 50% of the discretionary income in the United States, holding over $700 billion in combined financial assets (Beck, 2002), and their share of the wealth will only increase. Seniors are spending their money on home improvement, travel, entertainment, children and grandchildren, health care, and of course normal living expenses.   Despite the fact that the over-50 population is growing faster than the under-50 and baby boomers have $1 trillion in spending power, marketers have largely ignored them as a target market, according to eMarketer (SeniorJournal, 2005).

The changing demographics of this population, sometimes called the "Graying of America", is not unique to the United States. Similar changes are taking place in Europe and parts of Asia as well. For example, seniors over 60 already represent about ten percent of China's population, and by 2025 this figure is expected to almost double to about 290 million people (Boyd, 2002; International Data Base, 2006). Similar "graying" effects are being found in most of the industrialized societies of the world, as advances in science and medicine are allowing people to live longer while remaining productive and healthy. As can be seen in Figure 1, for the U.S. the greatest proportionate growth in population between the years 2000 and 2030 will be in the 65 to 84 age group, where it will literally double from just under 31 million to almost 62 million persons (U.S. Census Bureau, 2004).

Figure 1:
Projected Population of the US
Increase from 2000 to 2030

Source: U.S. Census Bureau, 2004, "U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin," http://www.census.gov/ipc/www/usinterimproj/ Internet Release Date: March 18, 2004.

Although marketers fail to target the elderly as potential buyers of their products (e.g., a quick glimpse of an Apple iPod commercial or advertisement would sufficiently illustrate the chasm), seniors do use IT products and services, although in a limited sense. One example of seniors "mainstreaming" into the general computer user population is shown in Figure 2. Among all people 18 and over using the internet, 87.0% of those 65 and over use it for e-mail. This compares quite favorably (almost identically) to other age groups. In fact, those in the 55 to 64 age group actually use e-mail more than their 35 to 44 year old counterparts (88.3 % to 88.1%) and even their 18 to 24 year old underlings (88.3% to 87.1%). Although not statistically significant, it is still an astute, and perhaps

somewhat surprising, observation. A Kaiser Family Foundation (2005) report noted that among those seniors who go online, about one third say they consider e-mail (34%) and the Internet (33%) "an important part of their life that they wouldn't want to do without" (p.9).
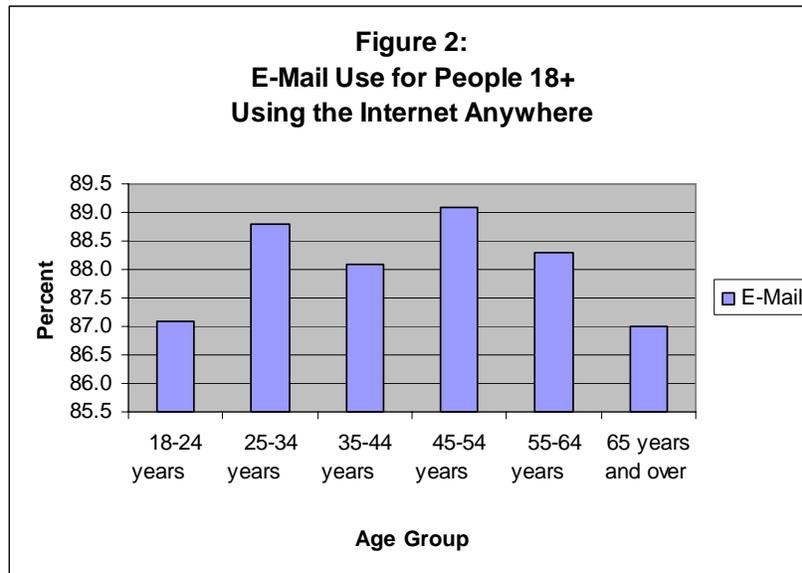
Figure 2:
E-Mail Use for People 18+
Using the Internet Anywhere

Source: U.S. Census Bureau, Current Population Survey, September 2001. Internet Release Date: October 27, 2005

For some applications, such as investing online, older individuals actually outpace the younger set. Figure 3 shows that more seniors trade stocks, bonds or mutual funds online than the under-25 group, and specifically the 55 to 64 year old age group invests online more than any other single demographic. While such an observation may seem obvious, in that seniors have more money to invest in such financial activities, this is the whole point – that seniors have more money to spend on IT and both hardware and software vendors should take notice. And with less than ten percent of *any* of these groups investing online, it seems there is potentially a tremendous amount of market share available to entrepreneurial vendors of these kinds of financially-intensive applications.
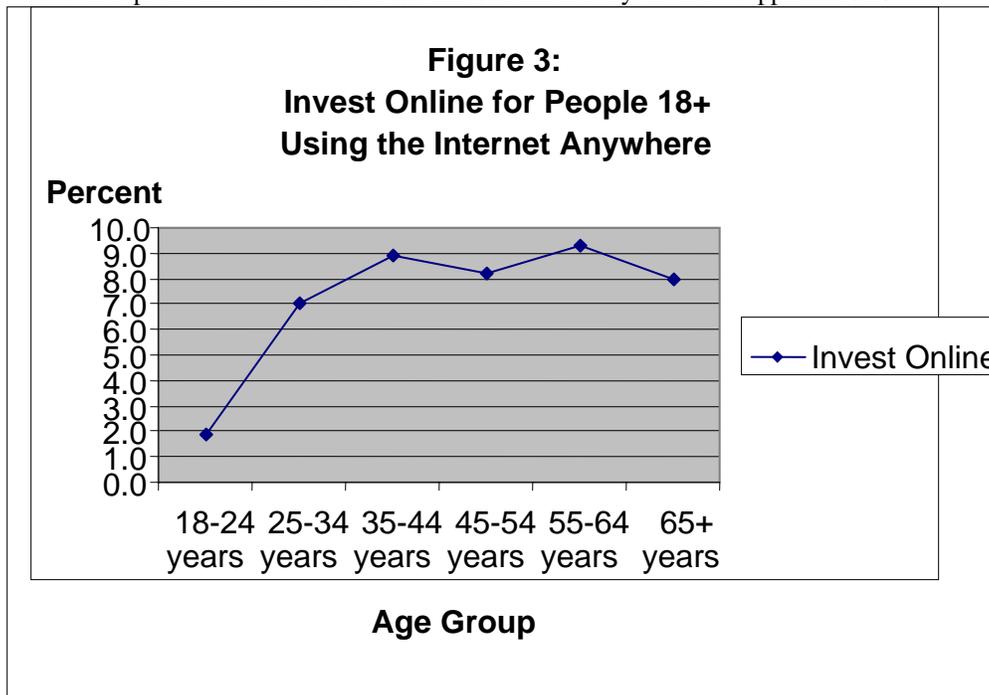
Figure 3:
Invest Online for People 18+
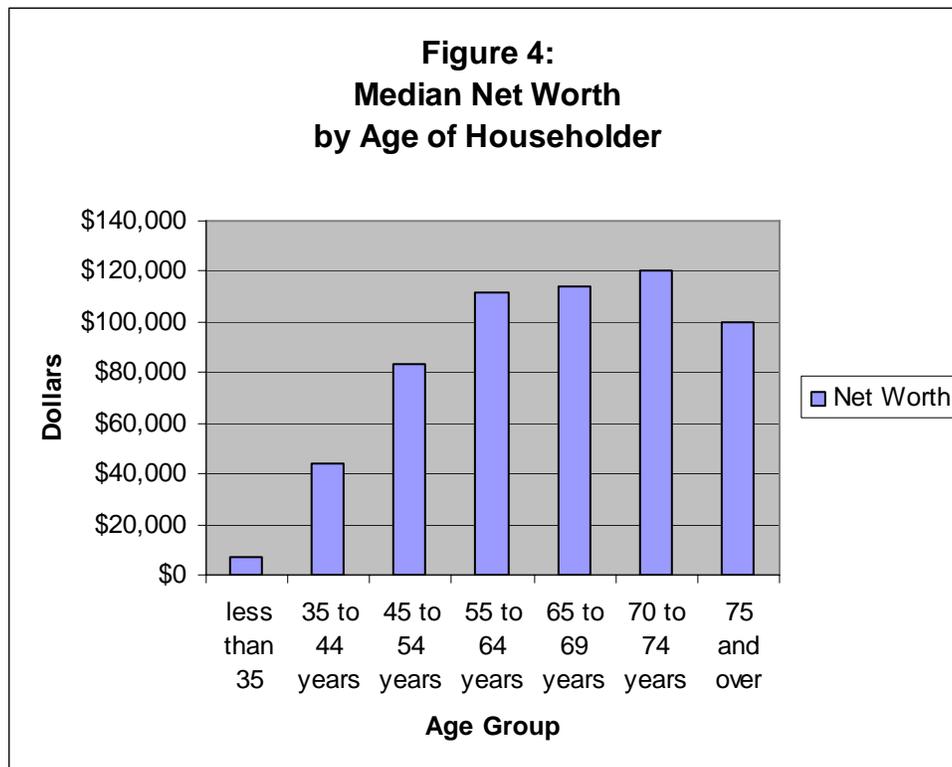**Using the Internet Anywhere**

Source: U.S. Census Bureau, Current Population Survey, September 2001. Internet Release Date: October 27, 2005

Furthermore, more and more seniors are taking part in social networks such as MySpace, Facebook, etc. as well as those envisioned by Lea, Yu, and Kannan (2007). This increased engagement in social networks serves to underscore the importance of including the elderly as intended recipients of marketing campaigns for IT goods and services, since engaging in these activities requires the use of such products. Strategically, vendors should wisely take advantage of this growing market segment before their competition does.

PURCHASING POWER OF THE ELDERLY

In the next quarter century, seniors will outnumber teenagers – often the darling and direct recipient of the majority of advertising done today – and will have plenty of money to spend. Almost 80% of the wealth in the U.S. is in the hands of older Americans. The Depression/WWII generation controls over $43 trillion alone (Davis, 2001), and the median net worth of 65 years and older households in 2000 (the latest year for which figures are available) was $108,885, almost twice the U.S. average of $55,000 (U.S. Census Bureau, 2003). Figure 4 shows the median net worth by age of householder for 2000 census data (the latest year for which data are available):

Figure 4:
Median Net Worth
by Age of Householder

Source: U.S. Census Bureau, 2003, "Net Worth and Asset Ownership of Households,"
http://www.census.gov/prod/2003pubs/p70-88.pdf   Issued May, 2003.

Thus, more and more, the transfer of wealth is steadily toward an ever-aging populace. This in itself does not run counter to intuition, as seniors by and large have spent considerable portions of their lives and careers in the determined quest for material wealth and security for themselves and family members. It is certainly not surprising then, that older individuals are finding themselves in control of more and more assets as well as disposable income. What is surprising and even alarming to some, is that the IT industry has largely ignored these persons as direct consumers of their products. Beyond their efforts to sell seniors standard hardware and software tailored to the needs of the young, little has been done. The key players in the IT industry have not made a serious effort to adapt products to the needs of seniors.

IT hardware, software and service providers have developed computing appliances for business people on the go, for college students, games for kids of all ages and for young adults, for the disabled, and for many other segments of our population. Why not design and develop computers or other computing appliances especially for seniors? There seems at present to be little interest in capitalizing on this rapidly growing segment. With plenty of money to spend on IT-related products and services and the will to buy, it behooves entrepreneurs and innovators to find ways to target this already huge and rapidly expanding market segment.

Elderly It Use – They Want It!

A study funded by Microsoft in conjunction with the American Society on Aging showed that 30% of older people in the U.S. between the ages of 50 and 79 own and use a computer (Leavengood, 2001). Encouraging news from a study by the AARP showed that 81% of their respondents 45 and above had access to the Internet, and more than half of these described themselves as "experienced" computer users; 8% said they were "experts" (Quinn, 2001). Although this study does not necessarily represent a good cross section of our elderly population, the results are encouraging.

The U.S. Census Bureau (2005) reported that in the year 2000 (the latest year for which data are available) almost 35% (34.7) of seniors 65 years and older had a computer "presence" (i.e., someone in their household owned one that they could use), while almost 30% (29.6) had an Internet presence. In the antecedent age group (age 55-64 years, approximately half of whom will move up an age group at the time of this writing), computer presence was an amazing 63.1% while Internet presence is a high 56.6%. These figures are almost 10% higher than their 15-24 year old counterparts (56.7% and 47.1%, respectively).

The use of the Internet, or more specifically the World Wide Web, is probably the "bright spot" in elderly computer use. Despite the lack of concerted attention to seniors' needs regarding IT, our elderly are persevering in their use of the Internet nonetheless. Internet users age 50+ increased from 38.3% in September, 2001 to 44.8% in October, 2003 (U.S. Department of Commerce, 2004). Furthermore, the U.S. Census Bureau (2005) reports that 40.1% of seniors 65 years and over used the internet to purchase products or services.

Surge In Growth Rates

Surveys fielded in 2006 show that Internet penetration among adults in the U.S. has hit an all-time high. Fully 73% of respondents (about 147 million adults) are Internet users, up from 66% (about 133 million adults) in a one year period. The share of Americans who have broadband connections at home has now reached 42% (about 84 million), up from 29% (about 59 million) in the same time frame (Pew, 2006). A simple projection of existing demographic trends, as outlined previously in this monograph, would suggest that a growing proportion of these new Internet users are seniors, however defined. At least that is what one would tend to assume, but a Pew Internet and American Life study from 2005 showed that certain groups still lag in their Internet adoption, including Americans age 65 and older, African-Americans, and those with less education. Specifically, 26% of Americans age 65 and older go online, compared with 67% of those age 50-64, 80% of those age 30-49, and 84% of those age 18-29. Furthermore, 84% of 18-28 year olds go online and 87% use a computer on a regular basis. In contrast, 22% of people age 70 and older go online, and just 24% use a computer on a regular basis (Pew, 2005).

While there are various economic, psychological, and demographic factors that account for some of this disparity, it is our contention that it would be less so if the machines themselves, and associated software programs, were designed in a more elderly-friendly fashion. Indeed, Dickinson and Gregor (2006) noted that most computer systems as currently configured demand considerable knowledge to set up and use and that to a large extent current computer systems are not usable for frail older people, unless they have considerable support.

The good news is that the situation may be changing, and it may be changing rapidly. A recent Harris Poll showed that there are now 172 million American adults online and almost 14 million of those are senior citizens age 65 and older. Seniors online are eight percent of the total (compared to 16% of all adults who are 65 or over), which has increased by five percent since last year (SeniorJournal, 2006). Department of Commerce (2004) statistics show that those aged 50 and over represented the largest increase in internet users from September 2001 to October 2003 (see Figure 5):

**Figure 5: Increase in Internet Users
September, 2001 - October, 2003**
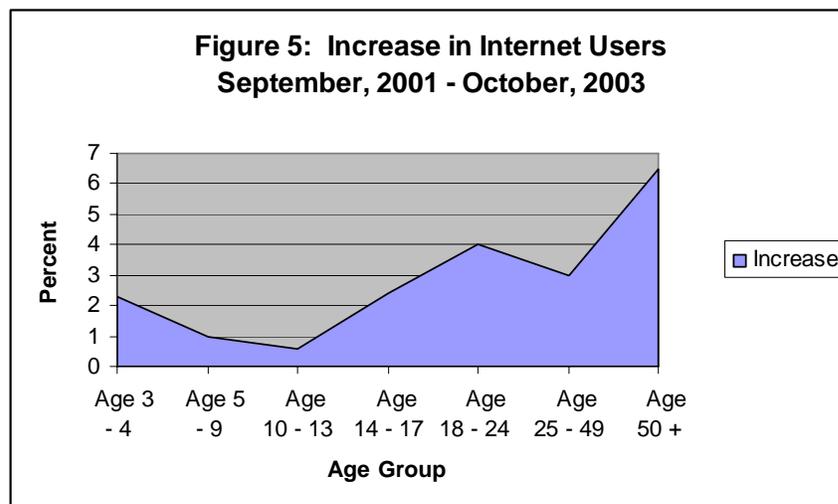
Source: U.S. Department of Commerce, 2004, "A Nation Online: Entering the Broadband Age," (September, 2004). U.S. DOC, Economics and Statistics Administration, National Telecommunications and Information Administration. http://www.ntia.doc.gov/reports/anol/index.html

These findings and similar results from other Internet-based surveys do give some reason for optimism.

It does seem that seniors are being attracted to the Web and are using the Internet primarily for e-mail and web-surfing. The elderly use e-mail to keep in contact with family and friends, and the majority of their surfing is to find information about news and current events and health related information (Kiel, 2005). Several studies suggest that there is tremendous potential for the use of IT generally, and the Internet specifically, in non-medical home care (Kulvin, 1998) and accessing health information (Nayak et al., 2006), online banking (Quinn, 2001), and even those with arthritic conditions (Tak & Hong, 2005).   Thus, with seniors making headway onto the information superhighway, we turn our attention to the current generation of IT wares.

Current It Products Tailored (Or Not) To The Elderly

The focus of the research concerning computer use by the elderly has been primarily on issues pertaining to trainability of older adults, general attitudes of older adults toward computers and computer use, and more recently, Internet use by the elderly (Reisenwitz. Iyer, Kuhlmeier, & Eastman, 2007; Iyer & Eastman, 2006; Eastman & Iyer, 2004). There are some studies of physical, psychological and sociological changes that come with age and their influence on the use of new technology like computers (Ansley & Erber, 1988; Hendrix & Sakauye, 2001; Jay & Willis, 1992; Krause & Hoyer 1984; McNeeley, 1991). The findings of such research, however, have produced little impact on the design of IT products and services.

Touch-screen technology was shown to work well with the elderly in a domestic study (Allenby, 2003), while a Japanese study of older adults found that touchscreen interfaces reduced anxiety among participants, compared to the standard keyboard interface (Umemuro, 2004). Considering Japan, it is one of the fastest-ageing societies in the world. Of its approximately 127 million residents, almost 20% (18.5%, to be exact) are over the age of 65 (Kakuchi, 2003). Thus the concerns and needs regarding elderly use of computers are not restricted to domestic research or practice, but are international and global in nature.

As part of a project funded by the UK government, a multi-disciplinary team set out to develop usable software (i.e., e-mail) that would introduce older people to the Internet (Dickinson, Newell, Smith, & Hill, 2005). Their specially-designed system, Cybrarian, was significantly more usable than an industry-standard equivalent (i.e., Outlook Express). In another international study, two reputable UK websites were used to retrieve health information by 99 older adults in order to understand the key elements of elderly friendly websites (Nayak et al., 2006).

Not Just a Software Problem – Hardware too

This age bias is not just present in software, it is evident in hardware as well. Take the mouse for instance. A mouse is easy to master for a young person with steady hands and quick reflexes. Not true for the elderly who are apt to have less steady hands and diminished response times as a consequence of the aging process (Wah, 2001; Braus, 1995). While some studies suggest that the speed of target acquisition is improved for the elderly with a mouse (Charness & Bosman, 1990), the fact remains that the loss of manual dexterity and reflex speed that comes with age makes the mouse a less than perfect input device for elderly computer users. Not only is this supported by research, there is plenty of anecdotal evidence to support this view.

Examine the front of any personal computer and you will likely find a small Start button (and sometimes a Reboot button, although they have all but become obsolete) that is the same color as the box itself, usually dark gray, white, or off white. The lack of color contrast and generally small size makes the buttons hard to see for the elderly. Not only that, they may be difficult to use, as some are very, very small. As we age, we experience normal deterioration in our vision as we age. We tend to become farsighted, we see color differently, we do not focus as quickly, and our ability to detect contrast is diminished (Braus, 1995). Problems with farsightedness are correctable with glasses, but the others are not. Solutions too many of the vision related problems associated with age, at least for the present, must come in the form of senior friendly system design.

In addition to the buttons, one will find small, difficult to read labels etched or molded into the plastic (again no contrast), or worse yet, rather than labels that are spelled out like on/off, symbols are used instead. It is common to use a 0 to denote off and 1 to denote on, but those numbers or similar symbols may convey little or no meaning to elderly computer users. Even if they did convey accurate meaning, that does not change the fact that they are difficult for aging eyes to see. Drives will have buttons, often very small buttons, to eject a disk or CD, very small holes for plugging in a microphone or speakers, slots for insertion of floppy or zip disks that look similar but accept only appropriate disks, and trays that slide out for receiving and removing CDs or DVDs which are also activated by very small buttons.

One need only to evaluate carefully the dexterity required to insert or remove a disk, or to plug in a head-set. It is easy if one has good eyes, a steady hand and good dexterity, yet it is not nearly so easy for the elderly. Examine a monitor and consider how easy or difficult it is to adjust screen characteristics like contrast, color, vertical position, horizontal position, vertical size and horizontal size. Consider also that a lack of standardization complicates matters—buttons and steps for changing the settings vary from monitor to monitor. All said it is quite easy to see from examining the typical desktop computer that the design is not exactly user friendly to the elderly. Laptops, notebooks, and PDAs are even worse than the typical desktop PC. Senior citizens can learn to use computers, but manufacturers certainly do not make it easy for them.

Other Factors Influencing Adoption and Use

Besides these physical end-user issues, there have been various studies over the years that examined how previous computer experience influences attitudes towards computers (Danowski & Sacks,1980; Jay & Willis, 1992; Krauss, Kenyon, Charette, Familant & Hoyer, 1983); how age (Cutler, Hendricks, & Guyer, 2003) influences attitudes towards computer use (Ansley & Erber, 1988; Condreay & Condreay, 1984; Krauss et al., 1983; Weisman, 1983); how training interventions can influence attitudes toward computers (Jay & Willis, 1992); how educational level can influence attitudes toward computers (McNeely, 1991); and more, but little research has been directed at examining the computer system itself. Specifically, what inherent features or characteristics about the computer system itself influences a senior's perception of the computer and thus his or her predisposition to like or dislike, to use or not use the computer. Along with those mentioned previously, Table 1 shows some commonly identified barriers to elderly adoption of IT:

Table 1:

Obstacles to Adoption of IT by the Elderly

mouse	screen (hard to read)
keyboard	on/off controls
type size	font styles
fear (cyberphobia)	ID Theft
Privacy Issues	skills
typing ability	other

Czaja and Hiltz (2005) noted that systems designers and software developers were not accommodating the needs of seniors. They echo our sentiments, that

> "…careful attention must be paid to the design of the display screen, choice of input device, and the design of instructional materials and technical support systems (such as help functions)…" (p. 44).

Thus there appears to be a call for vendors to supply these sorts of products, but nobody seems to be listening. And considering the potential financial windfall or bonanza that could accompany such a feat, it seems that would-be entrepreneurs would be up to the task. In line with our beliefs is a research agenda put forth by Zajicek (2004; 2006), who calls for more attention to be focused on interface design for older people. In addition, she notes that the "oldest old" (those over 80) are growing more quickly than that of all the other segments of the population.

One would think that by now Microsoft, Apple, or some other innovative company would have designed a graphical user interface (GUI) that is more appropriate for seniors. Very extra-large icons that are intuitive in their meaning for seniors would make for a more comfortable computing experience for the elderly. For example, why not an icon that looks like a cabinet door, or just a door for open and close, or a very large mailbox for mail applications, or even perhaps a large typewriter as the icon for a word processor? The results from Jensen's (2005) laboratory study, comparing a young and elderly group of experienced computer users, recommended avoiding small screen objects and letters – but is anybody listening?

The *Generations Online* website at www.generationsonline.com illustrates symbols that are more familiar to the elderly. On this particular site (designed specifically for the elderly) one will find elderly user-friendly symbols like a clothes-line, clothes pins, books, letters, family pictures, etc. which readily convey meaning to the elderly. There is no reason why GUI settings (Windows has many settings to choose from) could not be similarly designed in such as way that they would be intuitive for the elderly. How much more enjoyable could that make their computing experience? Such an interface could make the elderly as comfortable with computers as the standard GUI does younger users. We see this as an opportunity, but where are the entrepreneurs?

Finally, another area that has increased in importance, especially of late, is that of trust. Due to the proliferation of identity theft, phishing scams, and the like, even seniors who have crossed the digital divide are wary about making purchases online and/or submitting personal information. Cazier (2007) developed a framework to help establish trust that could be applied to our senior population. Similarly, Lippert and Swiercz (2007) present a model

showcasing the relationship between personal data sharing, privacy sensitivity, and technology trust and discuss how organizations can apply these insights. Future research should apply these theories to our elderly computer users.

A Few Points of Light

Despite these many ergonomic issues, seniors are still trying to learn how to use computer technologies. These machines' architectural and configuration biases notwithstanding, there are at least a few options available to the elderly. *SeniorNet*, a non-profit organization based in San Francisco, operates a network of more than 240 learning centers in 38 states, staffed by more than 5,000 older adult volunteers. *SeniorNet* has benefited millions of seniors since its founding in 1986. The *AARP* (American Association of Retired Persons) provides a guide listing some of the Internet search tools that they have found to be useful for older people, while the *U.S. Census Bureau* provides links targeted primarily at seniors.

Sageport, founded in 1999, designed a system that not only simplified the technology of the personal computer but also produced a website that was user-friendly. *Sagevision*, designed to connect older people to the Internet, offered large icons, a track ball instead of a mouse, and a simplified keyboard. However, this company has now gone out of business, underscoring the notion that it will take innovative target marketing and advertising to capitalize on this potentially huge market segment. Another company, *It's Never 2 Late*, provides help for the disabled with an adaptive keyboard and magnified screen. These products are available to individuals, and the company is also marketing to retirement communities (www.in2l.com). We have noted the innovative web site of *Generations Online* and how it is designed to be user-friendly to the elderly.

Many senior centers (or retirement centers, rest homes, or assisted-living facilities) are getting on the IT bandwagon in varying degrees. A New Jersey rest home claimed the title of "first wireless retirement center" (SeniorJournal, 2003), while Saunders (2004) reported on the implementation of computers and related internet technology at senior centers in rural areas. Thus the technology is making its way into the daily lives of senior citizens, although it is of the hand-me-down variety probably more often than not.

Finally, a quick inspection of any local newspaper of moderate size will show local entities offering computer training for seniors. Such "mom and pop" courses are usually coordinated through local senior centers, nursing homes, and community centers. Such training is usually offered in conjunction with a Lifelong Learning program, or one of a similar type but using a different name. Sometimes these courses are housed under charitable organizations, such as the Red Cross or United Way, while at other times they are offered through taxpayer-subsidized venues such as high schools, community colleges and universities. In addition, large churches, mosques, synagogues or other faith-based initiatives sometimes have the capacity and infrastructure to offer such training.

IMPLICATIONS FOR RESEARCH AND PRACTICE

We believe there is much need for research on IT use by the elderly. There is a need for research to better understand elderly users, their wants, their needs, their limitations, and more. There is a need to better understand how computer system design facilitates or inhibits computer use by the elderly. Below we identify some areas where we feel research is needed if we as a society are to meet our obligations to the elderly to improve their quality of life. More specifically, we highlight research areas that could help us better fit IT to the elderly, rather than "force fitting" the elderly to systems that are difficult for them to use.

Thus far, efforts to encourage IT use by the elderly have been about as productive as teaching a four-year old child to drive an automobile. No commercial automobile is designed with a four-year old driver in mind, and no commercial computer system we have seen is designed with a 75-year old grandmother in mind. Computer hardware and software manufacturers have attempted to capitalize on the elderly market, only to the extent that they were able to so by selling the elderly systems that are not specifically tailored to their computing needs. There is a need for research to really understand elderly users in order to develop systems to meet their needs, with resulting implications for practice.

Ignoring the Elephant In The Room?

Many elderly citizens own computers and use them on a daily basis, yet many never touch a computer. Many elderly consumers are simply ignored by IT providers, in part because of the tendency to lump together those over 50, or 60, or 65 into one group. This practice is foolish from a marketing perspective. There are many niches in this group. This is analogous to lumping everyone under 50 into a group called the "young," and everyone over 50 deemed the "old." There are many subgroups with different characteristics in both the under- and over-50 age group. They differ along many dimensions including age, sex, education level, interest, experience, economic status, social status, as well as in their physiological and psychological needs. The so-called elderly have many different motives for using, or not using computers and they exhibit different patterns of computer use. Further research into these differences is warranted.

We included many statistics on the elderly in this manuscript. We noted that older citizens tend to be placed into one large category, which ignores important differences in subgroups of the elderly. We believe there is a need to better understand just who are the elderly. What are their wants, their needs, their abilities, their limitations, their likenesses and their differences? What are appropriate variables for better segmenting this large group of citizens we call the elderly? This would seem to be a fruitful area for marketing research, as the applicability of such research findings would go far beyond better tailoring IT products to their needs.

There is a need to understand the physical and mental abilities/limitations of the elderly that influence their capacity to interact with computer systems. There is much research on aging and its physiological, psychological, and sociological impact. Unfortunately, little effort has been made to apply this knowledge in developing computer based information systems that better meet the needs of the elderly. It is in the interest of hardware and software manufacturers to examine their products carefully and understand the extent to which their product offerings are well matched to the physical needs and abilities of elderly users. Such ergonomic considerations can not be ignored. Thus we submit the first of two, deliberately broad, research propositions:

> <u>Proposition:</u> *There is a need to study very carefully the complex nature of both hardware and software issues that plague adoption and use of IT by the elderly. There is a need to identify substantive areas where manufacturers and vendors can better address the frailties inherent in our senior population, and develop products that are more in line with their abilities.*

We believe that we should understand more completely the forces that shape the attitudes of elderly computer users toward the computer system itself, as well as various other aspects of the broader computing experience. It is important to break down the computing experience into its many elements. People can develop a somewhat positive or somewhat negative attitudes (note there are degrees of feelings as suggested by the structure of most attitudinal scales) about a particular computer component, such as the mouse, and their attitude toward that component can predispose them to have an overall positive or negative attitude toward the broader computing experience.

We must dissect the computing experience and understand attitudes as they relate to each element of the computing experience. To determine whether one enjoys or dislikes their computing experience, as most researchers have done when they have evaluated attitudes toward the computer, gives us little information that would help us know what to change about the computer itself, or some other aspects of the computer experience to bring about a change in attitude. Attitudinal research should be well grounded in the psychological literature if it is to be productive. If we are better able to understand the complex nature of the many attitudes that are formed from one's computing experience, we will be better able to effect positive change in attitudes.

We feel a different direction in research pertaining to elderly attitudes toward computers is needed, thus we submit the second, intentionally broad, proposition:

> <u>Proposition:</u> *There is a need to study very carefully the complex nature of elderly attitudes towards IT; to understand how they feel about the many elements that comprise the total computing experience. Furthermore, there is a need to study how the entire range of attitudes varies among the diverse subgroups of elderly computer users, or potential users.*

More applied research on physical, psychological and sociological changes that come with age and their influence on the use of new technology, such as computers, to translate findings into products better suited to the needs of seniors. The authors plan to use focus groups of seniors to determine these issues in the next phase of this research.

CONCLUSIONS

We believe that IT should play a much larger role in improving the quality of life for our seniors. It has failed to reach the potential envisioned by Ramm and Gianturco (1973). There is no question about its positive impact on medical care, but benefits to seniors in other areas have been slow to materialize. We contend that the reason is simple. Computer systems specifically, and IT products generally, have not been designed in a way that makes it user friendly for the elderly. Hardware and software manufacturers have continued to make what they wanted to make, and try to sell them to the elderly, in spite of the fact that the products are obviously not aimed squarely at them.

Many elderly use computers, but it is not in our view because the systems are tailored to the needs of the elderly, but because the elderly *want so badly* to use the technology that has so much potential to improve their lives. They use it in spite of the fact that it is not designed with them in mind. How many more would use IT, and enjoy the experience and potential benefits if offers, if it were more elder-friendly (tailored to their needs), or at least, *customizable* to their needs?

This situation not only demonstrates a lack of socially responsible behavior, it demonstrates poor business decision-making. Seniors are growing in terms of raw numbers and percentages, and ignoring their needs will cause vendors and manufacturers of IT-related products (both hardware- and software-based) to miss a potential goldmine of opportunity. Aggressive pursuit of the senior market(s) for IT products and services is unquestionably a "win-win" situation, as selling more IT-related products will stimulate economies and provide jobs for everyone, including seniors themselves, while at the same time increasing the quality of life for seniors and the rest of society. In the words of the late John F. Kennedy, "a rising tide lifts all boats."

As we noted in the introduction, we see a win-win situation. Companies will benefit financially by engaging this relatively untapped market for IT, and seniors would benefit from being able to use IT directly to improve their quality of life. At the same time, the digital divide will shrink as it pertains to this component. It has been said that knowledge is power. If that is the case, we are denying the elderly power by denying them tools that they can use to gain knowledge. Not that we tell them that they are not allowed to use it, but we deny them access by making it hard for them to use. Let us go back to the analogy of a four-year old driving an automobile. What good does it do to tell them they can drive it when their feet will not reach the pedals, and they cannot see over the steering wheel? Even if you give them the vehicle and give them the keys, because it is not designed for them, they won't go far. If we give elderly citizens computer systems or access to computer systems, but we fail to tailor the systems to their needs, neither will they go far. It is time for a change.

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