WHITE PAPER SERIES

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AGING POPULATIONS

The Role Of Venture Capital In Supporting The Industry

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OVERVIEW

True North, a Canadian impact investing firm, has launched its first fund focused on Digital Health and Wellness in February 2021. The fund focuses on three key areas marked by strong investment activity and potential for wide-reaching impact: aging populations, women's health, and behavioural health. These address the United Nations Sustainable Development Goals #3 (good health and well-being), #5 (gender equality), and #10 (reduced inequalities) (True North Impact Investing, 2021). This whitepaper is part of a three-part whitepaper series by True North about the above-mentioned investment areas. To learn more about True North's predictions about the future of Age-Tech and how we connect investor capital with impactful ventures around the world, please contact Fund Manager, Kai Chen (kai@truenorthimpact.com).

INTRODUCTION

The COVID-19 pandemic has exposed gaps in our long-term care industry which will only worsen as the annual growth rate for the elderly population (referred interchangeably in this paper as aging population), defined as people aged 65 and older (OECD, 2021), continues to outpace that of all other age groups (Woods, 2019). As a result, there is a unique opportunity to support the aging population with technology-enabled solutions, such as digital health technologies, which have rapidly advanced since the beginning of the COVID-19 pandemic.

PART 1

AN AGING POPULATION

HISTORY OF THE ISSUE

Since the mid-1800's, two significant occurrences have changed the dynamic of the aging population. The first was the advancement of medical technology which enabled people to live longer and thus contributed to the steady growth in the life expectancy rate. The extension of people's lives, however, was not necessarily matched by an enhancement of quality, as technological advancements across a number of sectors and poorer diets promoted a more sedentary lifestyle and negatively impacted the health of people as they grew older (Vivify Health, 2020).

The second occurrence was the replacement of the extended family — children, parents, grandparents, aunts and uncles living in the same household — with the nuclear family, as defined by a couple and their dependent children. Following WWII, the likelihood that children would move far away from their parents to find better opportunities increased, which left elderly to fend for themselves or hire professional caretakers (Vivify Health, 2020).

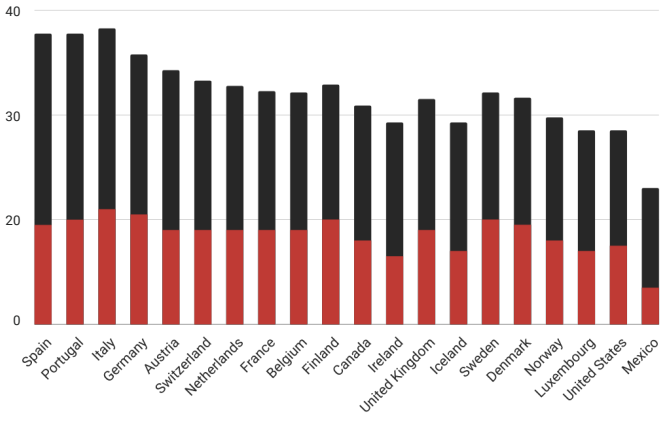
LANDSCAPE OVERVIEW

Today, the high growth rate of aging populations around the world speaks to the importance of this issue. It is estimated that by 2050, 25% of people living in Europe and North America will be aged 65 years or older (United Nations, n.d.). In the US specifically since 2011, 10,000 Baby Boomers have turned 65 years old every day (Rock Health, 2020) and this will continue until 2030, when those over 65 years old will number 75 million, almost double what it was in 2008 (Kuffel, 2019). As these statistics suggest, the aging population is the fastest growing demographic group, with an annual population growth rate of 2.5% (Woods, 2019). However, the rate at which individual countries' populations age varies. For example, Figure 1 shows that, although all populations of the listed countries are aging, by 2050 nearly 40% of the total population in Portugal and Spain will be over the age of 65 while the United States and Mexico's higher fertility rates and influx of migrants will lead to a smaller increase of elderly people in their total populations (OECD, 2017). As such, some countries will be disproportionately impacted by the challenges associated with today's aging population if solutions to properly care for the population are not widely adopted.

By 2030, Canada is expected to have almost 20% of its population over the age of 65, an increase of 3.5 million from 2014 (Government of Canada, 2014). This will increase the pressure on health care spending and other services for the elderly. By 2040, a staggering 71.4% of total healthcare spending will be spent on care for the elderly population, up from 45.7% in 2019 (Globerman, 2021).

The overall aging economy in the U.S. and Europe has grown as a result of the rapid increase in the aging population, a shortage of caretakers, the effects of COVID-19 on long-term care and the increased demand for innovative, high-quality healthcare solutions. Respectively, the American and European aging economies have been sized at $7.6 trillion and $4 trillion (Woods, 2019). This market sector will only continue to increase as the demand for healthcare solutions similarly increases. With this growth comes the opportunity to improve the care of the increasing elderly population while reducing the associated costs through digital health technology.

Figure 1: Share of the population aged over 65, 2015 and 2050



Source: Adapted from OECD Health Statistics 2017, OECD Historical Population Data and Projections Database, 2017.

CHALLENGES OF THE GROWING AGING POPULATION

As the aging population grows so do the challenges associated with adequately caring for this demographic. Such challenges include the shortage of caregivers, the lack of affordable long-term care, and a growing chronic disease burden. The shortage of caregivers for the aging population is projected to worsen significantly in the next 30 years. It was estimated that each American over the age of 80 has about seven caregivers today, but as Baby Boomers (born between 1946 and 1964) reach 80, American Baby Boomers will have access to just three caregivers by 2050 (Intiago, n.d.). The decline is a result of lower marriage rates and fewer children, meaning that there is a smaller pool of possible caregivers in an elderly person's family. As the number declines, so too will the quality of care as these caregivers are not always available due to the demands of modern life, such as balancing childcare with a career. The pressure on caregivers will continue to grow as 50% of the professional caregiving workforce is leaving the workforce each year and there is a shortage of people entering it (Intriago, n.d.).

A second challenge is the cost of care and access as many middle-income seniors will not be able to afford long-term care. As seen in Figure 2, for an individual of retirement age or older, the reported total costs of long-term care can equate to between one-half and five times the median of their disposable income (OECD, 2020). Unless the majority of the elderly population has savings from which they can draw, the majority would not be able to afford long-term care. On top of that, while long-term care facilities are often unaffordable, there is also a long wait time for people who prefer to receive care at home (Rock Health, 2020). COVID-19 has accelerated the desire for care at home, also known as aging in place, which has led to a 15-year low in senior housing occupancy (Rock Health, 2020). Despite the increasing desire for aging in place, older adults still perceive barriers to doing so: in a survey done by Rock Health (2020), 29% of Americans fear that they will not be able to afford to live at home, possibly due to the rising cost of in-home care (Johnson & Wang, 2019), and 24% believe that their homes are not suitable places in which they can stay.

A third challenge is the high incidence of chronic disease in older adults. In the U.S., 66% of individuals on Medicare have at least one chronic illness (Longyear III, 2020). Chronic illnesses, such as heart disease and diabetes, can make staying mobile and maintaining the activities of daily living very challenging for the elderly population. Moreover, chronic illness is now responsible for 75% of total healthcare costs in North America (Snowdon, 2020), highlighting the significant impact it has on the system. This will only worsen as new therapies for chronic diseases have high costs and current health systems are not designed to cope with the growth in demand for chronic illness care. Until new business models that can adapt to the changing healthcare environment are developed, many of the life-saving therapies will be unaffordable and inaccessible to those that need them (ibid.).

If solutions to these challenges are not developed and implemented, the costs of caring for the elderly population may negatively impact government spending and taxes, as well as the wider economy. As people get older they could become prone to chronic illnesses or other diseases related to aging if they do not remain active (BBC, 1999), straining

government budgets as the costs of health and retirement programs and pension funds for elderly people grow. To pay for these programs, governments rely on income from taxes. However, as the number of tax-paying individuals in the labor force declines and the aging population increases, it will become difficult for governments to continue to provide support (Kim, Sirivunnabood & Yoshino, 2019). In the U.S, federal spending is projected to climb from 21.6% of GDP in 2022 to 31.8% by 2051 largely due to spending on healthcare and retirement programs for the elderly. However, revenue projections for the same period of time range from being 4.3% to 13.3% less than projected federal spending, thereby pushing the national debt to historic levels even in a post-COVID world (Peter G. Peterson Foundation, n.d.). As a result, governments may need to borrow money to pay for these programs which may lead to a decrease in funds for private capital investment (Lee & Mason, 2017), an increase in taxes, or a reduction in program benefits.

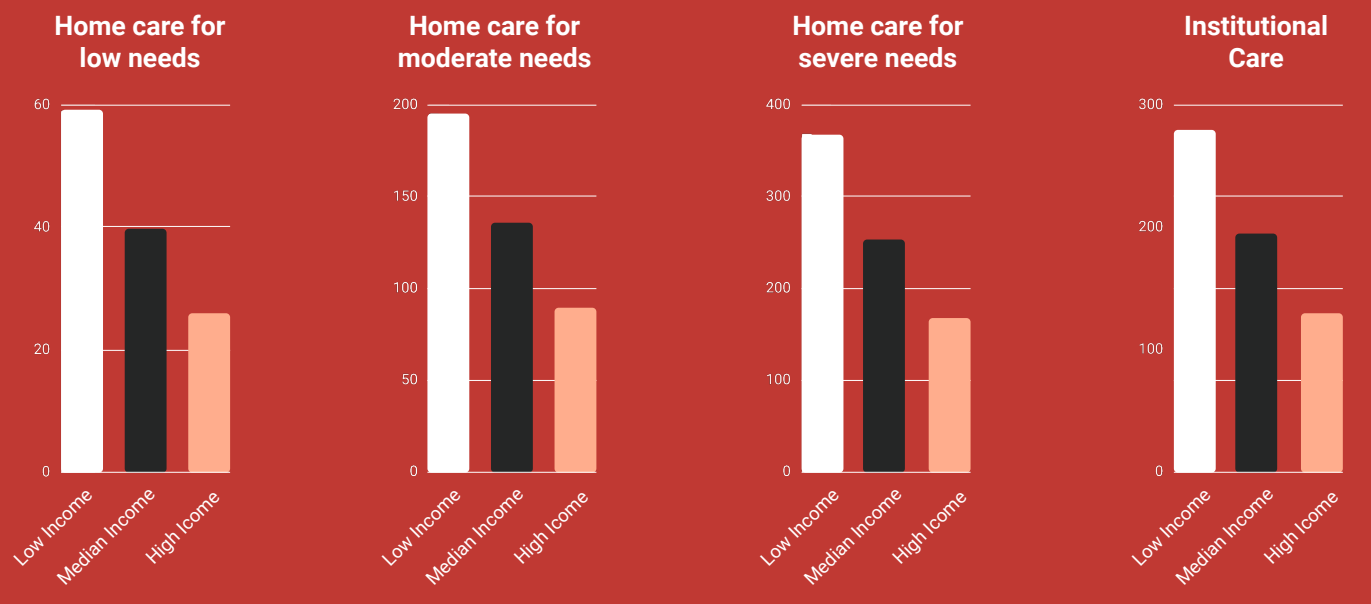


Figure 2: Total costs of long-term care as a share of over-65s' disposable income, in different settings and for different levels of needs, averaged across 26 jurisdictions in the Organisation for Economic Co-Operation and Development (OECD) and EU

Note: Bars show averages for 26 jurisdictions in the OECD, which includes the US and Canada, and the entire EU. According to OECD (2020, pp.1), "low income refers to the upper boundary of the 20th percentile, and high income to the upper boundary of the 80th percentile. Low, moderate and severe needs equate to 6.5, 22.5 and 41.25 hours of care per week, respectively and the costs of institutional care include the provision of food and accommodation."
Source: (OECD, 2020)

PART 2

DIGITAL HEALTH & AGING POPULATIONS

OVERVIEW OF DIGITAL HEALTH AND AGE-TECH

There is no firmly established definition of 'digital health'. This umbrella term has been variously described as encompassing, "tools that facilitate the electronic or mobile collection and analysis of data… to inform health care decision making", (AdvaMed Center for Digital Health and CapView Strategies, 2020) and the, "organization and delivery of health services and information using the internet and related technologies", (Beasley and Fischer-Sanchez, 2021).

Digital health tools are likewise diverse in nature, and they include integrated software devices, mobile apps, sensors, clinical support software, AI technology, and wearables (AdvaMed Center for Digital Health and CapView Strategies, 2020).

The merits of using digital health tools have been largely recognized; it has been said that using innovative digital health solutions will allow for the individual needs of an elderly person to be met no matter their environment (Bayer AG, 2021).

In January 2016, the World Economic Forum (WEF) identified four emerging themes within the digital health landscape: smart care; care anywhere; empowered care; and intelligent health (World Economic Forum, 2016). These themes, the WEF opined, “will be of crucial importance to the digital transformation of healthcare over the next decade”, (World Economic Forum, 2016). According to the WEF, care anywhere refers to the ability of digital health technologies, specifically connected home and virtual care, to move the delivery of healthcare services, “closer to the home”, improving access to care (World Economic Forum, 2016).

Much as it has upended every aspect of our society, the COVID-19 pandemic has affected the trajectory of digital health, whose presence has only grown during this tumultuous period. As the pandemic made in-person healthcare visits difficult, if not impossible, select countries began to encourage the use of telemedicine and other digital health technologies to facilitate the delivery of care. For no group was this development more evident than the elderly population. During the pandemic, the utilization of telemedicine services among American seniors increased by 300% (The Medical Futurist, 2021).

DIGITAL HEALTH TRENDS

In spite of its relative youth and continued evolution, digital health exercises an outsized influence on the healthcare industry, a phenomenon that, as noted above, is partly a product of the COVID-19 pandemic.

By and large, as a stakeholder group in the healthcare system, patients have enthusiastically embraced digital health technologies, as they better enable the creation of a "patient-centered and patient-driven healthcare experience", in part by empowering individuals to actively participate in their care plans (AdvaMed Center for Digital Health and CapView Strategies, 2020). This enthusiasm extends to the aging population, who can greatly benefit from the growing prevalence of digital health technologies. Americans aged 65 and older are, "very enthusiastic", about the latest digital health technologies, highlighting the results of a 2018 Consumer Survey on Digital Health that Accenture conducted (Diamente et al., 2018). Accenture noted how 71% of surveyed seniors would like to use virtual health to have an after-hours appointment, and that 63% would like to use it for "daily support to manage an ongoing health issue", (Diamente et al., 2018). Complementing today's seniors' interest in using digital health technologies is their already-strong online presence. More than two-thirds of individuals aged 65 and above in the United States say that they regularly go online, while roughly 60% of them between 65 and 69 own a smartphone (Diamente et al., 2018). As the adoption of digital technologies by the elderly population grows, so too does the market value of digital health in aging, which is projected to reach over $650 billion by 2026, at a 28.5% CAGR (Stewart, 2021).

Many digital health companies are focused on providing services that are directly relevant to the aforementioned needs and challenges of the aging population. For instance, a new crop of companies is developing platforms and devices that enable older individuals to "live independently, better cope with dementia and other illnesses, and maintain family, caregiver, and social connections" (PGIM, 2016). Major focus areas in the "Silvertech" or "Age-Tech" markets, which encompasses any technology that improves the lives of aging adults, and not just apps and software (Etkin, n.d.), include chronic care and mobility. Regarding chronic care, technologies like "smart" pill boxes are being developed to support seniors with a chronic condition (PGIM, 2016). Services to support seniors' mobility "include on-demand Uber-like services," while telehealth and other remote patient monitoring services are being developed and deployed to improve care coordination for elderly people (PGIM, 2016).

BENEFITS OF DIGITAL HEALTH TECHNOLOGIES FOR AGING POPULATIONS

The benefits of digital health technologies for members of the aging population are manyfold. As noted above, digital health can better enable individuals to age in the comfort of their own homes, rather than in nursing homes or other such facilities, which aligns with the care and lifestyle preferences of most individuals within this demographic (Rock Health, 2020). Additionally, by ushering in a more patient-centric model of care and making care settings more flexible and open, digital health can equip individuals with the resources to assume greater agency of the care they receive (Snowdon, 2020).

Digital health also has the ability to shift the care paradigm from one focused on treatment to that of prevention. Specifically, via these technologies, data can be collected, mobilized, and then deployed to more effectively monitor outcomes, identify patient risk, and then direct treatment programs accordingly (Snowdon, 2020).

Additionally, there are many diverse applications of digital health technologies for aging populations. To enable more individuals to age at home, telehealth and remote patient monitoring (RPM) can be used to support patients with a host of different healthcare needs, including those with chronic conditions who do not properly manage their health needs, as well as those with early-stage Alzheimer's or dementia and individuals recently released from an emergency department visit or inpatient stay (Vivify Health, 2020).

PART 3

ROLE FOR PRIVATE SECTOR INVESTMENT IN AGE-TECH

OVERVIEW OF PRIVATE INVESTMENT IN AGE-TECH

As digital health's role in the industry has grown, so has private sector investment in this space. Between 2011 and 2018, venture capital funding in digital health start-ups in the United States grew from $1.1 billion to $8.2 billion (AdvaMed Center for Digital Health and CapView Strategies, 2020), rising to a record high of roughly $14 billion in 2020, which nearly doubled the 2019 total (Micca et al., 2021). Additionally, between 2011 and 2018, there has been a 300% increase in the number of investment deals in the digital health space, from 92 in 2011 to 368 in 2018 (Safavi et al., 2020). Much of this support has been directed to companies "focused on well-being and care delivery models"—these organizations received $6.4 billion in funding in 2020 alone (Micca et al., 2021). In spite of a growing level of investment in digital healthcare, healthcare tech deals comprised only 7% of the volume of healthcare deals and investment in European and American mar-

kets between 2015 and 2018, with most of the volume concentrated in the United States (Champagne et al., 2019).

Owing to expansion of the aging population and the relevance of digital health technologies for this demographic, there are venture funds that have been created to specifically invest in this space, such Primetime Partners and 4Gen Ventures, or those with key investments in this space, including Generator Ventures, Zigler Linkage Longevity Fund, and Third Act Ventures (Etkin, 2021). Dominic Endicott, of 4Gen Ventures, offered another estimate of the size of the Age-Tech market, noting that he believes it will reach upwards of $2 trillion by 2025, with an average annual growth rate of 21% (Newman, 2019).

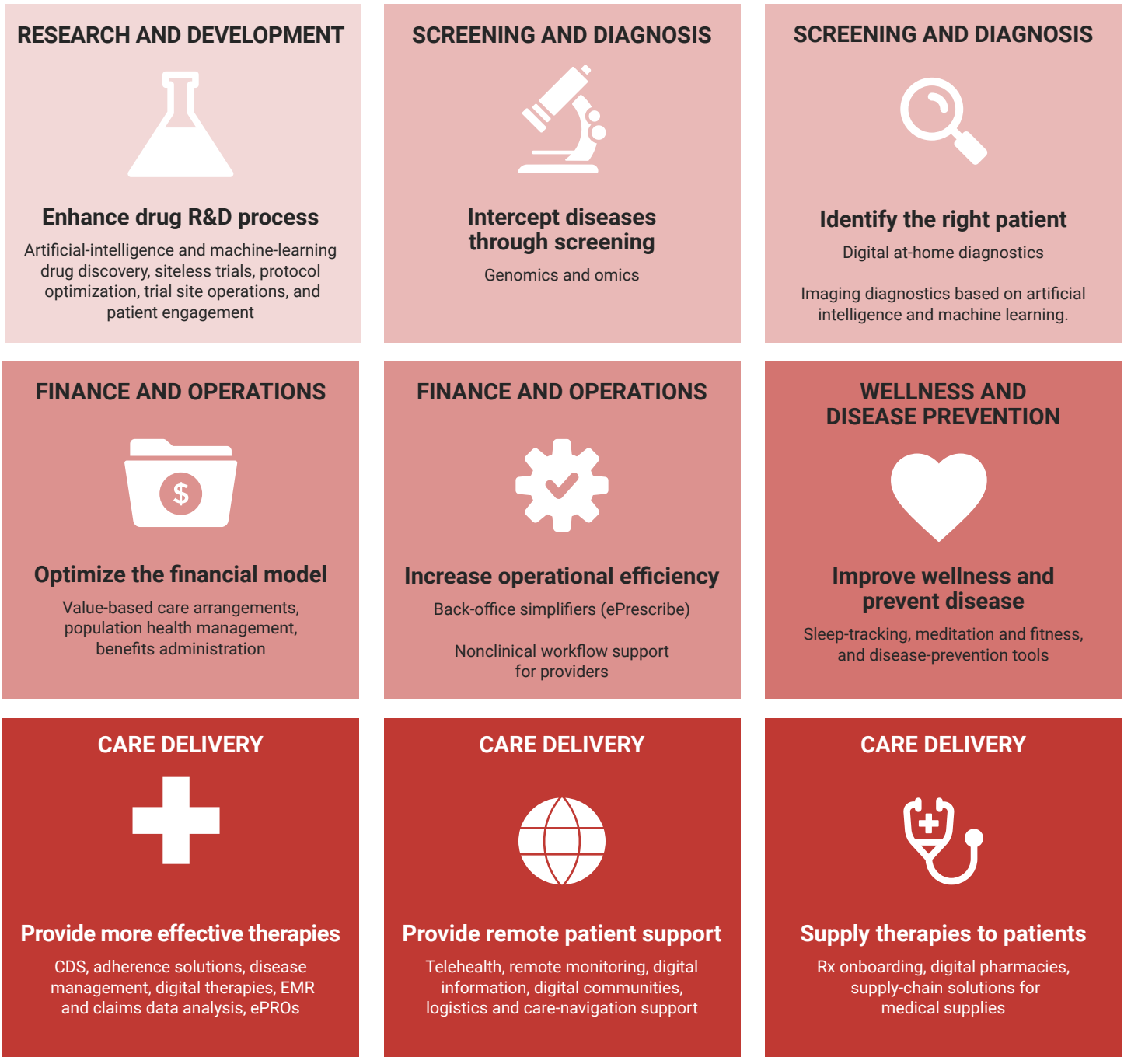
There are multiple reasons why investors are flocking to the Age-Tech space. As previously noted, because of the rapidly expanding size of the aging population in the United States and other countries, this arena presents an adequate membership scale for investors and companies. Additionally, there is a growing demand among seniors for new technologies and services that will enable them to age in their homes rather than in outpatient or inpatient facilities. Third, this segment within healthcare is one with a forecasted high rate of future growth. Between 2020 and 2027, for instance, the North American and European elderly care markets are projected to grow with a CAGR of 7.1% and 6.8% respectively, in large part due to the "rising patient pool for chronic illness" (Data Bridge Market Research, 2020a; Data Bridge Market Research, 2020b). Fourth, digital health companies in the United States have a high enterprise value multiple of more than 23, signifying the relative strength of these companies (NYU Stern, 2021).

According to The Gerontechnologist, as of 2021, there are more than 200 distinct companies that have both "developed technology with and for older adults" and "are funded or have a commercially available product" (The Gerontechnologist, 2021). As Figure 3 highlights, these companies have different focus areas, including home care, caregiver support, end of life care planning, fall prevention and detection, and medication management.

‘WHERE TO PLAY’ & ‘HOW TO WIN’ IN THE AGE-TECH SPACE

There are a number of different opportunities that private investors looking to invest in the Age-Tech space can seize. Figure 4 presents nine different areas across five categories in digital health, each of which, as Figure 5 highlights, is expected to grow by at least 8% per year through 2024. These areas include: wellness and prevention; screening and diagnosis; remote patient support; and drug R&D process.

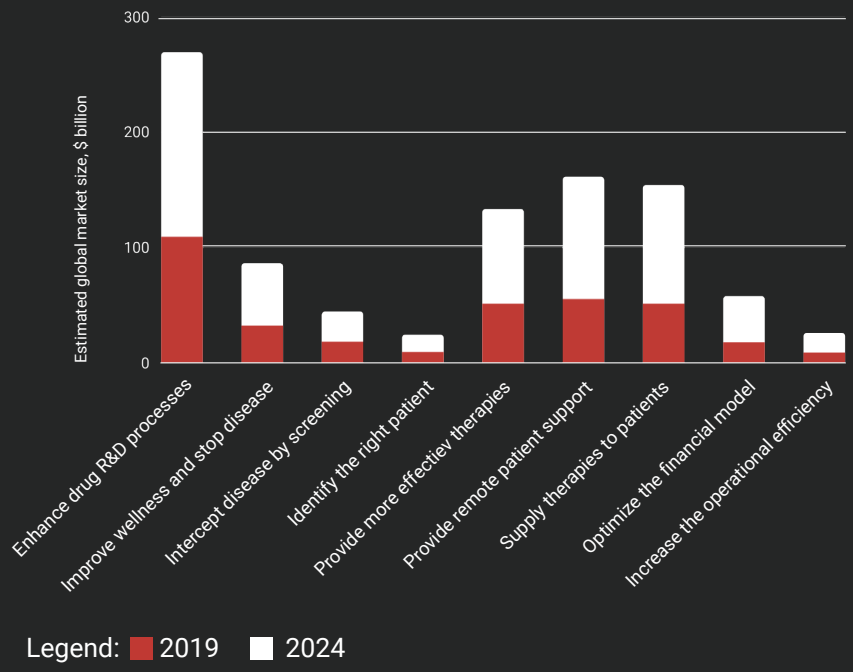
Figure 4: Examples of innovation in nine value pools across five categories



Source: (Cohen, Hung, Weinberg & Zhu, 2020)

Figure 5: Expected rate of growth of different digital health verticals

All digital health verticals are expected to grow by at least 8 percent annually through 2024.



Category	Value pool	Technologies
Research and development	Enhance drug R&D processes	Precision medicine
Wellness and disease prevention	Improve wellness and stop disease	Wearable activity tracker
Screening and diagnosis	Intercept disease by screening	Genomics, other omics
	Identify the right patient	Digital diagnostics
Care delivery	Provide more effective therapies	CDS, disease management
	Provide remote patient support	Telemedicine, monitoring
	Supply therapies to patients	Digital pharmacies
Finance operations	Optimize the financial model	VBC, population, health management
	Increase operational efficienty	Back-office automation

Source: (Cohen, Hung, Weinberg & Zhu, 2020)

In describing attractive areas for further investment within the Age-Tech space, Ananda Impact Ventures pointed to physical and mental health as a key topic (Ananda Impact Ventures, 2020). The organization highlighted the prevalence of loneliness among many elderly individuals, a condition that the Association for Psychological Science says can, "increase people's risk of death by around 30%", (Ananda Impact Ventures, 2020). The San Francisco-based Rock Health, a digital health investor and advisory services firm, likewise identified a host of interesting topics for investors and digital health companies within the Age-Tech space, such as the following ones: addressing loneliness; enhancing health insurance literacy and transparency; enabling at-home rehabilitation; and expanding support for caregivers, especially unpaid ones (Rock Health, 2020).

CONCLUSION

Digital health for aging populations remains an arena in which private capital is not only beneficial, but also needed. Aging populations is a large and growing segment of society around the world, and, to meet their health needs and preference to age at home, this community requires new and innovative services and methods of care delivery. Unfortunately, in their present state, institutions, systems, and models of care alone will not be sufficient to meet this impending need. For these reasons, the deployment of private capital in support of emerging and established digital health technologies — an ongoing trend — will become even more important with time.

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