IBM

Outthink Aging

Explore the challenges and opportunities created by an aging society

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in collaboration with
Consumer Technology Association FOUNDATION

“UNDERSTANDING THE DIVERSE GOALS OF ADULTS IN LATER LIFE, IMAGINING ALTERNATIVE WAYS TO MEET THOSE GOALS, AND BUILDING

TECHNOLOGIES THAT CREATE ACCESS — THESE ARE ALL EXCITING OPPORTUNITIES FOR THE FUTURE.”

– Jan E. Mutchler, PhD
Professor of Gerontology and Director, Center for Social & Demographic Research on Aging
University of Massachusetts, Boston

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"WE HAVE TO INVEST IN, CARE FOR, PROTECT, AND EMPOWER AN AGING POPULATION."

The world changes in unexpected ways. But one trend is clear – the world's population is aging, with a higher and higher percentage of seniors in all nations. While an aging society should come as no surprise, many marketplace sectors and governing bodies seem to be just beginning to acknowledge and confront this important reality: *We have to invest in, care for, protect, and empower an aging population.*

We're facing a major shift. If the explosion of mobile connectivity was the biggest *technology shift* of the early 21st century, the worldwide aging population is the biggest *demographic shift* – one with major potential impact on all sectors of the economy. An aging population creates a unique (and uniquely challenging) market with layered, diverse, and evolving needs but without easily drawn boundaries or segments. While technology plays a key role in meeting these needs, it's just part of a much larger picture.

We're in the early days of a long journey. The opportunities created by an aging population are huge, but the right approach is still coming into focus. Meeting the needs of millions of older adults will require new technologies, partnerships, ideas, and business models. In short, to outthink aging, we need a new vision, including how we assess the needs of this demographic, engage with its ecosystem – and create, develop, and deliver solutions destined for a new type of market.

We wrote this brief book as a starting point, a catalyst, and a conversation-opener for the technology community and beyond. In it, you'll find out why an aging population poses such unique challenges – and opportunities. You'll hear how IBM collaborated with the Consumer Technology Association Foundation to conduct fresh research in an unconventional way. Our goal? To find new ways for technology to improve the lives of older adults. We will explore innovative ideas for serving this aging demographic created by college-age visionaries with unfettered imaginations. And we highlight strategies for moving forward.

We want this book, and the dialogue it inspires, to help define the challenges, crowdsource great ideas for new innovations and approaches, and identify areas of major potential. But most importantly, this book is an invitation to all – technology innovators large and small, governing bodies at all levels, non-profit organizations, solution providers, and the growing population of aging individuals and their caregivers.

Join us. Lend your voice to the dialogue. Create new partnerships and innovations. Together, we can *outthink aging*. Now is the time to start.

USING TECHNOLOGY TO ENRICH LIVES

> “TECHNOLOGY DOES NOT REPLACE THE HUMAN ELEMENT, BUT IT’S A TOOL THAT WILL ENABLE THE GROWING AGING DEMOGRAPHIC AND THEIR CAREGIVERS TO BETTER THEIR LIVES.”

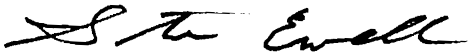
This report reflects the culmination of a project launched at CES 2016 when IBM CEO Ginni Rometty gave a keynote presentation highlighting how cognitive computing is impacting consumer technology. At that keynote, the Consumer Technology Association Foundation and IBM formed a partnership to look specifically at how this revolution in technology would change the way we age or experience disability.

The Consumer Technology Association Foundation believes strongly in the ability for technology to empower us to live longer, healthier, more independent lives. Technology does not replace the human element, but it's a tool that will enable the growing aging demographic and their caregivers to better their lives. Each year at CES we see the latest innovations in categories such as smart home, health and fitness, automotive, security, entertainment, and many others. Cognitive computing offers the opportunity to provide the powerful back-end processing that will enable these services to anticipate and address consumer needs.

Whether it is preventing fraud and abuse, providing greater social connectivity, or enhancing the analysis of individual requirements, it's clear that cognitive computing will play a massive role in the development of technology to meet the needs of consumers – regardless of age or ability.

Thank you to the IBM Accessibility Research team including Frances West, Nicola Palmarini, Sheila Zinck, Marnie Hoover, and Timothy Powers for their work on this report. Thank you as well to all of the student participants in the IXL Innovation Olympics for their contributions to this research.

Now that the research is complete, I hope that you will join me in taking up the challenge of using technology to enrich lives. New partnerships between industry, non-profits, academia, government, and the general public will form to accomplish these goals. I look forward to working with IBM, the broader technology industry, and each of you to find ways to implement these innovations and revolutionize the way we age.



Stephen Ewell
Executive Director
Consumer Technology Association Foundation

A CALL FOR INNOVATIVE THINKING

> “NEW WAYS OF ACCESSING INFORMATION ARE ESSENTIAL; OLDER ADULTS ARE INCREASINGLY TECHNOLOGICALLY SOPHISTICATED, YET ACCESS TO NEW TECHNOLOGIES IS UNEVEN.”

Academics and other observers cite the aging of global populations as perhaps the most significant demographic shift underway. The world will include nearly 10 billion people in 2050, more than one out of five of whom will be age 60 or older, compared to just 12 percent currently. In many countries – such as Korea, Israel, and Singapore – babies born in 2050 are expected to live nearly 90 years on average, fueling a continued rise in the share of the world's population made up of older adults.[1]

In truth, a majority of older adults age with good health and with energy and enthusiasm for enjoying life and engaging with their communities. However, disability and chronic disease are more prevalent in later life and needs for assistance can be substantial. Yet many older adults are embedded in social networks that are shrinking in size and in their capacity to participate as care partners. In many countries, formal systems for providing support for frail or disabled elders are absent. In others, such as the United States, ambivalence about the balance between formal and informal supports and grave concerns about associated costs drive debates about the best way to support older adults in need of care – debates occurring in the political arena, at the local senior center, and around countless dinner tables.

Outthink Aging, the result of a partnership between IBM and the Consumer Technology Association Foundation, inspires us to imagine the ways that innovation can help navigate this somewhat uncharted territory. This book offers an "ecosystem" approach, accurately highlighting the network of informal and formal supports and resources intersecting with older adults as they age.

Aging services in the United States and in many other countries are highly fragmented, and establishing flexible platforms for sharing and disseminating information throughout all elements of the ecosystem is sorely needed. New ways of accessing information are essential; older adults are increasingly technologically sophisticated, yet access to new technologies is uneven. Elder services and supports, as well as the information platforms with which they intersect, must respond to emerging and evolving needs of older adults and their families.

Outthink Aging offers welcome innovation in thinking about aging in an integrated way. Understanding the diverse goals of adults in later life, imagining alternative ways to meet those goals, and building technologies that create access – these are all exciting opportunities for the future.

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[1] United Nations, Department of Economic and Social Affairs, Population Division (2015). *World Population Prospects: the 2015 Revision, Key Findings and Advance Tables.* Working Paper No. ESA/P/WP.241.

1.

WHY IS AGING SUCH A CHALLENGE?

DEFINING THE CHALLENGES

WE ARE AGING THROUGHOUT OUR ENTIRE LIVES. IT'S A NATURAL FACT, INESCAPABLE AND UNSTOPPABLE, DESPITE ANY CLAIMS TO THE CONTRARY. BUT AT A CERTAIN POINT IN THE AGING PROCESS, NEW CHALLENGES ARISE – FROM PHYSICAL AILMENTS TO MENTAL HEALTH ISSUES, FROM SOCIAL ISOLATION TO A LACK OF ACCESS TO VITAL INFORMATION AND SERVICES. TO ENVISION NEW WAYS OF THINKING ABOUT AGING, WE MUST START BY TAKING A CLOSE LOOK AT THE UNIQUE AND DAUNTING ISSUES RAISED BY AN AGING POPULATION. WE'LL EXPLORE WHAT AGING INDIVIDUALS WANT. AND WE'LL DEFINE THE LARGER, COMPLEX ECOSYSTEM OF AGING, STARTING WITH THE INDIVIDUALS DIRECTLY AFFECTED BY AGING AND THEN MOVING ON TO THE NETWORK OF FAMILIES, COMMUNITIES, CAREGIVERS – AND THE ORGANIZATIONS AND BUSINESS THAT CAN CREATE AND DELIVER INNOVATIVE NEW SOLUTIONS AND SERVICES.

Demographers estimate that by 2050, the number of older persons in the world will exceed the number of young individuals for the first time in the history of mankind – a shift that has already taken place in Japan, Italy, Germany, and other countries. Addressing the needs of an aging population is arguably one of the most pressing global challenges of the early 21st century – one that is not being met by existing solutions or business models.

Here are just some of the reasons why this fascinating but complex challenge is different – and why it merits serious attention *now* from diverse innovators and visionaries in government, business, healthcare, and more.

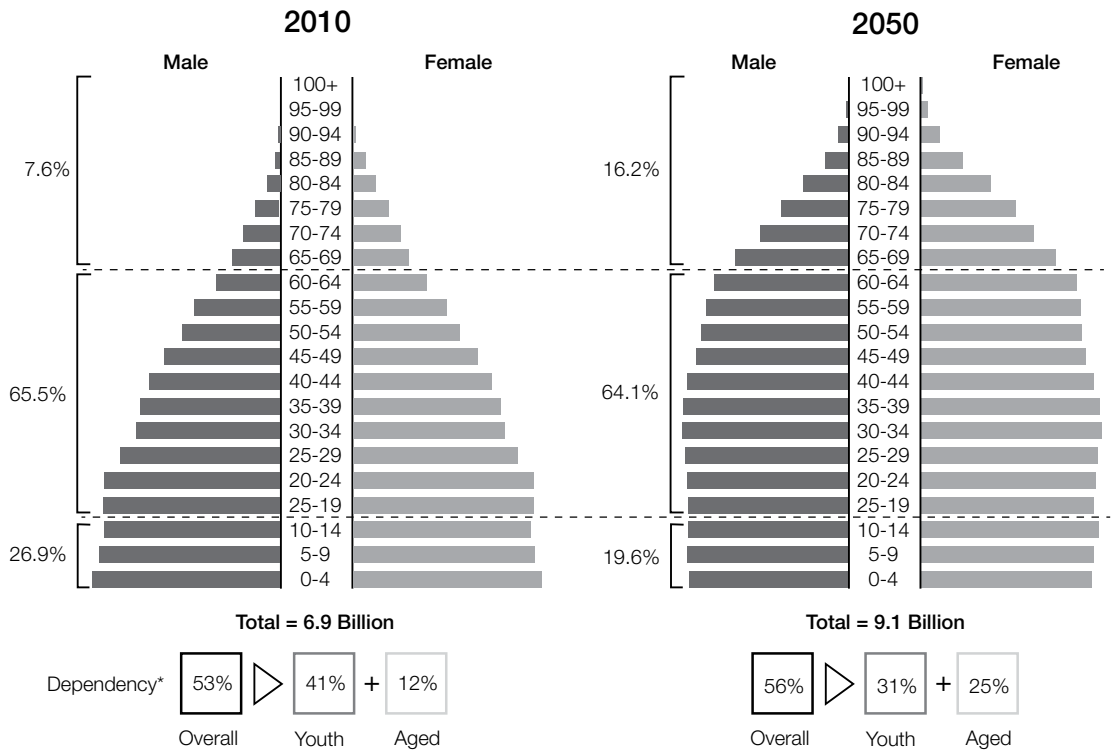
AGING IS GLOBAL

Every country has different economic, political, and cultural drivers that affect its population demographics, creating a unique and ever-shifting balance of younger and older citizens. As lifespans increase and larger generations age (e.g., Baby Boomers in the United States), this balance tilts inherently toward an older population. Despite country-by-country variations, the challenges of how to ensure the health, wellness, safety, and security of an aging population resonate across all geographic boundaries. There are deep personal, societal, and financial impacts. And in all countries, the support systems to meet these challenges remain largely inadequate.

The percentage of aged individuals worldwide will double from 2010 (12 percent) to 2050 (25 percent).

The population is growing, with the aged representing a greater majority

WORLD POPULATION PYRAMIDS 2010 – 2050



*Overall dependency is defined as the sum of the youth and aged dependencies. Youth dependency is the ratio of youth (0-14) to working-age population (15-64), and aged dependency is the ratio of aged (65+) to working-age population.
Source: UN Population Division, *"World Population Prospects. The 2008 Revision"*; Booz & Company analysis

AGING IS LOCAL

Though it's a global challenge, aging is also an inherently local issue. The resources available to an aging person vary from country to country, from city to town. For example, a senior person in an urban or suburban location may have access to greater resources – including healthcare, retail stores, library services, community centers, emergency services, and more. Others in rural settings may have more challenges with transportation and the ability to obtain the same level of support available in a city.

The technology infrastructure will also vary depending on the location. For example, seniors will have different levels of access to broadband, mobile, and other online capabilities.

THE AGING POPULATION IS DIVERSE

We are all individuals – a fact that becomes even more obvious as we age and our defining qualities emerge. Every individual ages at a different pace and begins aging with different skills and habits, preferences and dislikes, health and wealth. Some aging individuals are extremely tech-savvy while others are tech-phobic. For some, aging is a time of extensive involvement with family and community, while others drift into isolation and fear.

The numeric age of a person is not a clear indicator of who they are or what they need. Aging represents a spectrum of abilities and issues, and any attempt to address these challenges must recognize that there is no *one-size-fits-all* approach. And each individual continues to evolve and age at a different rate as they get older. Technology must be personalized and adaptive to their changing needs. It's also a very delicate topic, one that must be approached with great empathy and sensitivity.

THERE IS NO ONE SOLUTION

No one application, device, pill, legislation, or other magic solution can address the diverse challenges raised by an aging population. Dealing with this issue requires a holistic and empathetic approach, one that considers the challenge from every angle – health and safety, lifestyle and happiness, financial security, and beyond. Meeting the needs of the newly dominant senior generation will require new business models, breakthrough collaboration, and an openness to new ways of thinking. Because aging creates so many intertwined challenges, there must be an equally comprehensive and innovative range of solutions.

TECHNOLOGY IS JUST PART OF THE ANSWER

To address the complex and crucial challenges of an aging population requires a major attitudinal shift in the technology sector. Technologists tend to think of people as users. We design devices and applications to meet defined needs and to provide an appropriate user interface and experience. But human needs are complex and not easily met through technological fixes alone. The aging population is not a user group. It's a diverse human, global audience with varying needs, habits, technical abilities, and more. Engaging this audience means leveraging technical innovation *and* human empathy to enhance the *human experience*. Technologists must envision and articulate the real advantages of any emerging technology to diverse individuals, communities, and society – as well as to the marketplace.

After all, plenty of devices – including much-touted smart devices, voice-enabled applications, and more – are already available to this audience. But these technologies only scrape the top of the iceberg of opportunities to address the needs of an aging population. Acceptance isn't automatic – it must be earned by truly addressing core human needs. Not just coming up with the *next big thing*.

COLLABORATION MUST EXPAND RAPIDLY

The range of experts and visionaries necessary to address the challenges of an aging population is remarkably diverse, encompassing individuals and large organizations, technology firms and healthcare organizations, non-profits and governmental agencies, academicians and venture capitalists. The breadth of this list is impressive and daunting. But the bigger challenge is that many of these types of organizations – as well as the individual businesses and other entities within them – have rarely, if ever, collaborated on this scale. Many of the key players in any potential solution exist in silos. These separating walls between important collaborators must break down, and quickly, to ensure the cross-fertilization, seamless collaboration, and breakthrough innovation necessary to envision any solution.

AGING IS AN ONGOING, EVOLVING CHALLENGE & OPPORTUNITY

While we can envision a day when the challenges of aging are addressed better and more thoroughly, they will continue to evolve – requiring an ongoing effort to meet the needs of an aging population. In short, an aging population is a challenge that will never be completely solved. But it's also an opportunity. As people lead longer lives, they also have more years to accomplish their goals, deepen family ties, establish new friendships, and contribute to their communities and beyond.

The variables of an aging population will continually change – demographics, needs, solutions and services, economic conditions, and more. And the players in the aging market will need to be nimble and innovative enough to evolve with that market to address these challenges and meet the opportunities that arise with longer lifespans.

MEETING THE NEEDS OF AN AGING POPULATION

THE AGING POPULATION IS DIVERSE, WITH INDIVIDUAL NEEDS, PREFERENCES, AND PRIORITIES. BUT THE NEEDS OF AGING INDIVIDUALS FALL INTO CORE CATEGORIES THAT WE CAN DEFINE IN BASIC TERMS. IN MANY WAYS, THE DESIRES OF THIS POPULATION MIRROR THOSE OF A YOUNGER POPULATION, BUT OVER TIME, THEY BECOME MORE DIFFICULT TO ACHIEVE.

What do aging individuals want?

The classic eight Activities of Daily Living are defined as the ability to eat, dress, bathe, groom, use the toilet, get out of bed, get out of a chair, and walk. All without aid, of course. Physicians, geriatric counselors, and others use this list to evaluate basic physical independence. A more sophisticated, updated list that addresses more than just physical aspects of living might include the ability to work, shop, prepare food, maintain housekeeping, do laundry, manage medications, meet friends, exercise, make phone calls, travel, and handle finances.

However, these are activities that happen on the surface of day-to-day life. The core desires of an aging population can be distilled down to these essential aspects of an independent life:

Health

- Access to high-quality healthcare and services
- Active aging that encourages physical/cognitive health
- Mobility

Connection

- Staying connected with family, friends, and associates
- Freedom from loneliness and isolation
- Remaining in the home and community for as long as possible, if that is the preference
- To be relevant and productive, still working and earning (a growing trend)
- Personalized and adaptive digital access to online resources and friends/family

Security

- Protection against theft and financial fraud
- Personal safety in the home
- Quick access to emergency services

Dignity and Independence

- Respect from family, caregivers, and society
- A balance between privacy and the need for support
- Making decisions and exerting control over the direction of their lives

MAPPING THE TERRITORY

MEETING THE NEEDS OF AN AGING POPULATION INVOLVES A COMPLEX ECOSYSTEM OF DIVERSE GROUPS LINKED BY INTERPERSONAL AND COMMERCIAL CONNECTIONS. AT THE CORE ARE AGING INDIVIDUALS AND THEIR FAMILIES, THEIR INFORMAL CAREGIVERS (OFTEN DAUGHTERS OR SONS), PROFESSIONAL CAREGIVERS, AND OTHER RESOURCES. BEYOND THIS CORE IS THE LARGER MARKETPLACE OF PRODUCTS, SERVICES, SUPPORT ORGANIZATIONS (E.G., AARP), AND OTHER CREATORS OF OFFERINGS DESIGNED TO MEET THE NEEDS OF THE AGING. THESE TWO AREAS ARE INTRICATELY LINKED AND DEPENDENT, BUT VERY DIFFERENT.

A dual ecosystem

In a way, we can think of the aging ecosystem as two interrelated but separate sub-ecosystems – like two hemispheres of the earth. For simplicity, we'll call them the Personal Ecosystem and the Provider Ecosystem.

The Personal Ecosystem

The Personal Ecosystem encompasses the aging individual and the people around them – family caregivers, friends, community connections, and beyond. This area is as individual and singular as a fingerprint, defined by the life and desires of the aging individual. They may have a broad support network, or no one available. They may have plenty of capabilities (health, attitude, finances) that serve them well when aging, or they may need wide-ranging assistance. One fact remains clear, however – the burden of care in the personal ecosystem often falls to a daughter or son, who may or may not have other resources available and who is often balancing their parents' care with other responsibilities, including career and children.

Generalizing about the people within the Personal Ecosystem is impossible, since they are diverse and singular, with varying (and conflicting) needs and wants, which evolve over the arc of aging.

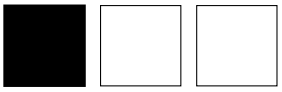
- **The aging individual**

Active, worried, wise, confused, lonely, fearful, relevant, ready for change, engaged, isolated, tech-savvy, frustrated by gadgets, working, retired, traveling, staying close to home, excited about the future, living in the past, starting new projects, learning, forgetting, meeting new people, saying goodbye

Recent research by AARP[2] found that among people cared for by family members:

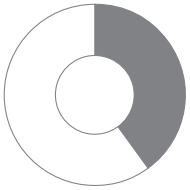
Three in five have a long-term physical condition

One in three have a short-term physical condition



One in four have a memory problem

Almost 40 percent have more than one ongoing problem or illness



[2] *Caregiving in the U.S.*, 2015, AARP Public Policy Institute, June, 2015.

• **Daughters, sons, and other family caregivers**
Overwhelmed, financially stable, financially strapped, glad to step in, burdened by responsibilities, unable to get help, alone, working with siblings, part of a team, frantic, calm, fueled by guilt, patient, frustrated, reaching out, looking for answers, using technology, afraid of technology, daunted by paperwork

According to another AARP report,[3] there are fewer available family caregivers to shoulder the responsibility and burden of caring for aging family members.

2016

7:1

The ratio of available caregivers between 45 and 64 to care for recipients 80+ years old.

2030

4:1

Due to demographic shifts, this ratio drops dramatically, triggering a need for new approaches to caregiving, including proactive services and prevention-driven self-care tools.[4]

[3] *The Aging of the Baby Boom and the Growing Care Gap: A Look at Future Declines in the Availability of Family Caregivers*, AARP Public Policy Institute, August, 2013.

[4] *Active Aging Study*, Consumer Technology Association, 2016.

The Provider Ecosystem

The Provider Ecosystem includes all of the many organizations and other stakeholders that create, market, and provide solutions and services that help aging individuals and their supporting caregivers meet their specific needs and wants. These groups are wildly diverse, including:

- **Professional Care Providers** work directly with aging individuals and their families. These include hospitals, physicians, physical therapists, pharmacists, social workers, trained home aides, and other non-family caregivers.

- **Active Aging Solution and Service Providers** support aging individuals. These include commercial organizations that offer solutions or services that enable *safety and smart living, health and remote care, and wellness and fitness*. For these players in the ecosystem, an aging population is an opportunity to address a pressing societal need, as well as to explore an important, potentially profitable market. After all, an aging population will generate business opportunities of $279 billion by 2020, in the United States alone.

- **Consumer Products, Retail, Travel and Entertainment Providers** deliver new, effective ways for an aging population to buy and use their solutions and services – recognizing the unique needs of this market segment.

- **Non-profit Organizations and Associations** (e.g., AARP) advocate for and provide wide-ranging aid to aging individuals.

- **Policymakers and Regulators** respond to the needs of this growing demographic by ensuring that aging individuals are being treated fairly as citizens and consumers.

- **Local/State/Federal Agencies** provide varying levels of support to aging individuals.

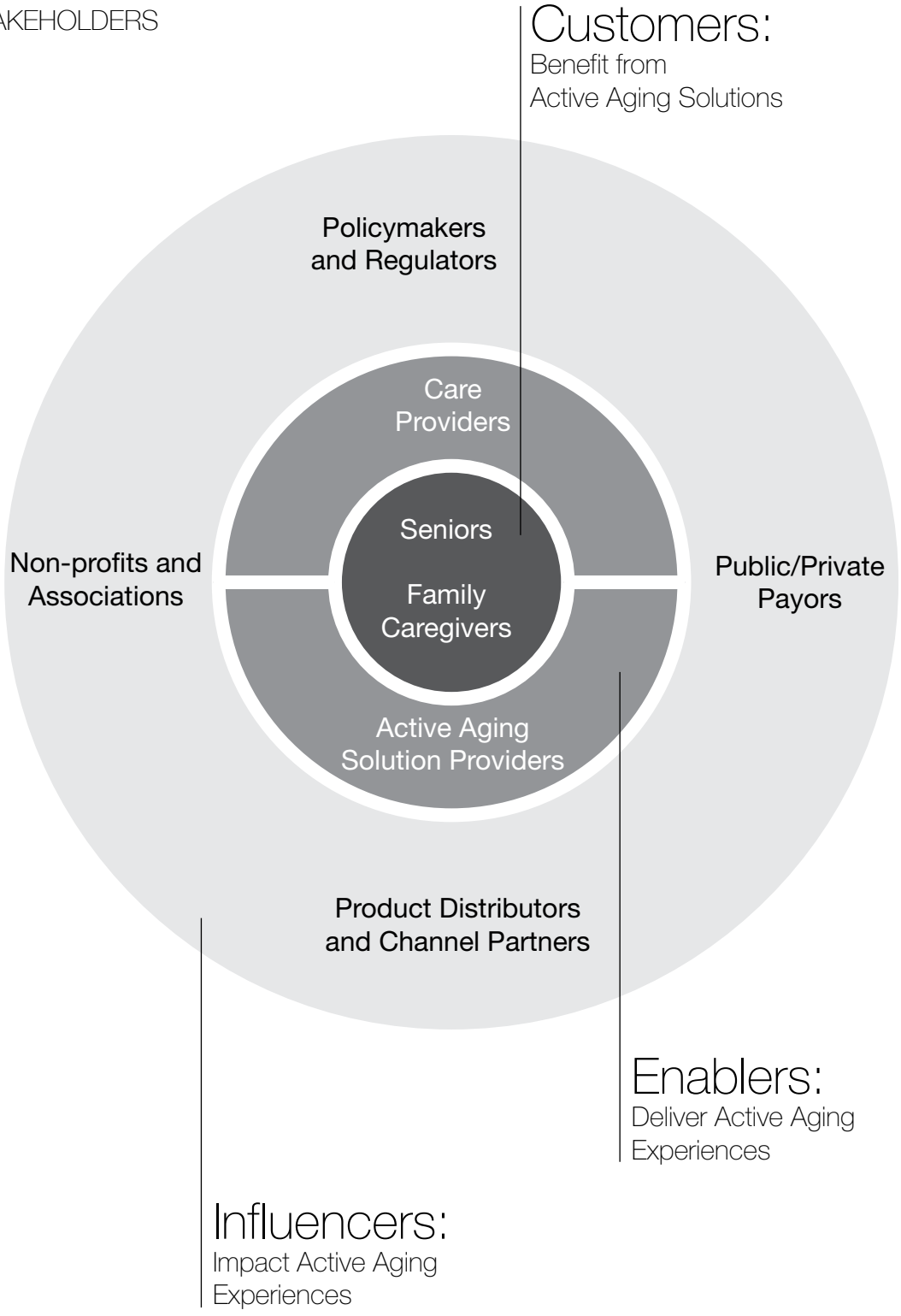
- **Financial Services** control the financial underpinnings of the aging economy by providing insurance and other instruments that support the aging population. Beyond that core capability, this group also plays a critical role in protecting seniors against fraud, and advising them how to invest and leverage their assets to support themselves over their lifetime. New services can make it easier for seniors to monitor accounts, share information with selected caregivers, and utilize other capabilities that simplify, streamline, and strengthen the ability of seniors to handle their finances.

Opportunities for real innovation and collaboration

In a market economy, meeting a pressing need with a new, compelling service or solution is often rewarded with market success and profits. Clearly, there are many pressing needs within the aging community – the Silver Economy, as some call it. Meeting them will require a clear-eyed exploration of these needs, varying by geography, demographics, and more. In short, typical methods of exploring new markets may not apply here in this much different context.

An aggressive (or worse, rapacious) approach to this marketplace would be counter-productive, given its sensitive, delicate nature. Instead, disparate groups must collaborate to find the right approach – one that protects

ACTIVE AGING ECOSYSTEM
AND ITS STAKEHOLDERS



Source: *Active Aging Study*, Consumer Technology Association, 2016.

privacy, respects abilities, and delivers solutions in a way that makes a real difference in the lives of the aging.

To convey an idea of the scope of the players involved, the Provider Ecosystem includes healthcare providers, the nursing home industry, insurance groups, telecoms and digital services providers, a full continuum of technology organizations (focused on devices, sensors, applications, data, services, and more), banks and financial services providers, the retail sector, the FDA and other regulatory groups, politicians and policymakers, and many, many more.

Cross-pollination and collaboration within this remarkably robust Provider Ecosystem will result in remarkable innovations that serve the aging population and address some of the pressing challenges of an aging population.

We are just beginning, of course. As we move ahead, we will need new levels of collaboration, visionary leadership, new business models, and major leaps in innovation.

What is still needed from the Provider Ecosystem?

Many organizations in the Provider Ecosystem are already serving the aging population. However, these solutions are not coordinated, personalized, integrated, or at scale. At best, there is a growing constellation of point solutions – but not connected or delivered in a way that brings high-value support, knowledge, or innovation to aging individuals or their caregiving networks.

Consider the "elder daughter/son" model of caring for the aging. What does that crucial caregiver do that the Provider Ecosystem can create/replace at scale? At a meta level, the elder child:

1. **Acquires data and information** on what the parent needs and wants – by talking to them, observing them, and asking questions.

2. **Interprets this information** – adding in a broader context of other knowledge (information, history, habits) – and makes decisions.

3. **Coordinates** creation, acquisition, and delivery of what the parent wants/needs.

4. **Delivers** the coordinated support/service/solution.

Today, the Provider Ecosystem is strong in solutions that fall into the first category (#1). In market today there are a plethora of devices (e.g., wearables) and point applications, and services that create, collect, and deliver data. The real opportunity for the Provider Ecosystem rests where new technologies, such as cognitive computing (#2) and new partnerships (#3 and #4) come into play.

One of the key goals of our research is to examine how we could replicate the eldest child in a way that would scale. What would be the areas where the marriage of devices, cognitive computing, and providers could have the greatest impact? What would these new solutions and ecosystem of providers look like? These questions and more open the door to some fascinating opportunities.

2.

HOW CAN WE GENERATE NEW IDEAS?

A DIFFERENT APPROACH TO RESEARCH

AS WE CONSIDER DEVELOPING SOLUTIONS FOR THE AGING DEMOGRAPHIC, THERE IS NO STRAIGHTFORWARD PATH OR GUIDEPOST, NO SINGLE END-USER PERSONA OR MARKET SEGMENT, NO UNIFIED SET OF REQUIREMENTS, AND NO DOMINANT CHANNEL. INSTEAD, THERE ARE HUNDREDS, IF NOT THOUSANDS, OF VARIABLES TO CONSIDER, EACH WITH A COMPLICATED NETWORK OF CONDITIONS, DEPENDENCIES, AND POTENTIAL IMPACT ON EACH OTHER. EXPLORING THE CHALLENGES OF AN AGING POPULATION, WE LEVERAGED A HYBRID RESEARCH APPROACH – COMBINING A MORE TRADITIONAL SURVEY WITH A UNIVERSITY-BASED PROJECT DESIGNED TO UNCOVER HELPFUL INSIGHTS AND TO IDENTIFY POTENTIAL SOLUTIONS.

ASKING TOUGH QUESTIONS ABOUT AGING

OVER THE YEARS, THE SOUTH BY SOUTHWEST CONFERENCE HAS GROWN FROM A LOCAL MUSIC FESTIVAL TO A PREMIER GLOBAL EVENT, ATTRACTING A LARGE, TECH-SAVVY AUDIENCE AND SHOWCASING THE LATEST INNOVATIONS IN DIGITAL AND INTERACTIVE TECHNOLOGIES. AS A YOUTH-FOCUSED EVENT, IT IS NOT A PLACE WHERE YOU WOULD EXPECT TO FIND AGING ON THE AGENDA, OR EVEN DISCUSSED.

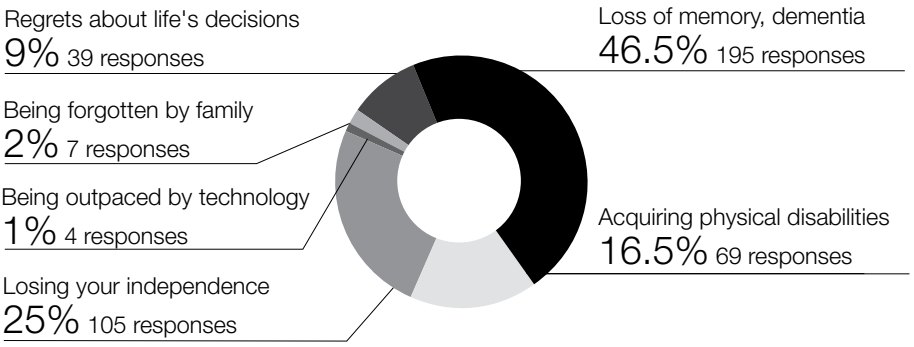
However, at the 2016 event, visitors to the IBM Cognitive Studio were asked to respond to three questions posted to a large wall as they entered the space:

- What worries you most about getting older?
- What emerging technology will help manage the aging process the most?
- What discussions are the most difficult to have with your parents?

Question 1:

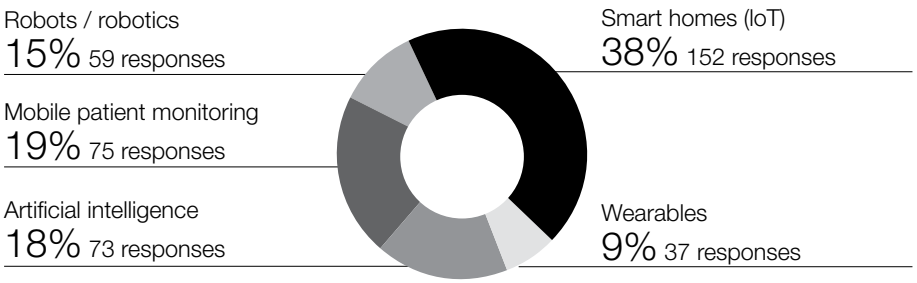
What worries you most about getting older?

Total responses 419



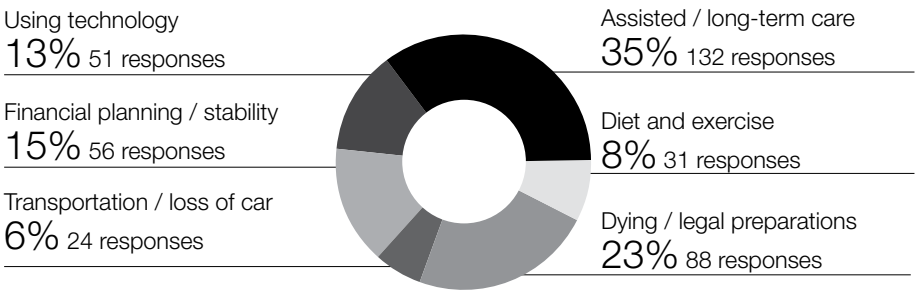
Question 2:

What emerging technology will help manage the aging process the most? Total responses 396



Question 3:

What discussions are the most difficult to have with your parents? Total responses 382



Each visitor was given three sticky dots and asked to place one dot next to the answer they felt best represented their opinion. Of the 1,500 people who stopped by the IBM Cognitive Studio that day, more than 300 responded to the questions and provided additional feedback on the topic – confirming that even among a relatively young audience, aging is a subject of significant interest.

Based upon the high response achieved at SXSW, the same survey was implemented later in March at the International Technology and Persons with Disabilities Conference (CSUN). During the same timeframe, the survey was also distributed and promoted through IBM social and digital media channels, as well as through those of several leading accessibility advocacy partners.

The combined survey results gave us a perspective of both individual and familial concerns about aging, as well as attitudes about the role of technology in the process. This simple survey confirmed existing research but also gave us additional data as we began the process of exploring solutions.

ENVISIONING NEW SOLUTIONS

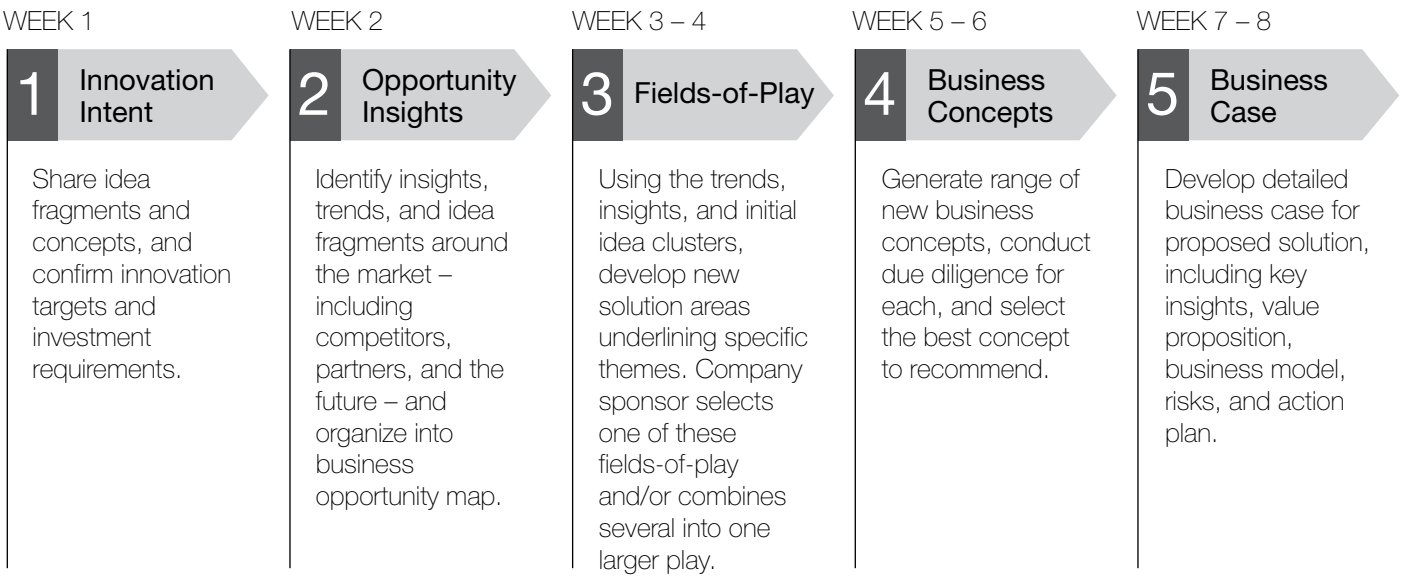
PARADOXICALLY, TODAY'S RAPIDLY AGING POPULATION REPRESENTS ONE OF THE MOST SIGNIFICANT CHALLENGES FACING THE MILLENNIAL AND POST-MILLENNIAL GENERATIONS. AS A COHORT, MILLENNIALS HAVE BEEN RAISED ALMOST ENTIRELY IN A DIGITALLY-ENABLED WORLD, WITH TECHNOLOGY INTEGRATED INTO ALMOST EVERY ASPECT OF THEIR DAILY LIVES. THE EXPLOSION IN SOCIAL MEDIA PLATFORMS AND MOBILE DEVICES FACILITATES THEIR COMMUNICATIONS AND INTERACTIONS. SO WHO BETTER TO ENGAGE TO EXPLORE SOLUTIONS THAT WILL CERTAINLY REQUIRE THE POWER AND INNOVATION DELIVERED BY 21ST-CENTURY DEVICES AND COGNITIVE COMPUTING?

Launching the Outthink Aging Innovation Olympics

In order to engage with millennial thinkers, we turned to the IXL Center for Innovation and Excellence, based in Cambridge, Massachusetts – and with a practice dedicated to helping both start-ups and Fortune 500 companies generate new ideas and business strategies. We selected their Innovation Olympics program, an 8-week guided project that challenges university and business school student teams to leverage their knowledge and skills to solve a real innovation and growth issue.

Each project has 3 - 5 teams of mid-career graduate students from diverse job functions, industries, and countries. These teams are guided through a structured development process supported by IXL mentors and software tools. The early stages of the process encourage collaborative exchange and the crowdsourcing of ideas between the teams, with the teams later competing with increasing intensity to generate the best recommendations. At the end of the program, the top recommendations are selected by the client.

IXL CENTER INNOVATION OLYMPICS



We launched the Outthink Aging Innovation Olympics in February 2016 with teams from Babson, Columbia, Hult, Stanford, and the University of Texas. These teams were presented with the following guidance:

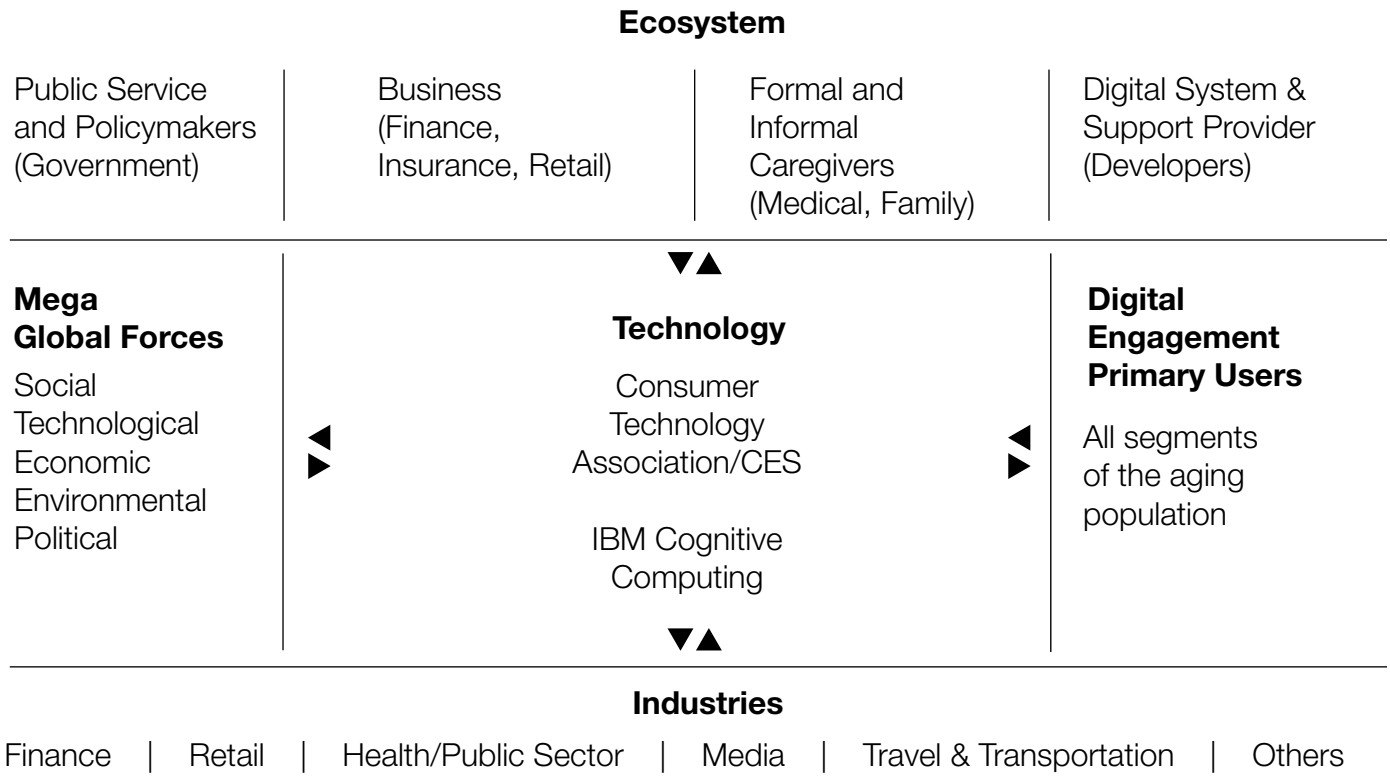
> This challenge is focused on new approaches and business models that leverage the power of cognitive computing to provide data, feedback, and predictive intelligence to significantly improve digital accessibility and engagement for the aging population.
>
> Specifically, we want you to help provide more actionable insights into the needs and drivers of behaviors of these populations in order to find and develop more scalable, sustainable, and financially viable solutions and business models that impact the entire ecosystem of those involved in the care process. These stakeholders could range from government institutions to informal caregivers and should include existing and new players and partners across the value chain.
>
> The ultimate objective is to rapidly enable the aging population segments to have significantly enhanced digital accessibility and engagement that will improve their lives.

Defining the Solutions

We provided the teams with an in-depth overview of the aging landscape, including demographic and population statistics, economic impact data, industry reports, and an outline of the ecosystem partners and providers. The teams were also briefed on the relevant technology – from consumer devices through cognitive computing platforms and solutions.

As the teams moved from the ideation stage to the development of the fields-of-play, they were given the following criteria for the solution areas:

- The solutions must include two core components: consumer devices as well as cognitive computing.
- The solutions must be delivered via a network of ecosystem partners (versus direct to consumer). The teams were highly encouraged to think outside of traditional partner relationships and to identify new potential players.
- The business model supporting the solution must offer the ability to scale at a global level.



Throughout the process, the teams received feedback from both their IXL mentors and the IBM and CTA Foundation project leads. As they developed their solution scenarios, the teams worked through similar challenges:

- Business-to-consumer models currently dominate this landscape and especially with regards to consumer devices. Developing business-to-business or more complicated ecosystem models for this space requires a shake-up of several deep-seated assumptions.

- Cognitive computing solutions are just beginning to appear in market, with clarification needed to differentiate them from big data and analytics.

- Many of the teams confessed they came into this project holding many common assumptions about aging individuals – that they are technology adverse, reluctant to adopt change and limited in capabilities and options. However, as they read through the research, spoke with their own families, and conducted their own studies, they came to a deeper and much richer understanding of the diversity of this market and the impact these solutions could have.

The selected business cases and the top recommendations are presented in the following section.

“WHEN WE SAT DOWN AND JOINED THIS COMPETITION, WE WERE LIKE *THIS IS SOMETHING COMPLETELY DIFFERENT FROM THE PROJECTS WE'RE DOING IN SCHOOL, SO WE'RE MOST EXCITED ABOUT THIS.*

WE'RE SO ENERGIZED BECAUSE IT CAN TRULY MAKE A DIFFERENCE. NOT ONLY WILL IT HELP OUR FRIENDS AND FAMILY, BUT IT'S SOMETHING THAT WE SEE GROWING ORGANICALLY AND CONTINUING TO EVOLVE!"

– Comment from an Outthink Aging Innovation Olympics Participant

3.

WHAT ARE THE KEY FINDINGS?

SHARING OUR RESEARCH IDEAS

THE FOLLOWING RECOMMENDATIONS ARE INTENDED TO INSPIRE MEMBERS OF THE PROVIDER ECOSYSTEM TO EXPLORE THE MANY POSSIBILITIES WITHIN THE SILVER ECONOMY. WHILE THESE RECOMMENDATIONS ARE FAIRLY SPECIFIC, THEY CAN ALSO TRIGGER NEW, CREATIVE SOLUTIONS. SO THINK OF THESE RECOMMENDATIONS NOT AS PRESCRIPTIVE SOLUTIONS, BUT AS IDEAS. BECAUSE ONE IDEA OFTEN LEADS TO ANOTHER. AND MEETING THE CHALLENGES OF AN AGING POPULATION WILL REQUIRE NEW CREATIVITY, EXPANDED COLLABORATION – AND LOTS OF IDEAS.

Recommendation #1

PROVIDE KNOWLEDGE AS A SERVICE

Inspire New Partnerships and Deliver New Insights to Technology Providers and Key Organizations that Serve Aging Populations

NON-PROFIT GROUPS (E.G., AARP) AND AGENCIES WANT TO IMPROVE THE LIVES OF THE MILLIONS OF AGING INDIVIDUALS IN THE UNITED STATES. AS IT STANDS NOW, THESE ORGANIZATIONS CONNECT WITH A RANGE OF INDIVIDUAL PARTNERS (E.G., BANKS) TO PROVIDE SERVICES SUCH AS HEALTHCARE DISCOUNTS, INSURANCE PLANS, TRAVEL BENEFITS, INTELLECTUAL COMMUNITY INVOLVEMENT, AND ENTERTAINMENT. WHILE THE CURRENT MODEL WORKS, IT'S MISSING A MAJOR OPPORTUNITY TO SHARE INFORMATION AND DEVELOP NEW INSIGHTS ABOUT THIS IMPORTANT AUDIENCE/MARKET.

Rather than a one-to-one relationship with a single non-profit or agency, what if partners could tap into a central cognitive computing platform that combines private data, industry data, and public information, uniquely and securely? The availability of large-scale, integrated sets of consumer data, combined with the power of cognitive computing, would enable the development of targeted new offerings and expanded partnerships.

A shared cognitive computing platform could deliver:

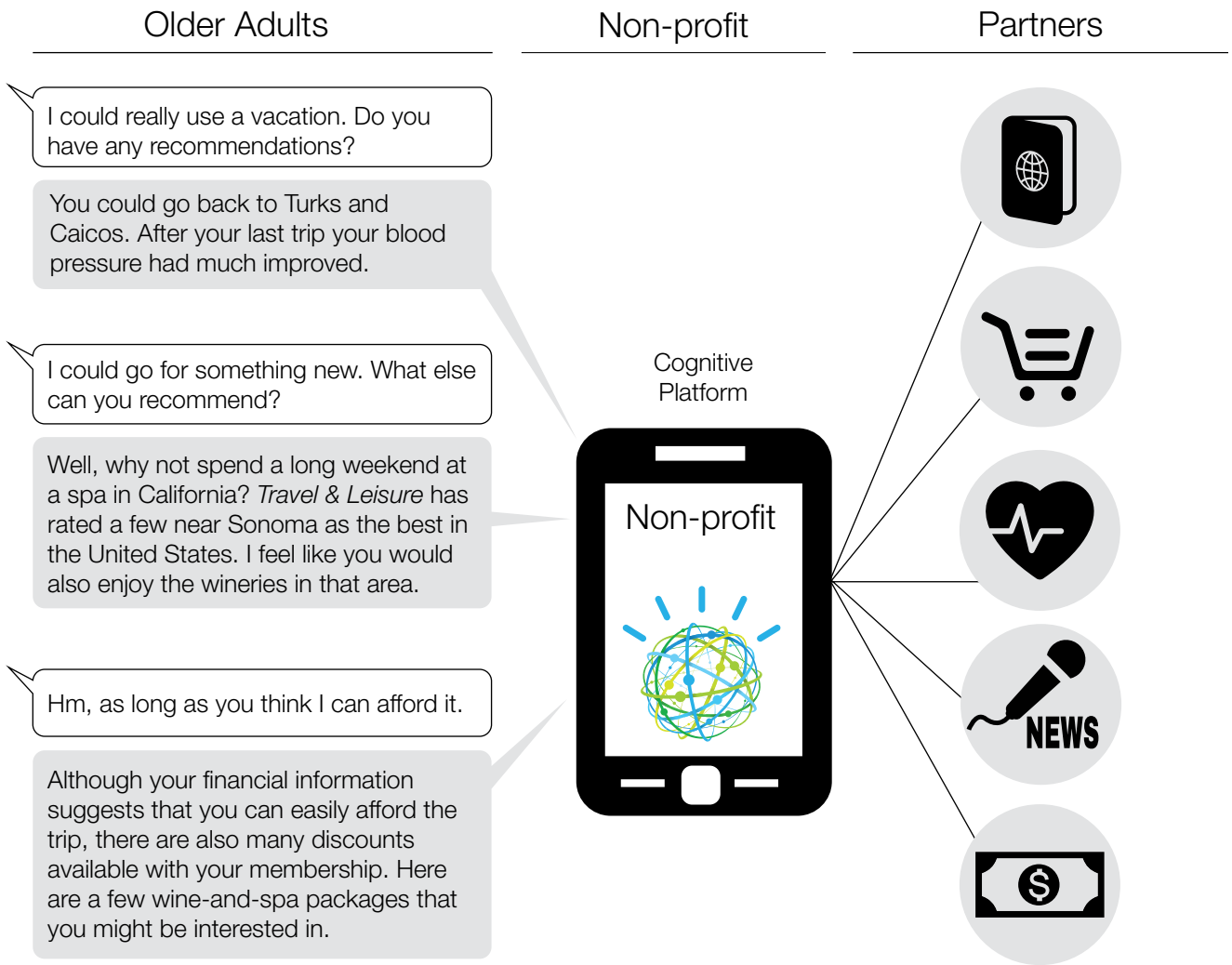
- **Cognitive Interaction.** Older adults could quickly and easily get answers to key questions, with the system learning from each interaction.

- **Analysis of Consumer Data.** Partners gain new insights from large stores of data, information previously siloed in industry repositories (finance, retail, government).

- **Knowledge Mining.** Leveraging the ability of a secure cognitive platform to analyze, detect, learn, and predict, partners get new, streamlined access to deep knowledge.

This list is just the beginning. With the power of cognitive computing to deliver new knowledge, the possibilities are limitless.

KNOWLEDGE AS A SERVICE



Value to the Aging Population:

- **Answers and Information.** Older adults and their caregivers get the answers they need, simply and easily, drawing upon the power of cognitive computing and integrated information.

- **Better Decisions.** With integrated information (instead of raw data) aging individuals and their families can make better decisions, access services they need, and feel more connected, one of the key desires of aging individuals.

- **Easy Interaction.** Expanding and integrating services makes it easy and more pleasant for seniors to find the full range of information and solutions they need.

Value to the Non-Profit Organizations, Agencies, and Other Groups:

- **Better Services.** Cognitive computing allows these groups to provide new, specialized services to their members.

- **A Critical Partnership.** By forging a partnership with a technology partner, these organizations gain a powerful, current solution, one that can expand to meet evolving needs.

- **Insights.** Data collected on user experiences helps these groups make better decisions on how to manage their existing partnerships, and on potential new partnerships.

- **An Attractive Offering.** Collective, integrated market-wide data can be offered to partners as an incentive to join the ecosystem.

Value to Technology Partners:

- **Market Access.** Partners not already serving aging customers can gain access to a growing, profitable market.

- **New Services.** Partners already serving this market can leverage new insights and knowledge to create new offerings and refine existing ones.

- **New Revenue and Business Models.** Partners can leverage knowledge insights to identify potential new alliances and innovative routes to market. “Knowledge as a Service” represents a new transaction-based revenue opportunity.

- **Seamless Collaboration.** New and existing partners can quickly and easily onboard with associations, agencies, and new partners, while still focusing on their existing markets.

The Potential?

New collaboration between technology partners and large associations serving aging individuals represents a unique opportunity to better meet the needs of the aging – as well as a multi-billion dollar opportunity. It leverages the power of cognitive computing to put new knowledge at the fingertips of the entire ecosystem supporting an aging population. And via a broad partner network, its potential is virtually limitless, with many new cross-sector opportunities. Growth of this new ecosystem can improve life for aging individuals, while enabling many players to enter a new, profitable market.

Recommendation #2

CREATE A COGNITIVELY POWERED COMMUNITY

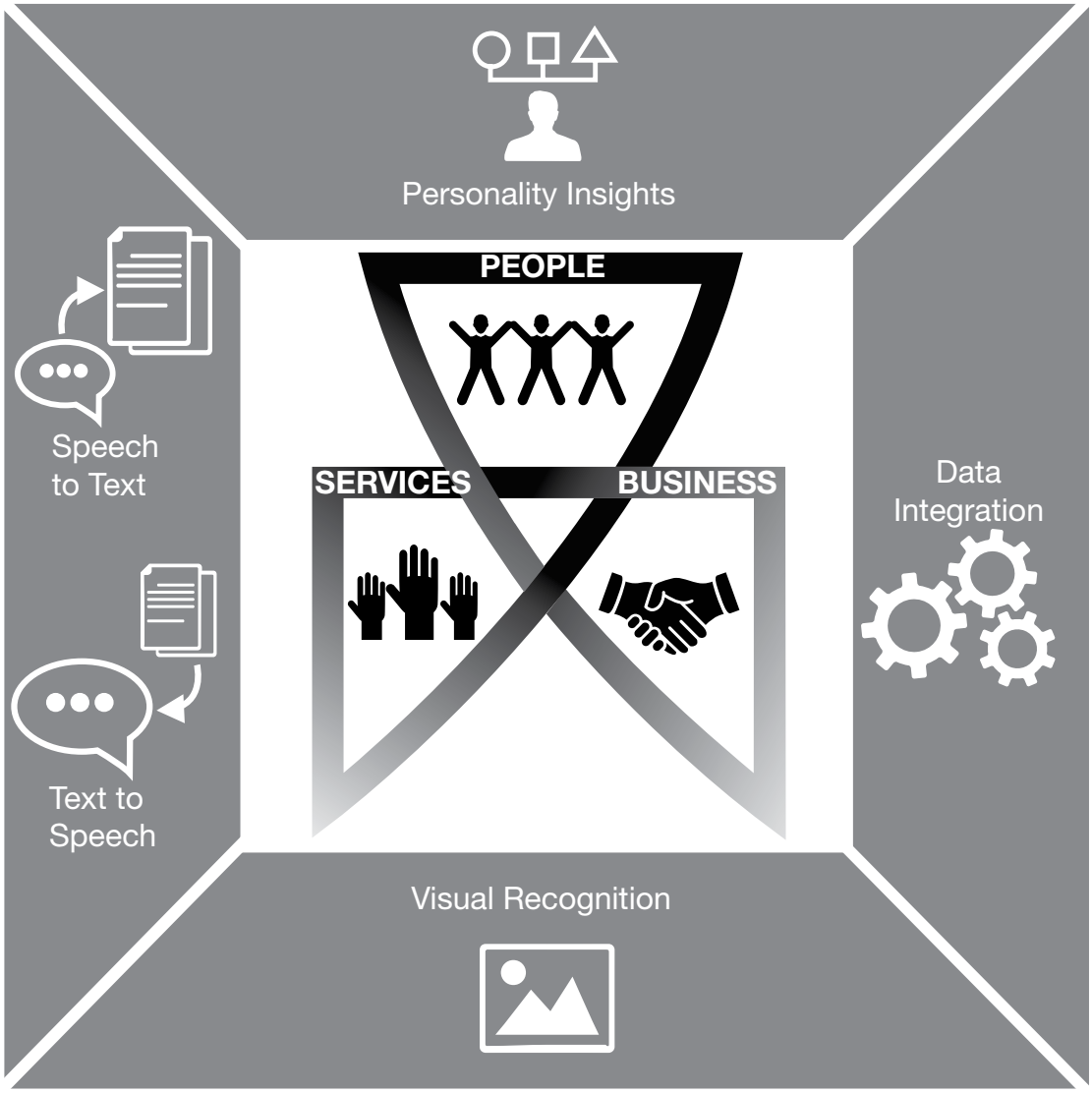
Recreate the Town Square for the Digital Era

AGING INDIVIDUALS WANT TO STAY CONNECTED WITHIN A COMMUNITY, ONE THAT PROVIDES SUPPORT, SERVICES, SOCIAL OPPORTUNITIES, ADVICE, AND MORE. IMAGINE THE OLD TOWN GREEN OR ANOTHER CENTRAL GATHERING SPOT IN A COMMUNITY. WHILE SOME COMMUNITIES ARE LUCKY ENOUGH TO HAVE A CENTRAL PLACE FOR THEIR RESIDENTS – ESPECIALLY AGING INDIVIDUALS – OTHERS ARE TURNING TO TECHNOLOGY TO HELP PROVIDE THAT IMPORTANT SENSE OF CONNECTION.

This recommendation puts cognitive computing at the core of the new "Town Square" – creating a new way of increasing the engagement of the aging population. Serving as an interactive experience platform, this digital community provides more than information – it provides human value by serving as a companion and concierge, provides access to services and support, and could deliver wide-ranging advice, from critical health advice to book recommendations.

Each community has a unique set of factors – libraries, shops, vendors, physicians, and other services that make it home to its members. Leveraging a cognitive platform such as IBM Watson with its standard APIs, any number of entities – cities, towns, agencies, hospital networks, telecommunication vendors, and more – could quickly build a virtual community platform with cognitive capabilities, including language, speech, vision, and data integration. Partners interested in participating in a community could easily plug in their services and offerings, creating a customized, scalable and extensible online experience.

COGNITIVELY POWERED “TOWN SQUARE”



Value to the Aging Population:

- **More Human Connection.** Aging individuals and their families can connect to each other, with others in the nearby community, and with people further afield – quickly and easily.

- **Beyond Answers.** Drawing upon the power of cognitive computing, seniors can easily ask questions and get customized information and advice, which goes way beyond the capabilities of a website, the hub of most current online communities.

- M**ore than a Directory.** Aging individuals can access a set of integrated information and services that help them lead full lives, ranging from home repair to shopping, medical support, educational opportunities, social events, and much more.

Value to the Platform Providers:

- **Powerful Capabilities.** IBM Watson APIs enable developers to quickly build and securely deliver new services that leverage breakthroughs in cognitive computing – including natural language processing, linguistic analysis, personality, data and concept insights, tone analysis, visual recognition, and more.

- **Customizable Solutions at Scale.** Providers can customize the platform to match the needs of individual communities, extend and enhance services currently being delivered to customers, and create solutions that nimbly serve both small groups and large networks.

Value to Technology Partners:

- **Critical Role.** Technology partners who choose to provide solutions in this area provide an important, high-value service – one that can integrate a wide range of applications, devices, and other elements, elevating their value beyond point products.

- **New Markets.** Partners not already serving aging customers can gain access to a growing, profitable market – one that's portable to other communities and geographies.

The Potential?

Isolation is one of the most common fears of an aging population. And while *independence is happiness*,[5] aging individuals thrive by being both independent and connected – to the degree that they prefer. By creating a robust community supported by cognitive computing, technology providers can help create a new level of connection and community – one that augments the resources and support currently available. Whether applied to a geographic area, a traditional elderly community, or an apartment building, a digital town commons goes far beyond the current traditional notion of an online community – bringing many benefits to aging individuals.

[5] Susan B. Anthony

Recommendation #3

PROTECT OLDER ADULTS FROM FINANCIAL FRAUD

Use Cognitive Computing to Prevent Elder Fraud

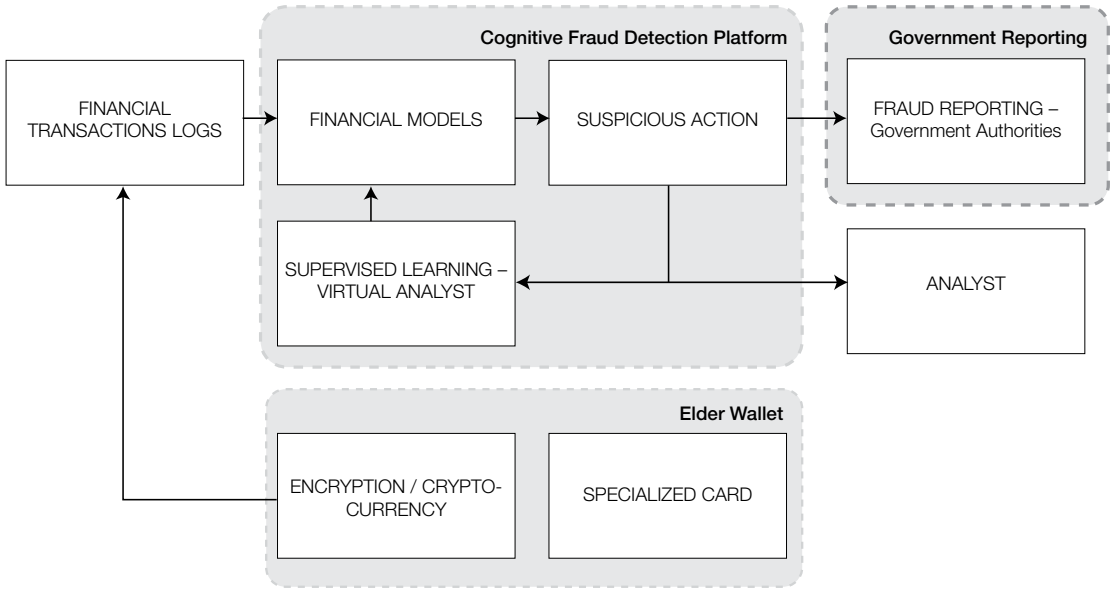
BEING TAKEN ADVANTAGE OF FINANCIALLY IS ONE OF THE MAIN FEARS OF AGING INDIVIDUALS AND THEIR FAMILIES, AND THE AGING DEMOGRAPHIC HAS PROVEN TO BE AN IRRESISTIBLE TARGET FOR FRAUDSTERS. OLDER ADULTS WANT PROTECTION FROM THEFT AND FINANCIAL FRAUD. HOWEVER, MOST FRAUD MANAGEMENT SYSTEMS AND SOLUTIONS ARE DESIGNED FOR A GENERAL POPULATION, NOT AN AGING POPULATION – DESPITE THE FACT THAT SENIORS ARE MORE VULNERABLE.

Fraud management systems today leverage manual, rules-based engines with limited real-time heuristic analysis. The transaction data is also typically limited to and by individual financial institutions or instruments, which constrains the ability to flag transactions deviating from a standard or set threshold. But what if there were a platform that could monitor, detect, prevent, and learn from fraudulent activities, designed specifically for aging individuals?

Using a cognitive platform, banking and investment institutions could integrate existing financial models – together with market data, government and regulatory agency reporting, and also monitoring of seniors' financial transactions – to build a comprehensive financial persona for elderly individuals. This persona would define *how they spend, how they purchase, what they do, and what kind of fraudulent activities are happening* – all critical information that can feed back into the financial model and fraud detection systems, continuously and instantly.

Taking this idea a step forward, this knowledge can be used to develop a virtual wallet for the elderly. An Elder Wallet, or crypto-currency, could be used through specific cards or devices protected by chip or biometric security features, offering secure purchasing with participating companies – including retailers, utilities, and other vendors.

FINANCIAL PROTECTION



Value to the Aging Population:

- **Protection and Ease of Use.** Recovering from an incident of fraud or identity theft is a long, complicated process. Creating a solution designed specifically for the aging population ensures that it is adopted, widely used, and effective – protecting older adults from the potentially devastating risk of fraud.

- **A Virtual Wallet.** By establishing a network of partners that support a virtual wallet designed for an aging population, solution providers can ensure that vulnerable older adults are protected while making purchases.

Value to Financial Institutions:

- **Enhanced Fraud Detection.** Existing fraud management solutions look for anomalies and deviations, fraud-detection methods that seem primitive in light of sophisticated AI and cognitive computing capabilities. With these new capabilities, financial models and fraud detection systems can continually learn and adapt to new threats to specific populations.

- **Expanded, Trusted Relationship.** As this demographic grows, the ability of financial institutions to meet its specialized needs will become a major differentiator. Fraud management is just one of a full array of financial offerings that banks could offer to older individuals.

Value to Technology and Service Providers

- **Untapped Market.** Currently there is no comprehensive financial platform that offers a solution for older adults that provides full fraud detection or protection, from point of purchase to banking and asset management. Providers entering this space have a first mover advantage, with a large and rapidly growing market with a clearly defined, critical need.

- **New Services, Less Risk.** Using the integrated data and analytics, standard APIs, security, and learning capabilities of a cognitive platform such as IBM Watson, providers can quickly create new services and new solutions – at far less risk, to both themselves and their older customers.

The Potential?

Securing savings and investments while creating a better, safer channel for making purchases remains a strong, unmet need for an aging population. And fraud is a major risk for aging individuals and their families, who often discover the theft after it's too late to take quick action. By creating a platform that enables seniors to conduct risk-free transactions, banks and technology providers help protect assets, reduce risk, and identify threats before fraud happens. Plus, they strengthen trust with loyal customers and market base, which can lead to new business and enhanced revenue streams.

Addressing the many issues that older individuals face when dealing with money – earning, spending, saving – is a critical challenge. Solving it requires sophisticated cognitive computing capabilities that go far beyond the solutions now available. In short, this area is awaiting innovation and collaboration.

4.

HOW DO WE MOVE AHEAD?

A CHALLENGE TO THE BROADER ECOSYSTEM

IBM IS NOW – AND WILL CONTINUE TO BE – COMMITTED TO PLAYING A PIVOTAL ROLE IN ADDRESSING THE CHALLENGES OF AN AGING POPULATION. THE CHALLENGE IS TO THE LARGER ECOSYSTEM: TO STOP LOOKING FOR THE NEXT GADGET, APP, OR OTHER EASY SOLUTION, AND TO COLLABORATE AND ENGAGE AT A HIGHER LEVEL. TOGETHER, OUR JOINT EFFORTS CAN DELIVER INTEGRATED, TECHNOLOGY-BASED SOLUTIONS THAT ADDRESS THE LARGER AND MORE COMPLEX ISSUES – AND SIGNIFICANTLY IMPROVE THE LIVES OF THE AGING POPULATION.

- **We Have an Enormous Opportunity, Despite Big Challenges.** The aging market is an enormous opportunity, and the rewards (both altruistic and commercial) will be great to the players who can successfully develop and deliver solutions.

- **No Quick Win.** This is a highly complex market due to many factors – large age span, different government/health/community models, different levels of technology adoption, and different infrastructure available. As pointed out earlier, it's also ever-changing – there is never an "end of job" state. It will also never be served as a business-to-consumer or business-to-business model – rather, it's an ecosystem (elderly, family, caregivers, community)-to-ecosystem (device manufacturers, hospitals/point of care, banks, retail, others) solution model.

- **It's Going to Take a Village.** This ecosystem-to-ecosystem model doesn't exist yet and it is going to be a challenge to build. It's going to require a set of strong players with a combination of unique strengths – vision, new technology, leverage with multiple potential partners, and an appetite for risk.

- **Large Scale, Individual Customization.** Scale and customization are two often contradictory, but essential criteria to succeed in this market. The ecosystem-to-ecosystem model needs to scale to deliver solutions to a large population. At the same time, it has to adapt to different geographical/country/local models and regulations, as well as be personalized and adaptive to an individual's specific needs.

- **Knowledge Will Truly Be Power.** Gaining knowledge, sharing knowledge, and generating knowledge are at the crux of this new ecosystem model.

- **Technology Must Deliver Meaningful Results.** Mass aging is a process that affects hundreds of millions of people, including Baby Boomers, a critical demographic that is more digitally savvy than previous generations. As a consequence, this key group will (ideally) be more prepared to play an active role in sharing data and taking advantage of the benefits of platforms that optimize time, resources, and knowledge. But they will also be more selective and discerning when approached with new solutions. Their evaluating criteria will go far beyond the traditional qualities of *price and performance* – instead, adopting technology will become a complex issue affected by multiple factors.[6] The wise integration of technology into core aspects of life requires a holistic view of wide-ranging human factors, as well as detailed knowledge of the needs and wants of aging individuals, who do not fit the typical definitions of technology users.

In short, all participants in charting the future of aging must balance the urge to take advantage of significant opportunities with the need to collaborate, create new business models – and meet the diverse and complicated needs of an aging population. Only then can we make progress using technology to improve the lives of older adults – an issue that will only become more pressing in the near future.

[6] *User-Centered System Design in an Aging Society: An Integrated Study on Technology Adoption*, Chaiwoo Lee, May 23, 2014.

WHAT'S NEXT?

OUR JOINT EXPLORATION OF THE CHALLENGES AND OPPORTUNITIES CREATED BY AN AGING SOCIETY IS JUST BEGINNING. NEW RESEARCH, ACADEMIC AND PROFESSIONAL CONFERENCES, BURGEONING ONLINE COMMUNITIES, AND DISCUSSION AND DEBATE WILL HELP LEAD US TO NEW APPROACHES AND, ULTIMATELY, RELEVANT AND POWERFUL SOLUTIONS. AS WE MOVE AHEAD, PLEASE JOIN US AND BE PART OF THIS FASCINATING JOURNEY.

To Learn More:

- IBM Aging Initiative - www.ibm.com/able
- CTA Foundation - www.CTAFoundation.tech
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