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Article

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Technology Needs of Aging Boomers

As the elderly population grows more numerous and more active, the public and private sectors will have to develop specialized products and services.

It happens every seven seconds: Another baby boomer turns 50 years old. As they have done in other facets of American life, the 75 million people born between 1946 and 1964 are about to permanently change society again. The sheer number of people that will be living longer and be more active than in previous generations will alter the face of aging forever.

One of the greatest challenges in the new century will be how families, business, and government will respond to the needs, preferences, and lifestyles of the growing number of older adults. In so many ways, technology has made longer life possible. Policymakers must now go beyond discussions of health and economic security to anticipate the aging boom and the role of technology in responding to the needs of an aging society. They must craft policies that will spur innovation, encourage business investment, and rapidly commercialize technology-based products and services that will promote well-being, facilitate independence, and support caregivers.

Society has invested billions of dollars to improve nutrition, health care, medicine, and sanitation to increase the average lifespan. In fact, longevity can be listed as one of the nation's greatest policy achievements. The average American can plan to live almost twice as long as his relatives did at the turn of the century. Life expectancy in 1900 was little more than 47 years. In 2000, life expectancy will be at least 77, and some argue that the real number may be in the early- to mid-80s. Instead of looking at the high likelihood of death upon turning 50, as was the case in 1900, Horace Deets, executive director of the American Association of Retired Persons (AARP), has observed that an American who turns 50 today has more than half of his or her adult life remaining.

Although people are living longer, the natural aging process does affect vision; physical strength and flexibility; cognitive ability; and, for many, susceptibility to illness and injury. These changes greatly affect an individual's capacity to interact with and manipulate the physical environment. The very things that we cherished when younger, such as a home and a car, may now threaten our independence and well-being as older adults.

Therein lies the paradox: After spending billions to achieve longevity, we have not made equitable investments in the physical infrastructure necessary to ensure healthy independent living in later years. Little consideration has been given by government, business, or individuals of how future

generations of older adults will continue to live as they choose. These choices include staying in the homes that they spent a lifetime paying for and gathering memories in; going to and from the activities that collectively make up their lives; remaining connected socially; or, for an increasing number, working.

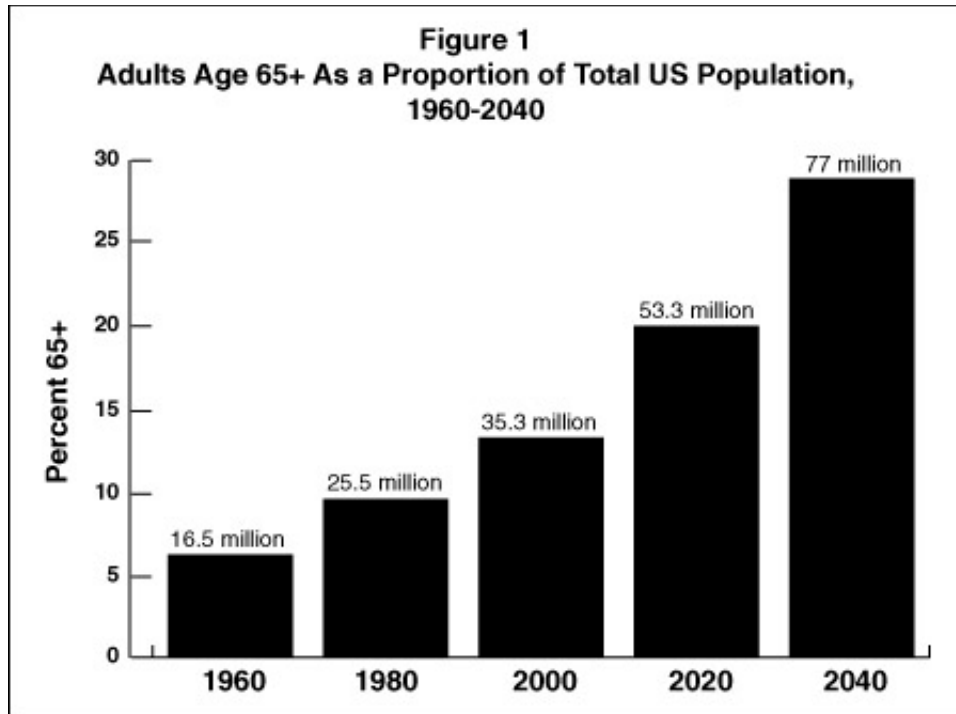
Moreover, as the oldest old experience disability and increased dependence, the nation is unprepared to respond to the needs of middle-aged adult children who must care for their children and their elderly parents while maintaining productive employment. Ensuring independence and well-being for as long as possible is more than good social policy, it is good economics as well.

All of us will pay higher health care costs if a large portion of the population is unable to access preventative care on a routine basis. Likewise, the inability of many older adults to secure adequate and reliable assistance with the activities of daily living may lead to premature institutionalization--a personal loss to family members and a public loss to society. Clearly, the power and potential of technology to address the lifestyle preferences and needs of an older population, and those who care about them, must be fully and creatively exploited.

Realities of aging

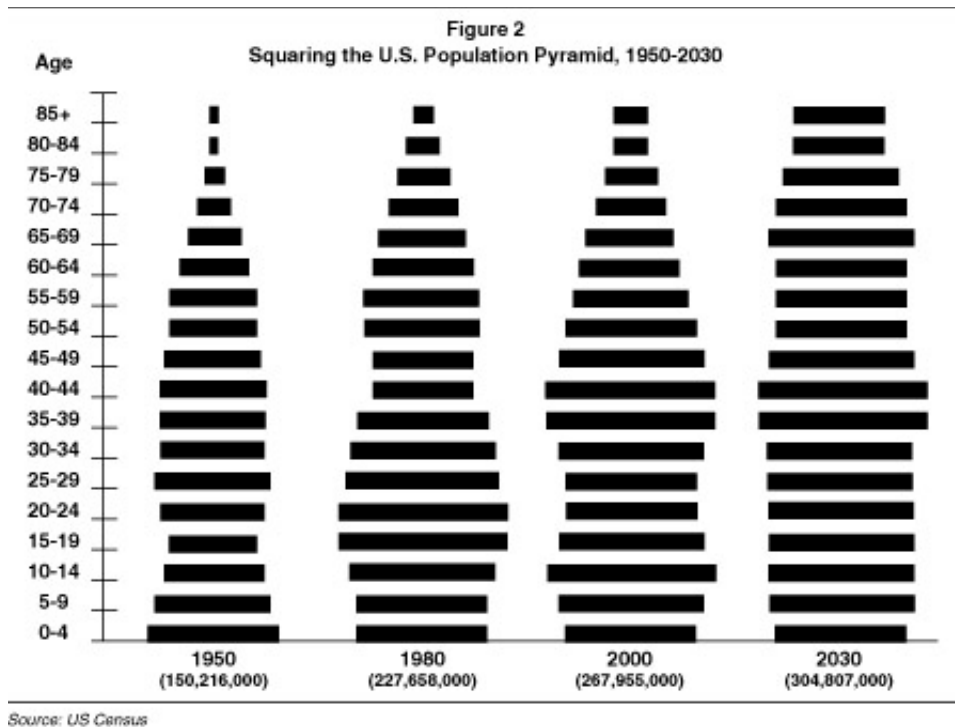
The baby boomers are not the first generation to grow old. However, their absolute numbers will move issues associated with their aging to the top of the policy agenda. Although chronological age is an imperfect measure of what is "old," 65 is the traditional milepost of senior adulthood.

As [Figure 1](#) shows, the proportion of adults age 65 and over has steadily increased over the past four decades, and it will continue to grow. From nearly 13 percent today, the proportion of older adults is likely to increase to almost 21 percent in the middle of the next century--a shift from nearly one in eight adults over 65 to one in five. Although the growth in the proportion of the nation's population that will be older is impressive, their actual numbers are even more dramatic. According to the U.S. Census, the number of people 65 and over increased 11-fold during this century, from a little over 3 million in 1900 to more than 33 million in 1994. Over the next 40 years, the number of adults over 65 will climb to more than 80 million.



Source: US Census, Middle Series Projections

As [Figure 2](#) indicates, the baby boomers are the first great wave of older adults who will lead a fundamental shift in the demographic structure of the nation that will affect all aspects of public policy.



Equally important as the large numbers are the qualitative changes occurring within the older population. Unlike previous generations, tomorrow's older adults will be dramatically older and represent greater racial diversity. For example, over the next five decades, the number of adults 85 and older will quadruple and approach nearly 20 million. Although still a relatively small proportion of the nation's total population, the oldest old will certainly represent the largest segment needing the most costly care and services. Although the majority will remain white, over the next five decades the older population will reflect far more people of Hispanic, African-American, and Asian origins. Such diversity will require government and business to be more flexible on how policies, services, and products are delivered to accommodate the varied needs and expectations of a segmented older population.

To assume that the needs and preferences of yesterday's, or even today's, older adults will be the same as those of future generations would be misleading. Data indicate that tomorrow's older adults will be in better health, have more years of education, and have larger incomes. These characteristics predict a far more active population than has been the case in recent older adult groups.

Improved health. The National Long Term Care Survey indicates that chronic disability rates fell 47 percent between 1989 and 1994 and that functional problems have generally become less severe for older adults. In 1990, more than 72 percent of older adults surveyed assessed themselves in excellent, very good, or good health. Baby boomers are predicted to enjoy better health due to continued improvements in nutrition, fitness, and health care.

Increased education. Tomorrow's older adults will be better educated than previous generations. Twice as many young old (60 to 70 years old) will have a college degree--a jump from 16 percent in 1994 to about 32 percent by 2019. Even the percentage of adults age 85 and over with a college education will double from about 11 percent to between 20 and 25 percent for the same period.

Larger income. Although many older adults may continue to live in poverty, most will be far better off than their grandparents were. Compared to 1960, when more than 30 percent were below the poverty line, only 10 percent are considered poor today. Moreover, baby boomers will soon be inheriting from their parents anywhere from \$10 to \$14 trillion--the largest transfer of wealth in history.

The relative improvement of socioeconomic status and well-being suggests real changes in the lifestyle of older adults. Active engagement will typify healthy aging. If people have good health, a wider range of interests, and greater income with which to pursue those activities, then it is very likely that they will choose to lead more active lives. A recent Wall Street Journal-NBC poll revealed that between 62 and 89 percent of the next wave of retirees anticipate devoting more time to learning, study, travel, volunteering, and work. Improved well-being overall will raise the expectations of what it means to age for older adults and their adult children. Both will place unprecedented priority on the infrastructure that will facilitate active independent aging and the capacity to provide care for the oldest old.

Physical environment of aging

Tapping technology to meet the needs of older adults is not new. There are countless families of "assistive technologies"-- even an emerging field of "gerontechnology"--and "universal design" theory to address the multiple use, access, and egress needs of those with physical disabilities. In general, however, these efforts are fragmented and address single physical aspects of living: a better bed for the bedroom, a better lift for the senior van, or more accessible appliances for the home.

We do not live in single environments. Life is made up of multiple and interrelated activities and of interdependent systems. Throughout life we work, we play, we communicate, we care, we learn, we move, and although it is crucial that we be able to function within a setting, it is the linkage among those activities that makes a quality life possible. An integrated infrastructure for independent aging should include a healthy home, a productive workplace, personal communications, and lifelong transportation. As the baby boomers matured, the government built schools, constructed sidewalks and parks, and invested in health care to create an infrastructure to support their well-being. Today, the challenge for policymakers and industry is to continue that commitment: to fully leverage advances in information, communications, nanotechnology, sensors, advanced materials, lighting, and many other technologies to optimize existing public and private investments and to create new environments that respond to an aging society's needs.

Lifelong transportation. The ability to travel from one place to another is vital to our daily lives. Transportation is how people remain physically connected to each other, to jobs, to volunteer activities, to stores and services, to health care, and to the multitude of activities that make up living. For most, driving is a crucial part of independent aging. However, the natural aging process may diminish many of the physical and mental capacities that are needed for safe driving. Drivers over 75 cause the second highest fatality rate on the nation's roads, second only to drivers age 16 to 24. A recent study conducted for the Department of Health and Human Services and the Department of Transportation suggests that over the next 25 years, the road fatalities of those over 75 could top 20,000, nearly tripling today's number of deaths. Consequently, transportation must be rethought to determine how technology can be applied to the automobile to address the specific problems of older drivers and passengers in the 21st century.

Driving may not remain a lifelong option because of diminished capacity or even fear. Many may live in communities with inadequate sidewalks, short-duration traffic signals, and hard-to-read signage that can cause problems for older pedestrians. For those who pursued the American dream of a single-family detached home in the suburbs, the inability to drive may maroon them far from shops and friends. Most older adults will live in the suburbs or rural areas where public transportation is limited or nonexistent. Leveraging existing information and vehicle technologies to provide

responsive public transportation systems that provide door-to-door services will be critical to the millions of older adults who choose to age in the homes they built and paid for.

Healthy home. Home is the principal space where we give and receive care, have fun, and live. The home should be a major focus of technology-related research to address how we can prevent injury, access services such as transportation, entertain and care for ourselves, shop, and conduct the other activities that constitute daily living. Most older adults choose to remain in their own homes as they age. From a public policy perspective, this is a cost-effective option provided that the home can be used as a platform to ensure overall wellness. For example, introduction of a new generation of appliances, air filtration and conditioning systems, health monitors, and related devices that could support safe independence and remote caregiving could make the home a viable alternative to long-term care for many older adults. Advances are already being made in microsensors that could be embedded in a toilet seat and used to automatically provide a daily checkup of vital signs. Research should go beyond questions of design and physical accessibility to the development of an integrated home that is attractive to us when we are younger and supportive of us as we age.

Personal communications. One of the greatest risks in aging is not necessarily poor health but isolation. Communication with friends, relatives, health care providers, and others is crucial to healthy aging. Advances in information technologies make it possible and affordable for older adults to remain connected to the world around them. Moreover, a new generation of interactive and easy-to-use applications can be developed for caregivers to ensure that their mothers, fathers, spouses, friends, or patients are safe and well.

Aging, once considered a personal problem, will surely become public and political.

Although personal emergency response systems have been invaluable, a new generation of "wireless caregiving" will enable caregivers at any distance to respond to the needs of older friends, family, residents, and patients. Systems that make full use of the existing communications infrastructure can be used to ensure that medicine has been taken, that physical functions are normal, and that minor symptoms are not indicators of a larger problem. They can provide early identification of problems that, if left untreated, may result in hospitalization for the individual and higher health care costs to society.

Yet health is more than a physical status; well-being includes all the other activities and joys that make up a healthy life. For the majority of older adults, connectedness means the ability to learn, to enjoy new experiences, to have fun, and to manage necessary personal services such as transportation and meal delivery. Today's information systems enable access to these and other activities.

Productive workplace. At one time, retirement age was a fixed point, an inevitable ending to one's productive years. The workforce is now composed of three generations of workers. Retirement age is increasingly an historical artifact rather than a reality. New careers, extending income, or simply staying active are incentives for many people to continue working and volunteering. Numerous corporations now actively recruit older workers. A recently completed AARP survey of baby boomers' expectations for their retirement years reveals that 8 in 10 anticipate working at least part-time.

An older workforce introduces new challenges to the workplace. For example, changes in the design of workspace will include more than features that enable improved physical movement and safety. Workplace technology will need to address a wide range of physical realities, including manipulation challenges for those with arthritis or auditory problems for those with hearing difficulty. Employed caregivers, particularly adult children, will seek ways to extend their capacity to balance multiple demands on their time and personal well-being. Likewise, employers will seek and adopt new technologies and services that will enable their employees to remain productive and ensure the well-being of their older loved ones.

Perhaps the greatest reality of the older workplace will be the need for continuing education technology that will enable the older worker to acquire new skills. As we choose to stay on the job longer or elect to change careers after two or more decades, technology will be instrumental in ensuring that an aging workforce remains productive and competitive.

Supporting the caregiver

No matter how conducive to independent living the physical environment may be, many older adults will need some form of support, from housecleaning or shopping to bathing or health care. Most caregiving for those who cannot live alone without assistance is provided by a spouse, an adult child, or sometimes a friend. Today, one in four households provides some form of direct care to an older family member. However, societal changes will affect this pattern of caring for future generations.

Many adult children are moving further from their parents. For many, this can mean living on the other side of a metropolitan area; for others, it may mean living out of state. In both instances, providing daily or even semiregular assistance can be problematic. In addition to distance, most caregivers (typically adult daughters) have careers that they are trying to balance along with children and a home. The challenges of balancing these multiple pressures are a major source of caregiver stress and lost productivity on the job. Findings from a survey conducted by the Conference Board reveal that human resources executives in major firms now identify eldercare as a major worklife issue, replacing childcare among their employees' chief concerns. Moreover, the composition of the family has changed. The high rate of divorce and remarriage has created a complex matrix of relationships and family constellations that make it difficult to decide who is responsible for what.

Technology, whether it be remote interactive communication with a loved one or a way to contract private services to care for a parent living at home, will be a critical component of caregiving in the next century. Such technology will help caregivers meet their multiple responsibilities. Indeed, virtual caregiving networks may become crucial to delivering publicly and privately provided services such as preventative health care, meals, and transportation.

The politics of unmet expectations

Improved well-being is likely to contribute to a very different vision of aging. In addition to wanting products, services, and activities that were not important to their predecessors, older boomers will also want new public policies to support their desire to remain independent. National efforts to ensure income and health security are already on the political agenda; concerns about the quality of life and demands of caregiving will be there soon.

Baby boomers have become accustomed to being the center of public policy. As children, they caused the physical expansion of communities; as young adults, they drove social and market change; and as older adults, they will expect their needs and policy preferences to be met. According to AARP's recent survey of boomer attitudes about retirement, more than two-thirds are optimistic about their futures and expect to be better off than their parents. What if, after a lifetime of anticipating a productive retirement and fully investing in the American dream, millions find themselves unable to travel safely, no longer able to remain in their homes, or unable to care for loved ones? Aging, once considered a personal problem, will surely become public and political.

State and local governments will be closest to these issues, but most will be ill-equipped to respond to the scope of the problems or politics that will arise. Numerous grassroots political organizations could form to represent the special needs of various older adult groups, such as safe housing for the poor, emergency services for those living alone, or transportation for those in rural areas. Intergenerational politics might emerge as the mainstay of local policy decisions affecting issues such as school budgets and road building. Because these issues are closest to the daily lives of voters, the political conflict could be far greater than today's Social Security debate, which focuses on the intangible future.

Technology is one tool that offers a wide range of responses that can enhance individual lives, facilitate caregiving, and improve the delivery of services. Boomers experience technological innovation every day in their cars, their office computers, and their home appliances. They will expect technological genius to respond to their needs in old age.

Stimulating innovation

Throughout the federal government, individual offices are beginning to consider policy strategies to address the needs of older adults, due in part to the fact that this is the United Nations' International Year of the Older Person. The White House is working on crafting an interagency ElderTech initiative, representatives on Capitol Hill aging committees are investigating the potential of technology, and various cabinet departments are pursuing individual activities in their respective areas. A strategic approach is necessary to leverage each of these activities, to provide a national vision, and to begin building the political coalition necessary to support sustained investment in technology for an aging society. This strategy includes two sets of activities: create new or restructured institutions that will administer aging and technology policy, and implement policies that will set the agenda, stimulate the market, and ensure technological equity.

Policy networks of administrative agencies, stakeholder groups, legislators, and experts typically control an issue area. Consensus within the group is generally based on existing definitions of problems, combined with a predetermined set of available and acceptable solutions. This structured bias keeps many issues from being considered and is a major barrier to policy innovation. The current array of interest groups and federal institutions that dominate aging policy was formed over 30 years ago to alleviate poverty among older adults. Special congressional committees and federal agencies, along with their state networks of service providers, were created to address the needs of the older poor. The fact that the majority of older adults are now above the poverty line is a tribute to many of these programs.

The aging of the baby boom generation creates a new frontier with new problems and opportunities. Aging on the scale and with the diversity that will occur over the coming decades will challenge the nation's current policies and the underpinnings of the existing institutions. Aging policy today, on Capitol Hill and within the bureaucracy, is typically defined around discussions of the "old and poor" or the "old and disabled." Although this will continue to be appropriate for many older adults, these definitions alone do not allow for the policy innovation necessary to respond to a new generation of older adults. Congressional committee structure and federal agencies should be realigned to allow a broader debate that would include examination of how technology might be used in coming years. Existing government agencies should develop greater capacity to conduct and manage R&D that addresses aging and the physical environment.

Congress should consider a broad range of tax incentives to encourage industry to invest in an emerging market.

Federal policy should seek to encourage the rapid development and commercialization of technology to address the needs of older adults and caregivers. To achieve this objective, federal strategy should include three goals: agenda setting, market stimulation, and technological equity.

Agenda setting. Discussions of Social Security and Medicare have begun to alert the public to coming demographic changes. However, the extent to which the graying of America will affect all aspects of public policy and business is less well understood. The White House is in an ideal position to use its bully pulpit to educate the public about the nation's demographic trends. Interagency initiatives are an appropriate beginning; however, this should result in a real and unified budget proposal with a single lead agency. This include resources to advance human factors engineering and aging, policy research to develop new models of service delivery and related data development to better understand older adult preferences, and demonstration projects to evaluate the efficacy and market potential of various technologies. Likewise, Congress should consider investing in direct R&D

to place the issue of aging on the agenda of the engineering community. Government should prioritize its investment to include research that first improves the delivery of existing public services and, second, provides the resources necessary to develop new applications that leapfrog the current array of technologies available to older adults and caregivers. An increase in funding for aging research that relates to disease and physiological problems does not replace the need to stimulate research in re-engineering the physical environment of aging. Moreover, this will jump-start industry research in a market where the return on investment may be too far in the future.

Market stimulation. Congress should consider a broad range of tax incentives to encourage industry to invest in an emerging market. This would include tax benefits for companies who invest in systems integration to adapt existing technologies and for those who conduct R&D to develop new products and services. Such product innovations would benefit older adults in this country and enhance the U.S. competitive position abroad. In Japan, for example, the proportion of older adults in the population is even higher than it is in the United States. Similarly, families should be given tax incentives to purchase technologies or services. This would create a defined market and assist those who might find the first generation of technologies too expensive. Finally, some long-term care insurers have begun to give premium breaks for households investing in home technologies. The federal government should work with the states to encourage insurers across the country to grant similar technology discounts.

Technological equity. Good policy must ensure equity. The federal government should develop a combination of incentives and subsidies to ensure that low-income older adults and their families have access to new technologies. The faster new technologies are commercialized, the more affordable they will become. Moreover, the government should become a major consumer of technology to improve the delivery of its services. For example, innovative states such as Massachusetts and California are already working to integrate new remote health monitoring systems into public housing for older adults to enhance preventative care and to improve the well-being of lower-income elderly people. To ensure consistency of service, the federal government should work with industry to facilitate technology standards, such as communication protocols for "smart" home appliances.

The aging of the baby boomers will affect every aspect of society. Healthy old age is the one characteristic that each of us hopes to achieve. The nation must begin today to ensure that one of its greatest achievements--longevity--does not become one of its greatest problems. Leveraging the technological power that in part helped us achieve our longer life span will be an important part of how we will live tomorrow.

Recommended reading

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