# Using Foresight to develop eHealth intervention implementation strategy

A Framework to ensure sustainability of digital health services supporting informal Dementia caregivers in Ontario

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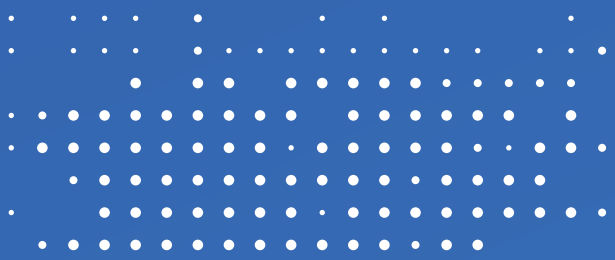

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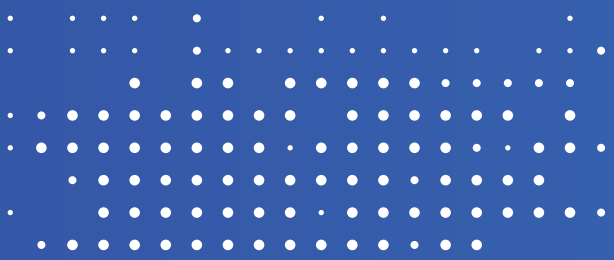
# Abstract

One of the key focus areas of the National Dementia Strategy, released by the Canadian government in 2019, is improving informal caregivers' quality of life through better support. While an array of services are available to support them, it's usually up to caregivers to find them and navigating through a fragmented health and social support system can be challenging, time-consuming, frustrating, and often ineffective.

Innovative approaches and eHealth interventions that can provide easy, timely, and need-based access to knowledge resources, enhances and safeguards care capacity among informal caregivers, reducing stress and depression levels, delaying nursing home placements, improving mood and their quality of life (Brodaty & Donkin, 2009). Innovations in technology are becoming a crucial element in improving support for and the well-being of family caregivers but a number of social, cultural, ethical, and technical issues complicate the rapid emergence of new technologies which affects its adoption, implementation, and scalability.

Using a participatory foresight approach, this research project speculates futures, 15 years from now, to explore and envision an implementation model for eHealth services for informal Dementia caregivers in Ontario. At a time when technology innovations present significant challenges and opportunities, the purpose is to identify leverage points that will inspire and inform organizations, developers, researchers, healthcare providers, and innovators interested in translating knowledge into practice by designing sustainable and resilient eHealth interventions. This has been accomplished by understanding the needs of informal caregivers, implications of emerging technologies, and factors affecting implementation of eHealth solutions that support informal caregivers.



# Acknowledgement

First and foremost, I offer respect and express gratitude to the Indigenous peoples for the opportunity to live, work, and dream, and conduct research on these lands. I acknowledge I am on the traditional territory of many nations, including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee, the Wendat, Squamish, Tsleil-Waututh and Musqueam Nations. I recognize the traditional guardianship of these lands by Indigenous peoples, the treaties signed with them, and commits to learning more about Indigenous communities.

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I also extend my gratitude to Lora Appel, an industry expert who reviewed my work with great attention and provided valuable questions and feedback that allowed me to gain new perspectives. Additionally, I would like to acknowledge Alex Fergnani, whose extensive knowledge in strategic foresight and innovation has been a significant source of learning and inspiration for me. Lastly, I thank Mansi Parekh for motivating me to approach my research with critical thinking, and for emphasizing the importance of embracing the challenges and uncertainties of the process. I appreciate each of you for sharing your experiences and creating a supportive environment for me to grow and reflect.

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I am deeply grateful for the immense love and support that my parents, family, and friends in Canada and India have shown me. Their unwavering belief in me has been a source of inspiration and motivation throughout my journey. To my life partner, I am particularly grateful to you for being there with me through thick and thin, providing constant encouragement and pushing me beyond my limits. To all of you, your kindness and patience have been invaluable to me. Even though you may not fully understand the nature of my work, your unwavering support has been a beacon of hope and strength for me. I hope to find better ways to communicate the significance of my work to you in the future. I consider myself lucky to have you all by my side, and I am excited to continue collaborating with you in the years to come.

Lastly, it is important to recognize that taking care of oneself is one of the most important things that a person can do in their life. It is the foundation upon which everything else is built, and without it, everything else falls apart. It can be a long and challenging journey which requires patience, resilience, and a willingness to make changes in one's life. Therefore, it is essential to thank myself for taking the time and effort to care for myself, especially when dealing with health issues. It is a reminder that self-care is a continual process and a necessary aspect of life.

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# 1. Introduction

## Context

The majority of older people would prefer to age at home, according to recent policy reports in Ontario and elsewhere (Sinha 2012; Walker 2011; Van Hoof et al. 2013) and the desire remains strong for the growing number of people living with Dementia and their caregivers also. Dementia is a progressive, irreversible, neurodegenerative disorder that usually begins with a minor loss in intellectual functioning and can progress to severe cognitive impairment. People with Dementia (PwD) eventually become completely dependent on other people for their personal care. This affects not only the patient, but also their relatives, caregivers, and even the society as a whole. There are two types of care systems that exist for PwD. A formal care system where the care is provided by the organizations with paid/volunteer work such as in the healthcare system and informal care which is delivered by family, friends, or neighbors.

With estimates of 430,000 Ontarians living with Dementia by 2038 (The Ministry of Health and Long-Term Care, Ontario, 2016), the need for informal caregivers will continue to grow who are often thrown into the role without any formal training or necessary knowledge to handle Dementia (Ihilchik, 2019). The caregiver is typically required to provide regular emotional, physical, psychological, social, and financial support to the individual (Rottenberg & Williams, 2021). As a result of the multiple responsibilities associated with their caregiving role, they experience high levels of burden and report increased rates of mental health declines, exhaustion, depression, and burnout. Research suggests that caregivers of those with Dementia are twice as likely to experience distress and/or find themselves unable to continue, compared to caregivers for those without Dementia (37.6% vs 18.6% in 2018-19) (Public Health Agency of Canada, 2020).

Innovative approaches and eHealth interventions that can provide easy, timely, and need-based access to knowledge resources, enhances and safeguards care capacity among informal caregivers. A systematic review on the implementation of eHealth interventions for informal caregivers of PwD showed that they were effective in improving a range of psychological outcomes in caregivers, such as the reduction of caregiver depression, anxiety, stress and burden, as well as increasing positive aspects of caregiving, caregiver self-efficacy, and confidence (Lindeman, Kim, Gladstone, & Apesoa-Varano, 2020) and reduced institutionalization for persons with early stage

cognitive impairment (Edwards, Chu, & Thomson, 2000). Similar results were achieved in a randomized trial study of family caregivers in Ontario (Mohide, et al., 2015). Another study suggests that there is value in continuing to develop, refine and implement internet-based interventions for informal caregivers of PwD (Hopwood, et al., 2018).

Innovations in technology are becoming a crucial element in improving support for and the well-being of family caregivers but a number of social, cultural, ethical, and technical issues complicate the rapid emergence of new technologies which may affect adoption, implementation, and scalability. While a large amount of attention has been devoted to theoretical implementation of these solutions, there has been a significant lack of attention paid to practical implementation that takes organizational, contextual, and societal factors into consideration. There are various challenges in using technology, including numerous issues related to equity, inclusion, and access; ethical concerns regarding privacy and security; political and regulatory issues affecting interoperability; inclusive/ human-centric design; and inherent difficulties in commercialization and logistics (Lindeman, Kim, Gladstone, & Apesoa-Varano, 2020) but the concentration of past researches has been on characteristics of interventions and not implementation frameworks.

In the absence of this knowledge regarding implementation of their solutions, eHealth organizations are unable to translate research findings into practice, leading to slow design of their solutions (Christie, et al., 2018). Additionally, there also remains a lack of suitable service models mapping informal caregivers' complex and evolving needs with digital solutions often leading to failure of services. The evidence base on services is further limited because of very little research in the Canadian context and evidence from research in other countries may not be applicable due to differences in the way healthcare and funding works here. COVID-19 has changed the healthcare climate dramatically, leading to an increase in many more societal issues and challenges for the informal caregivers. The majority of the studies from the literature review were conducted before 2019, and the rapid rate of implementation of technology-based interventions in these changed times also makes it critical to conduct research on this issue informing future research.

> **Education is helpful for caregivers and can range from emotional support to practical tools. Experience of navigating resources online is diverse, as caregivers are a heterogeneous population, with some being quite savvy.**
>
> **Interviewee #1**

Providing support to caregivers requires a multipronged approach and it is not something that the government should be expected to solve alone. Equipping eHealth organizations with the right kind of insights and approaches will empower them to build impactful solutions (AlMulla, 2020). Through participatory foresight and exploration of a variety of futures in the year 2038, this research project aims to design an implementation strategy that eHealth organizations can adopt to boost their resiliency enabling them to remain sustainable over time.

# What is an eHealth solution

PwD receive most of their health care from informal caregivers. Many caregivers lack the knowledge and resources they need to provide this type of care (Sztramko et al., 2022). For caregivers to acquire knowledge or skills, and to acquire meaningful informal and formal supports (community, friends, and family), online educational tools or programs are required. These interventions are often self-guided, interactive, and personalized and aim to reduce the physical, mental, and financial consequences of caregiving.

The eHealth (also referred to as digital health or mHealth in this research report) solutions include services and information obtained or enhanced through the internet and related technologies and can be accessed via web or mobile based applications. The resources may include knowledge about care recipients' changing condition or improved navigation of existing support systems (services or programs) available through community, government or any other social forms. By navigation this study is referring to the experience of finding support systems that meet diverse caregivers needs.

# Intended audience

With technological innovations presenting significant challenges and opportunities at the same time, this study seeks to identify leverage points for digital health organizations, developers, researchers, healthcare providers, and innovators looking to translate knowledge into practice by developing effective eHealth solutions.

Organizations are now shifting away from traditional definitions and business models of healthcare and caregiving in a rapidly evolving world. Innovative companies are embracing technologies to create an impact in these often complex fields, but strategies are needed to break down obstacles, stay motivated, and be sustainable. Neither is this study intended to propose a new business model or provide recommendations regarding User Experience (UX). The focus is also not on information needs and information seeking behaviour of informal caregivers. This research goes beyond that and the results will support organizations to determine what to do after they have created a business model and will support them in accelerating the commercialization and long-term sustainability of evidence-based studies.

It is crucial to emphasize the relevance of this research in light of the ongoing COVID-19 pandemic. The demand for effective online support for caregivers of PwD has never been more significant. The study's results offer valuable insights for eHealth developers looking to establish and expand eHealth interventions to assist caregivers of PwD. These implementation lessons can facilitate the process of providing web-based support to caregivers of PwD at a distance.

# Why this research

Due to a diminishing interest in geriatrics as a field of study in Canada, the country is facing a shortage of geriatricians at a time when its population is aging (Calahan & Chai, 2013). According to a Canadian study, there are fewer students pursuing an extended career in geriatric medicine, leading to escalating challenges in this field. An aging population, the retirement of a large number of baby boomers, and the shortage of new health care recruits indicate that a potential crisis is on the horizon. In addition to all this, rural areas are usually more severely affected than urban areas because there are fewer specialists, resources, and training opportunities (Canada, 2017).

Numerous online health services or eHealth interventions have been developed to support PwD and their caregivers. They have been shown to demonstrate effectiveness, but many are not implemented. Getting these products or services that have a big influence on the world off the ground is often hindered by challenges which are quite complex, where things are resisted by some the traditional institutional impediments, can take a long time, and require all the legacy integration processes (Lindberg, 2020). Mature businesses have clear operational procedures that work well in stable environments. When a firm becomes highly successful in its industry, other firms begin to imitate it. The classical approach to strategy can prevent organizations from adapting their thinking and behaviour to the new environment. In times of disruptive market or technological shifts, traditional strategic planning techniques might be insufficient to react adequately to new circumstances. The impact of such radical changes may result in what Schumpeter would call 'creative destruction', and it is necessary to look beyond traditional approaches to strategy formation to cope with such changes (Lehr et al., 2017).

It's important to identify social factors because human factors are just as vital as technological changes. Among the personal characteristics of the informal caregiver their motivation, digital literacy, and training and education were found to be the most important. Their approach to technology can affect whether they start using technologies or interventions, and their effectiveness impacts whether they continue using the technology. Terminology relating to diversity and inclusion were frequently mentioned as influencing factors in considering digital interventions, and the possibility of tailoring interventions to feature specific minorities before using them (Levinson et al., 2020). Furthermore, informal caregivers who are busier were less prone to make use of digital technologies (Sriram et al., 2019). Interviewee #13 says that caregiving involves dealing with fear, stress, and time constraints, further adding that the challenge for caregivers is finding time to educate themselves and try out new strategies, which may not always be possible in one moment. Taking advantage of digital health solutions effectively is hampered by the complexity of care coordination. There are also conflicting opinions between health care professionals concerning the suitability and effectiveness of the online and web-based format for advice and recommendations (Levinson et al., 2020).

> "Navigating online can be overwhelming for many"
>
> **Interviewee #13**

The healthcare industry is one of the most complex and change-resistant sectors of the economy. Technological advances have had to overcome a range of challenges, from patient privacy issues to legal restrictions on certain types of treatments and services. Despite the fact that healthcare is a vital component of society, it has been slower to embrace change than other industries due to its potential implications for millions of people. UX in some areas within healthcare hasn't changed much over decades, partly because many products are very technical and scientific and don't take into account the needs of doctors, nurses and patients interacting with systems or processes. It is crucial for healthcare providers to keep up with emerging technologies so they can create experiences that are safe, reliable and tailored for individuals' needs. This is more important now than ever before as it enables better adoption rates by users.

Innovation ecosystems are becoming increasingly important for business leaders in today's competitive, ever-changing environment. Companies must create the right conditions to pick up the best ideas and build sustainable growth engines. This means that they cannot rely on their own in-house talent or innovation process alone; they need to collaborate with external innovators. Leaders need to accept that they don't always have the winning ideas and focus on creating an ecosystem where winning ideas can consistently emerge. This approach to innovation recognizes that decisions and value creation should not be centralized, as this would limit a company's ability to respond quickly enough to changes in its environment. By collaborating with external partners, companies can expand their network of potential solutions beyond what their internal teams could create on their own.

Digital health organizations must consider more than just the product when attempting to make a successful transition from a demonstration project to bringing it to the market. Factors such as the wider institutional context, sociocultural context of policy and regulations, and continued adaptation of technology over time should be taken into account in order to ensure success. It is critical for firms operating within the healthcare industry to take a structured approach when innovating if they are looking for long term success. In such unstable and dynamic environments, companies that can skillfully take advantage of new opportunities and maximize their potential thrive and failure to do so can lead to an inability to compete in this ever changing environment (Bastoni et al., 2021). Working in healthcare can be quite restrictive but there's a lot of room for innovation and to adopt approaches that can create engaging experiences while delivering value.

> **My understanding is that there is a lot of information, tools, and resources out there, but caregivers are overwhelmed."**
>
> **Interviewee #12**

# The approach for innovation

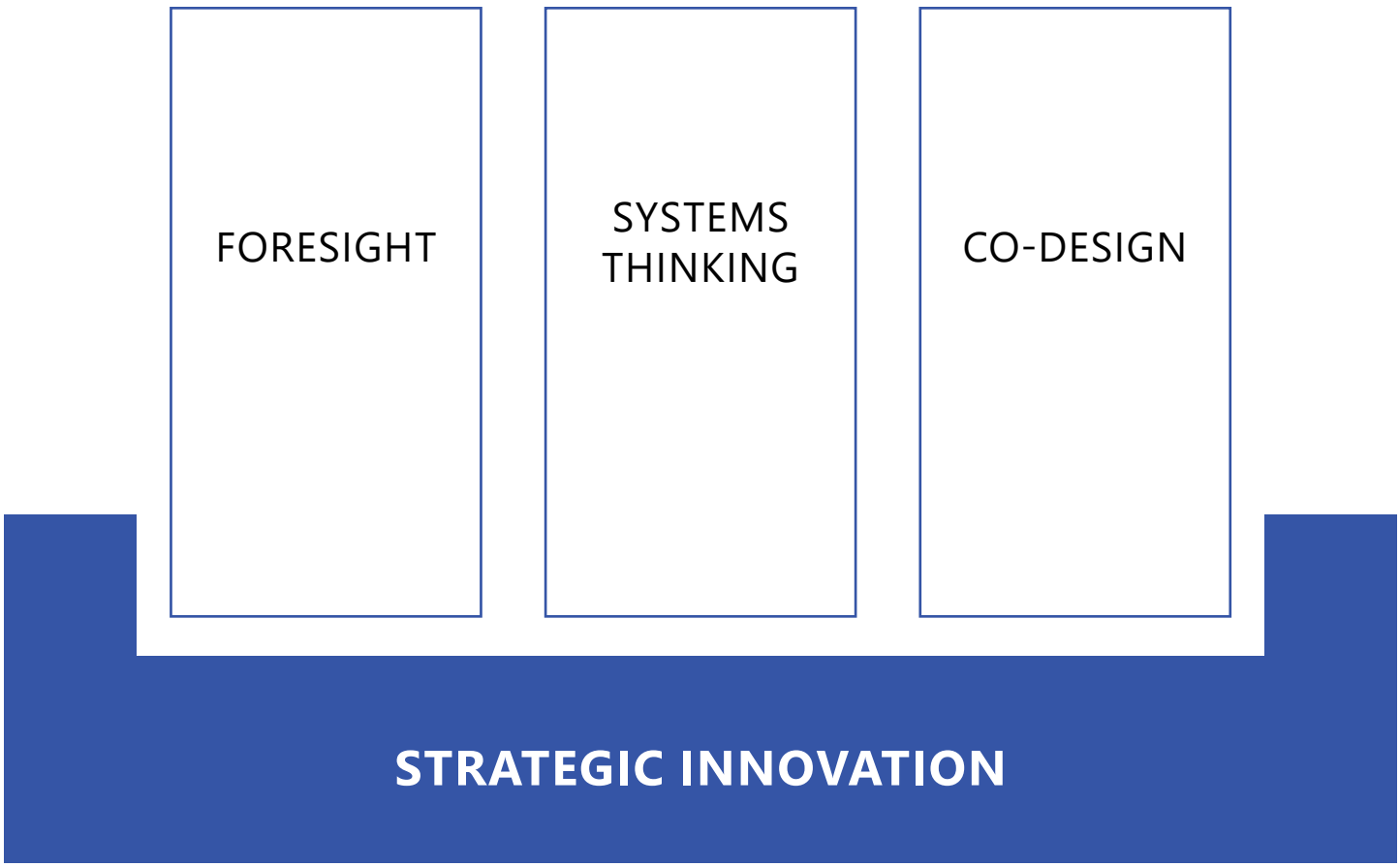



Figure 1 - Venn diagram representing the intersection of co-design, systems thinking, and foresight for strategic thinking

Creating solutions that are tailored to the specific needs of a particular group requires an active role from stakeholders in the design process and in shaping the final solution (Bird et al., 2021). This collaborative approach is called Co-design and it ensures that by working together, different perspectives and expertise of the stakeholders are leveraged to create a strategy that is well-informed and comprehensive. Employing a co-design strategy results in immediate advantages, such as generating highly original ideas with increased user value, improved quality and differentiated strategies, effective decision-making, reduced development costs, and enhanced collaboration among individuals and organizations. Furthermore, this approach can bring about long-term benefits, including elevated levels of encouragement for innovation

and change, and stronger connections between product or service providers and their customers (Design for Europe, 2011). Bird et al., in their research report, also say that there is a recognition of the need to involve end-users in health innovation initiatives which include engaging patient partners and other stakeholders in the design of healthcare systems, and services (Bird et al., 2021). Developing an effective strategy requires an understanding of the context in which it will be used, as well as the values that make up the foundation for successful implementation. This would entail identifying any potential barriers and the success formula for such digital health solutions which would be explored from three lenses - desirability, viability and feasibility to help assess the success potential of any innovative product.

When it comes to problem solving, it is also essential to think holistically by looking at the big picture. In today's complex and interconnected world, a Systems Thinking approach emphasizes the importance of considering not only individual components but also how they interact with each other and their environment (Bashan & Kordova, 2021) which means evaluating relationships between different parts of a system. It enables transformative change by enhancing our understanding of how systems work. This will help identify key actors and their roles in a given system, as well as the relationships and interdependencies between them. Through this method, we can gain greater insight into how our decisions may influence systemic outcomes and how we can work together to create greater value for all stakeholders. By incorporating multiple perspectives when analyzing problems, we are able to better explore underlying complexities and avoid overlooking important details or inadvertently creating new issues through quick fixes or oversimplified solutions (Woudenberg & Unis, 2023).
While it can be tempting to focus on the present and base decisions on current conditions, a more effective approach is to create strategy from the future backwards. A foresight-based approach helps organizations anticipate changes in the industry and develop strategies that can outlast short-term trends (Clampett, 2023). It provides an opportunity for strategic leaders to move away from traditional methods of thinking and transition into an innovative mindset that puts a focus on long-term problem solving. By visualizing future outcomes, referred to as scenarios, it allows us to explore various possibilities and identify potential pathways that could lead to success. Foresight is about lowering risks when making choices; not about guessing. This approach is especially helpful when dealing with issues that involve multiple stakeholders and variables. Its forward-thinking nature enables the development of strategies that are more effective, adaptive, and sustainable than those generated through conventional means. Additionally, it encourages us to think beyond their current circumstances and envision brighter futures.

To stay ahead of the curve, it's important for eHealth organizations to look ahead and plan proactively. While no one can predict the future accurately, a well-developed model for forecasting developments and processes can contribute to Strategic Thinking (Figure 1). A deep understanding of developments and a framework-based method of analyzing them can assist with the discovery of suitable and probable scenarios that is an indispensable source of insight into decision-making. Scenario analysis has been regarded for decades for its ability to forecast strategic decision-making in complicated and uncertain environments (Lehr et al., 2017). As interest in scenarios has grown as of late, there's a fantastic real opportunity to show how valuable they can be to an organization, integrate them appropriately with strategy, and promote them more effectively.

The wide range of factors across domains makes this an ideal foresight project while strategic thinking will help envision effective plans.

# Boundaries of investigation

Being the province with the largest population in Canada, focusing on Ontario will provide an opportunity to understand and address diverse demographic and geographic as well as socio-political challenges. According to research, the number of Ontarians living with Dementia will increase significantly in the next two decades, reaching an estimated 430,000 by 2038 (The Ministry of Health and Long-Term Care, Ontario, 2016). This staggering statistic highlights the need for a comprehensive and robust implementation strategy for eHealth organizations in Ontario that can also serve as a blueprint for innovation for other provinces.

Ontario has long been recognized as a leader in advancing eHealth initiatives across Canada. Over the past decade, several large-scale eHealth programs have been launched in the province, making it an interesting and important case study for exploring the challenges faced by eHealth organizations in implementing their services. Policy and regulatory frameworks in Ontario are also well-established, so understanding the challenges organizations face when implementing their services can be helpful.

Scenario planning is a vital tool for businesses and organizations that want to prepare for the future. It involves creating possible scenarios that reflect different potential futures, and analyzing the risks and opportunities associated with each one. However, there is no one-size-fits-all approach to scenario planning, and there are no hard-and-fast rules about the appropriate timeframe for scenarios. Traditional scenario methods tend to look 10-15 years ahead, as this is considered a reasonable timeframe for forecasting major changes in economies, industries, or societies. However, it's worth noting that this isn't always the case - some scenarios may need to consider shorter or longer time frames depending on the nature of the question being examined. For example, if a company is struggling with short-term cash flow problems, they may need to focus on creating short-term scenarios that only look ahead by a few months or years.

In the business world, we often rely on nice, linear timelines to bring structure and predictability to our plans. With the ability to preordain events, contain chaos and plot guaranteed success, it's no wonder many organizations rely heavily on these linear models. But while they may offer a certain level of assurance, it's important to acknowledge that they are not a one-size-fits-all solution in the real world (Webb, 2021). Leaders often address long-term risks with short-term solutions, leading to entropy and vulnerability to disruption. This is because traditional linear timelines result in tactical responses to constant external changes, which drain an organization's resources over time. No amount of planning or plotting can anticipate all potential external factors that may impact an organization's success. There are many factors that are wholly outside of our control such as regulatory actions or natural disasters. Furthermore, other critical factors like workforce development, operations efficiency or new product ideas are subject to various layers of decisions made throughout an organization (Webb, 2021). These decisions can vary greatly depending on the individual perspectives and goals of each team member and cannot always be easily controlled or predicted. As all those variables collide, they shape the horizon in ways that are both fascinating and unpredictable. And yet, despite this complexity, we can still discern patterns and trends that help us make sense of it all. Taking a look 15 years into the future allows us to gain control over an uncertain future while giving ourselves a reasonable window of time for predicting major changes in the external environment of eHealth organizations. By forecasting how certain events might unfold and what trends are likely to emerge over this time period, these organizations can take proactive measures to mitigate risks or capitalize on emerging opportunities.

# 2. Research Plan

## Intent

Instead of doing another systematic review on the effectiveness of eHealth interventions for caregivers of PwD, which has been the highlight of research work previously, the aim of this research is to leverage Strategic Foresight to develop a frame of reference and recommendations that can serve as an implementation guidance for those designing these solutions, filling a much-needed space in the present knowledge gap.

The focus is therefore on capability building beyond the internal functioning of an organization to fundamentally change how the work gets done. Effective capability building develops mindsets and behaviors fostering the ability to bring transformative results that helps companies translate these accomplishments into profits, and build an engine for continuous value development that enables them to stay relevant and competitive for long periods of time (Bachmann et al., 2021). The function of a scenario technique is to improve the ability of organizations to identify different and more effective courses of action compared to the status quo and to foresee outcomes. Learning about the possibilities of future events can support the development of a roadmap that allows us to exemplify goals, data, and insights into probable opportunities and potential dangers that we can translate into implementation strategies based on long-term objectives.

**"Firms can shift the boundaries of what they control and don't, through superior anticipation, flexible strategies, and dynamic monitoring."**

**- Paul Schoemaker (Hines & Bishop, 2015)**

# Research questions

This research is focused on the industry of eHealth solutions for informal caregivers of PwD. The research thus serves a broader value network suitable for multi-client environments and is not a conventional corporate foresight approach. Understanding new technological revolutions and market trends has always been a vitally important consideration for commercial enterprises, value networks and industry markets.

Implementation science is a rapidly growing field that focuses on the practical application of research findings. Its main goal is to bridge the gap between research and practice by identifying barriers and facilitators to the uptake of innovations. Bauer and colleagues argue that understanding these factors can help improve the implementation process, leading to more successful outcomes (Bauer & Kirchner, 2019). Considering this and the approach mentioned earlier, the researcher seeks to explore (i) the factors influencing the implementation of these technologies (ii) the changing environment of the industry and, (iii) its lead users and changemakers as all these will be critical in developing a successful strategy.

### *Primary Question*

How might we design an implementation strategy to help developers of eHealth solutions for informal Dementia caregivers in Ontario build resiliency and long term sustainability.

### *Secondary Questions*

- What kind of resources and support do caregivers seek and how is technology currently enabling access to information? - to understand caregiver needs and digital methods they are using to navigate information
- What challenges do caregivers face when navigating knowledge resources and what alternate forms of support services are helpful (non-digital)? - to learn about caregiver challenges and draw inspiration from what's working for them
- How can technology innovations shape the future of digital caregiver support services? - to explore ideas/approaches that can be adopted
- What factors influence the acceptance or rejection of technology based interventions? - to probe concerns related to use of technology
- What affects the creation, implementation, and success of these digital solutions? - to understand barriers, challenges and enablers of building digital services

# Methodology

Methods of strategic and participatory foresight are employed in order to analyze drivers of change, identify implications, and provide competitive intelligence and new strategies for long term sustainability of businesses and developers of e-health solutions. Following the Foresight Framework based on the book Thinking about the Future: Guidelines for Strategic Foresight by Peter C. Bishop and Andy Hines the project will be divided into six steps:

### 1. Framing

Through literature reviews and semi-structured interviews with stakeholders (informal caregivers, researchers in healthcare design, and professionals developing technology solutions for caregivers) the project will be scoped further by gaining insights on key competencies that any eHealth organization must possess and mapping a system within which solution providers exist. This will be done by learning about caregivers' unique needs and complicated lives, identifying challenges to effectively implement technology-enabled solutions, and how technology is shaping caregiver support. By talking to industry experts and professionals who have experience with digital health solutions, we drea an analysis on what makes up a successful formula for such solutions.

### 2. Scanning

A STEEPV (social, technological, economic, environmental, political, and values) analysis is used to scan for trends which helps explore drivers of change or indicators of the futures relevant to the theme. Current and evolving factors that may influence the system will be explored. The information will be gathered from popular media such as newspapers, podcasts, magazines, blogs, articles, and journals and through stakeholder interviews. Trend identification in this context will be in both environments, internal (within the organizations designing solutions impacting how the solutions are developed) and external (impacting the implementation and scalability of the solutions).

### 3. Forecasting

Signals that appear to have a significant potential for disruption are identified as drivers, two each of which are then identified as 'most critical' and 'most uncertain' which when plotted on a 2 x 2 Scenario matrix helps develop a set of four scenarios. Plotting drivers like this facilitates thinking of a broad range of futures that are plausible, relevant, and challenging. The process involves creative thinking allowing generation of a lot of ideas and possibilities using tools and artifacts. Backcasting, a process in which you move backward to the present from a defined future, describes how it came into existence by following specific actions and changes in the system.

### 4. Visioning

Transformation factors for organizations and strategic recommendations for each of the scenarios are set by understanding the implications of forecasting and challenging conventional wisdom to really think long-term and even of unintended consequences. Strategies are identified that will assist in mitigating challenges or leveraging opportunities that can future-proof eHealth organizations depending on the scenario that the future will evolve into.

### 5. Planning

A wind tunneling exercise that tests strategies against the varying pressures of scenarios and their ability to address caregiver needs while mitigating challenges are the ones eHealth organizations and service providers should focus on. Since they are common among multiple plausible futures, concentrating on them will help achieve success no matter which future turns out to be closer to reality. Thinking strategically will be imperative as these strategies will inform goals and aspirations an organization would want to achieve.

### 6. Action

If implemented, each of these strategies is likely to be successful thus giving eHealth organizations practical guidance and insights on an implementation approach they should take to create effective solutions for informal Dementia caregivers as well as be successful while being prepared for future implications of technology. An early warning system will be created to help organizations identify indicators of possible changes and act accordingly.

# Participant Recruitment

To develop future scenarios, industry thought leaders can provide valuable insights as they are driving the future. Professionals with structured knowledge who do not normally participate in strategic conversations of eHealth organizations can bring new and unexpected external impulses to research and were invited for interviews. Careful selection of these individuals was made based on their relevant knowledge to help surface insights, even if they were not necessarily experts in the field

The process of understanding the important stakeholders in a system is crucial to ensure that right participants are selected. Stakeholder mapping is a useful technique that helps to create a comprehensive picture of the system at various levels in society, and to identify and analyze the different stakeholders involved in a system or industry. The power/ knowledge matrix is a common tool used in stakeholder mapping which involves plotting stakeholders on a grid based on their level of power (i.e., their ability to influence outcomes) and their level of knowledge (i.e., their understanding of the system or industry). The mapping (Figure 2) helped identify three categories of stakeholders:

- Users: Those who directly interact with and use the product/services provided by eHealth organizations.

- Organizations: Companies or groups that may have a stake in the system or service.

- Ecosystem: Those who indirectly interact with or affect the industry of eHealth organizations.

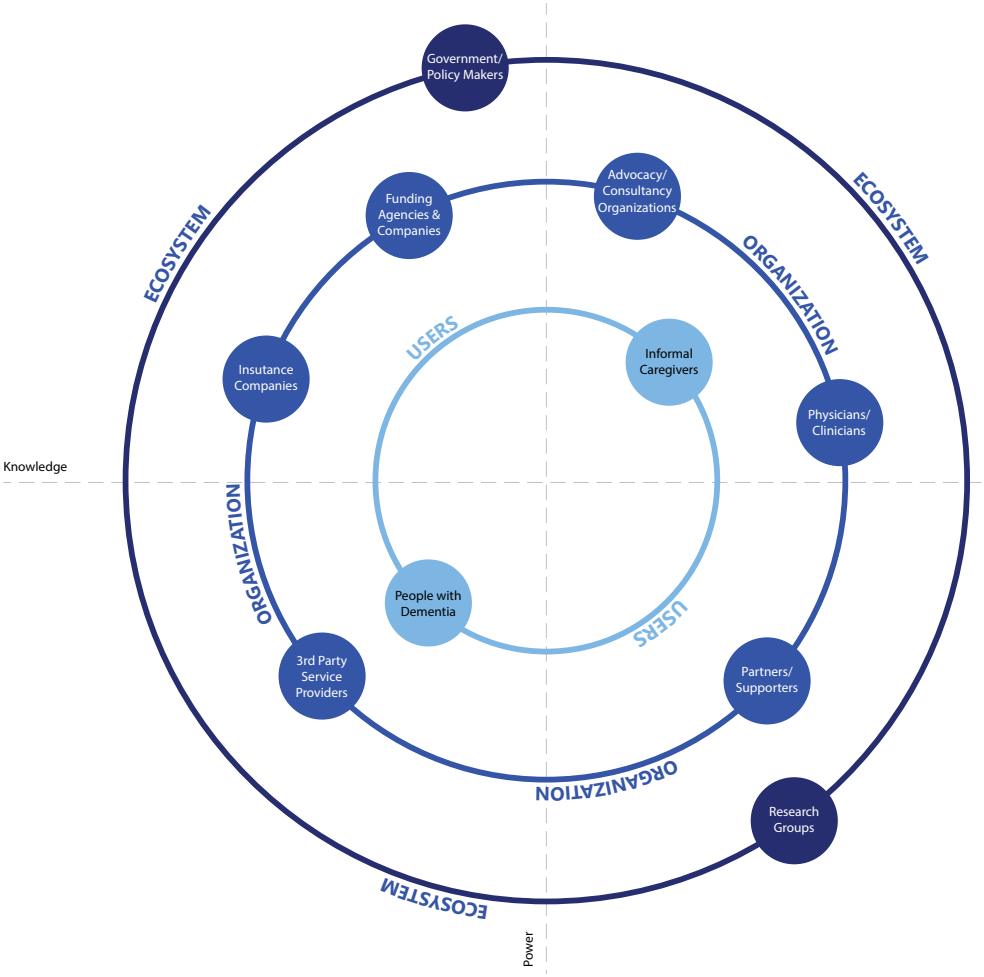



Figure 2 - Stakeholder map using a power and knowledge matrix showing three levels of stakeholders; ecosystem, organizations, and the users

Family caregivers play a crucial role in supporting their loved ones with chronic illnesses or disabilities. Despite the lack of sufficient medical knowledge about the conditions they are managing, family caregivers still hold significant power when it comes to making decisions about the best course of action for their loved ones. They are often intimately aware of their loved one's needs and preferences and can advocate for them within the healthcare system. Family caregivers may also choose to become involved in advocacy groups that work to improve support for those with illnesses, giving them a platform to raise awareness and promote change on a larger scale. Advocacy organizations may be highly knowledgeable about the successful implementation of digital health products. With years of experience in advocating for patient rights and healthcare policy changes, these organizations have amassed a wealth of knowledge on how to successfully introduce new technologies into the healthcare system. Not only do advocacy organizations possess high levels of knowledge regarding digital health products, but they also hold significant power to influence government policies related to healthcare. These organizations represent large groups of patients who are directly impacted by the quality of care provided by our nation's healthcare systems. As such, policymakers often take their opinions into account when crafting new laws or regulations related to healthcare technology adoption. In the world of digital healthcare, funding companies play a pivotal role in the implementation and success of these services who may lack extensive knowledge regarding healthcare practices but possess significant power in shaping the market for these services. This balance of power has significant implications for patients and providers alike. They can dictate how much funding is allocated to specific ventures, potentially steering money towards certain technologies or services over others.

Additionally, their influence extends to marketing efforts and even product design decisions. This level of control also means that funding companies can have a significant impact on patient outcomes if they prioritize profit margins over quality care.

Research groups are a vital component of the healthcare ecosystem, working tirelessly to identify and develop new technologies that can improve patient outcomes, reduce costs, and enhance care delivery. Through their interactions with patients, providers, and policymakers alike, they have gained valuable insight into the intricacies of healthcare delivery and the unique challenges that come with implementing new technologies. Despite their critical role in advancing healthcare innovation and improving care outcomes, research groups often find themselves relatively powerless when it comes to making meaningful changes or influence policy decisions due to the complex nature of the healthcare industry and with multiple stakeholders involved in decision-making at every level. The government is the highest authority in any country, and its decisions hold immense power. However, making decisions that impact millions of lives requires more than just political will which is why policymakers rely on research and empirical evidence to make informed choices that are grounded in facts rather than personal biases or popular opinion which also fosters transparency and accountability.

In order to make the research well informed, participants for the primary research identified are a mix of

professionals who are either working with technology to create digital solutions for Dementia caregivers or have a background in policy analysis to support the wellbeing of caregivers or are supporting such technology solutions for informal caregivers through funding or consultancy bringing in an outsider perspective in implementation of these services. These along with the informal caregivers themselves provide crucial information regarding the changing environment of technology solutions and its current state. 13 semi-structured interviews were conducted with stakeholders about their experiences with eHealth technology, their perceptions of barriers and facilitators to the implementation of the interventions, and their thoughts on the future. The study has been reviewed and received ethics clearance through the Research Ethics Board at OCAD University, file number [2022-08]. Participation in the study was voluntary and the researcher has ensured that all personal identifiable information is kept confidential in compliance with the ethics board approval. The interview guide is attached in Appendix A for reference. Listed below is the expertise and experience of the interviewees:

**Interviewee #1 -** A caregiver wellness coordinator at a community health organization in Scarborough who, at the time of the interview, was also working on implementing effective ways to provide education for caregivers through digital means.

**Interviewee #2 -** Retired architect who has served on many boards and is currently involved in advanced technology research with several Canadian universities to investigate how virtual reality can play a part in assisting clients with Dementia and communication with their families and medical advisors.

**Interviewee #3 -** Has been an informal Dementia caregiver for over 30 years. She has provided support to her father, her mother-in-law, and now to her life partner.

**Interviewee #4 -** A Registered Practical Nurse with a Master's in Dementia studies, currently doing her doctorate of applied social research in Dementia studies. She provides consultancy for designing facilities for people living with Dementia and supportive training for professional care providers as well as families.

**Interviewee #5 -** Has been a caregiver to parents with Dementia in a distant country for over 20 years who has immersed himself in learning about Alzheimer's through the Alzheimer's Society, e-learning programmes, volunteering, and also presenting techniques he learnt for caregiving remotely.

**Interviewee #6 -** Founder and CEO of an Ontario-based, Health Canada certified tech company that specializes in personal location monitoring for caregivers and family members of loved ones affected with conditions such as Dementia, Autism and Alzheimer's.

**Interviewee #7 -** A professor at the University of Waterloo Systems Engineering and University of British Columbia (UBC). She, along with a team of researchers, developed an artificially intelligent online resource for caregivers of persons with Dementia.

**Interviewee #8 -** He was diagnosed with Dementia in 2007, is a strong Alzheimer's Advocate and volunteers his time with AgeWell (Canada's technology and aging

network) addressing such issues as living well with Dementia, awareness, stigma, stereotypes and health-care worker education. He is also a co-principal investigator along with two researchers at UBC on a participatory action research project which focuses on eliminating stigma and discrimination associated with Dementia.

**Interviewee #9 -** Program Director for a Master of Health Informatics program, he leverages advanced technologies to bridge the equity, access, and system efficiency gaps people experience in Canada. His interest lies in the scalability and sustainability of the technologies we design and deploy.

**Interviewee #10 -** A Lawyer and National Director at a national, non-profit body dedicated to exploring the particular legal issues that affect older Canadians. Her work looks at the legal and policy issues that impact people as they age and works with committees to review legislation and make recommendations for improving laws. She also does consultation and community engagement with older adults and helps people understand their rights and responsibilities under the law by producing resources.

**Interviewee #11 -** She was the Vice President of Design and Delivery at a service design consultancy in Toronto, where she managed multiple project teams delivering projects in the healthcare space. She is also a caregiver to an aunt.

**Interviewee #12 -** Founder and CEO of an innovation consultancy with a focus on healthcare, governments, and not-for-profits. She was previously the Head of Innovation Engagement at a not-for-profit charitable organization that offers 24/7 health care and support services where she spearheaded the client voice initiative engaging clients and caregivers in their care.

**Interviewee #13 -** An advisor and a consultant on numerous projects on Dementia. He is also a member of the older adult and caregiver advisory committee at AgeWell and has a strong background in caregiving.

# Constraints

Despite every effort to devise and execute an extensive research study, the researcher acknowledges several limitations that constrained its scope and findings. The study's choice and framing reflected the biases of the researcher. There are multiple ways to examine this issue and this is just one of them. The study was restricted by a short time frame, which prevented a more comprehensive investigation into plural futures, and limited the ability to conduct additional expert interviews across a wider range of demographic, geographic, and disciplinary groups.

There were gaps in intersectional and geographic plurality due to a limited professional network and accessibility to diverse practitioners which made it challenging to identify individuals who engage in Futures elements but do not primarily self-identify as a practitioner associated with the field. Despite the study's reliance on qualitative data, a limited sample size may indicate that not all system actors' experiences and beliefs are equally plausible.

There was also a constraint in developing and testing Scenarios due to limited time for workshops and unavailability of experts for a group thinking exercise. The study was conceived, conducted, synthesized, and published during the COVID-19 global pandemic which further constrained the study's sample size and range of participants, making it challenging to collect precise and detailed qualitative data from more participant interviews, as well as from a more diverse range of participants that included policymakers.

# 3. Framing

## Introduction

'Framing' is an essential aspect of any scenario planning effort and the purpose of 'Framing' is to clarify as much as possible what the scenario effort is trying to achieve. This helps ensure that all stakeholders are aligned on the goals of the scenario planning exercise. If there is no attention to what the expected outcomes might be, the scenario process is not likely to produce useful outcomes (Chermack, 2022). This is no different than any other investment of organizational resources. Even having vague ideas of the purpose and expectations, helps check on what was actually achieved compared with what the intended outputs were. This involves understanding internal and external variables and how they can influence the eHealth organizations.

This starts with obtaining a good understanding of the client or the organization to customize and tailor the process and the results for the best chance of success. This research focuses on the sector of eHealth organizations and strategic thinking involves examining both environmental and organizational factors. As a result of considering these two clusters of insights together and by using the "wind tunnel" model, the strategists are able to consider how organizations can sustain themselves in any future scenario (Heijden, n.d.). Hence, the first phase is to reflect on the identity of the organizations and establish that, in order to determine how the eHealth organizations

> **"If you don't know where you are going, you may end up somewhere else." - Yogi Berra**

fit within the overall environment. It is important to note and distinguish organizational identity from the popular concept of organizational vision. While vision is a concise and clear statement about a desirable abstract change in the organization and is exclusively about the future, organizational identity is primarily about the current identity of an organization, although closely related to the direction where an organization is going (Fergnani & Sweeney, 2021). The concept of strategic identity is vital for any organization that wants to achieve long-term success enhancing their chances of not just surviving but flourishing. It contains the basics of a "success formula" and provides a roadmap for how the organizational goals can be achieved through clear objectives, strategies, tactics and measures.

Having a clearly defined and aligned identity forms the basis for further strategic decision making and understanding the rationale and purpose that can help build a razor sharp focus for scenario planning exercise while defining what the outcomes could be like. The organizations will not be able to understand and act on messages about change and the future if they are simply sprung on people without some background and preparation. 'Framing' is particularly important since it broadens the thinking of the leadership by opening up the future views of the industry by using their perspective. Designers and developers of eHealth solutions will ultimately be empowered to play a more strategic role in implementation of eHealth services in the future. It helps researchers in translation of insights into guidance that can help the organizations understand and prepare for the heady challenge of confronting and dealing with change (Hines & Bishop, 2015). If the analyst can provide a sense of comfort and openness to different perspectives, the clients (eHealth organizations) will, in turn, be more willing to participate and share.

The future of business and industry includes both opportunities and threats. Foresight assumes that businesses can foresee future developments, regardless of how uncertain the future is, if they have access to effective, usable information within their own operations as well as in their surrounding environments (Järvenpää et al., 2020). The scenario approach is a powerful tool that organizations can use to develop their knowledge and insights to make better decisions. According to Heiijden, it involves taking what is known about the "zone of proximal development" - the area where learning occurs at its highest rate - and using it to scaffold new information into the existing body of codified knowledge possessed by the organization. This creates a bridge between what is currently known and what can be learned, allowing for more informed decision-making (Heijden, n.d.). One advantage of this approach is that it allows organizations to build upon their existing knowledge base, making it easier to incorporate new information as it becomes available. By scaffolding new insights into already-established frameworks, companies can quickly adapt to changing circumstances in their industry or market. Additionally, this approach helps avoid mistakes caused by incomplete or outdated information, as teams are able to draw on a wider range of sources when making decisions and is the only way to help the organizations become resilient. Essentially, 'Framing' means assessment of the organization that can help provide criterias to assess the fit of strategies based on scenarios.

It is important to identify who the technology benefits and how it generates value before implementing it in informal Dementia care. Implementation-related factors that are related to demand-side value have received significant attention in research. This is because they determine how users perceive the product or service being offered, and ultimately its success. Factors such as usability, functionality, reliability, and user experience have been the primary focus of most research efforts. However, there has been little emphasis on factors that relate to supply-side value. These include business cases, models, chances of return on investment (ROI), and investor risks. These factors are critical for businesses seeking to develop sustainable revenue streams while minimizing risks (Bastoni et al., 2021).

The environment is constantly changing, and new developments, if unchecked, may push the eHealth organizations off course. Learning about it is crucial to direct research areas to emphasize and avoid. To create a unified overview it is first essential to filter significantly in order to obtain what is essential from a very large pool of available data and the environment needs to be simplified for strategic conversation to begin. In order to arrive at some sort of strategic identity for the eHealth industry it is important to use some principles and develop a mental model of the organizations as they pursue their strategic objectives (Heijden, n.d.). Strategic identity is the basis of this mental model which are the forces behind the organization's current and future success. Heijdan refers to this as a business idea that starts with identifying a need in the society and building services based on distinctive competencies and competitive advantage that creates unique value for the customers and thereby having a profit potential. It is one of very few applications of systems thinking as a pre-activity to scenario planning (Chermack, 2022). This set of business ideas form a key component in stress testing strategies against different future scenarios.

A conceptual framework (Figure 3) by Fanta et al applies a systems approach to understand the holistic structure of a sustainable eHealth ecosystem and reflects the nonlinear and dynamic complexity of eHealth systems implementation is used as the basis for this research and identification of mental models (Fanta et al., 2015). Their study indicates that the long-term sustainability of eHealth depends not only on technological factors, but also on economic, social, and organizational factors. The determinants of success may vary over time from privacy and ethical issues that can pose a barrier to implementation to regulatory environment and policy developments. The organization's capacity for long-term technical user support also plays a key role for sustainable implementation (Sriram et al., 2019)


Figure 3 - Conceptual framework for sustainability and scale of eHealth systems in a resource constrained environment (Fanta et al., 2015)

# Insights

The implementation of an eHealth project is a challenging yet rewarding endeavor that requires careful consideration and comprehensive understanding of the key components for success. An effective implementation framework for such projects should take into account the organization's goals and objectives, as well as the core values, culture and infrastructure. It should also consider user needs and feedback to ensure that the project meets its purpose. IInterviewee #11 comments that if you haven't rationalized the service for the patient or caregiver, and if you haven't rationalized the service on the back end of your organization, then you're essentially building vaporware which means a product that is announced to the general public but is late or never actually manufactured. The design of an eHealth project needs to be tailored to meet the unique needs of each individual organization while considering technical requirements, privacy laws, cost considerations, security measures and other factors. Organizations must have a clear vision for how they want to integrate technology into their operations in order to reach desired outcomes with maximum efficiency.

Based on the literature readings, reviews of existing eHealth solutions in the market, and interviews with industry experts, the following analysis was drawn on the basic characteristics and the 'success formula' for survival/growth considering distinctiveness, competitive advantage, customer value, and many other factors.

## 1. Implementation Team

Innovative breakthroughs change and reshape industries, disrupt markets, and lead to entirely new businesses, product categories, and industries. We shape our actions and outcomes based on the orthodoxies and mental models we hold. To push business boundaries, strong leadership with expansive vision and courageous decision-making, along with committed follow-through is required. In this way, the plan can be effectively and consistently implemented, addressed appropriately when issues arise, monitored for effectiveness, and changed as necessary (Canadian Academy of Health Sciences, n.d.). In addition, attracting and engaging the appropriate people for long-term user support also plays a key role in ensuring that the program is successfully implemented. A provider should be able to provide sufficient staffing and replacement capacity so that it can guide PwD and their caregivers on how to use technology, provide sufficient time for practice, and provide face-to-face assistance in case of technical difficulties. A systematic review on Informal carers' experience of assistive technology use in Dementia care at home suggests that this can also be achieved through a combined strategy of social media marketing, education, role modeling, training, and other similar activities (Sriram et al., 2019). Another systematic review on the implementation of eHealth interventions for informal caregivers of PwD highlights that in addition to a lack of resources, especially in terms of available time, there was also little leadership involvement in the implementation (Christie, et al., 2018). Interview #6 talks about having a good team and says that it's a valuable asset, and it's impossible to build everything single-handedly so one should listen to their team and not rely solely on their own thoughts.

Scaling a business requires more than just a great product or service. It demands a strong leader who can communicate the vision and benefits of their offering, while bringing together experts from different fields to share this vision (Christie et al., 2021). The ability to unite diverse professionals under one common goal is essential for successful scaling. This group of individuals will be responsible for choosing the appropriate technology, implementing it effectively, securing funding, forming partnerships, involving stakeholders and being early adopters of new processes. They must make informed decisions based on data so that the organization can grow quickly and efficiently. Without a skilled leader at the helm, these tasks become impossible to achieve in harmony. From his experience Interviewee #13 strongly feels that creating enthusiasm and passion for the outcomes is essential for success and that active participation in the innovation process can build strategic alignment among key stakeholders increasing the chances of successful implementation. A great team is not just about having the right skills and experience, but also about possessing certain characteristics that help foster a positive and productive work environment. Patience, flexibility and no preconceived notions are some of those key characteristics that can make all the difference according to Interviewee #8.

Interview #13 further adds that the implementation team includes mentors and advisors who can provide guidance and support to help move a product forward and navigate failures. They can connect the CEO or founder with mentors or coaches to help them overcome challenges or make necessary pivots. Success also involves knowing when to stop pursuing a project that may not be of interest or viable in the long run, and being able to communicate that to the team. Stakeholder management is another crucial aspect according to thim and it involves setting clear milestones and deadlines to ensure accountability and keep the project moving forward. Without accountability, there is a higher chance of failure, and it is important to keep pushing and updating stakeholders to maintain momentum and ensure progress.

## 2. Strategic Partnerships

In order for eHealth organizations to provide customers with the services they expect, ecosystems of digital health players are required to provide an end-to-end continuum of services (BCG Digital Ventures, 2022). Collaboration becomes a key factor that accelerates adoption of eHealth services and helps the whole ecosystem thrive. Networking and partnering with organizations like Alzheimer Societies, caregiver associations, memory clinics, family health teams, and hospitals plays an essential role in empowering, educating and supporting caregivers (Canadian Academy of Health Sciences, n.d.). Interviewee #11 notes that COVID has helped break down some of the silos in the healthcare system and led to more collaboration between organizations. However, there is still a need for more collaboration to scale successful solutions across different regions. She notes that prior to COVID, collaboration across different regions was challenging and sometimes combative.

Credibility is important for a startup, especially when competing with established companies like Best Buy or Walmart, says interview #6 who is working with insurance providers to cover the cost of their product under health group benefit plans. Marketing the product through these insurance companies adds more value and credibility to the product, making it more likely for users to adopt it. This approach also improves overall literacy as users are more likely to read about the product through a credible channel. One of the challenges he faced is the overall mobile data usage of their solution, especially for older adults who may not have data plans on their phones. They are now working with providers and potentially targeting them as channel partners to provide their solution with an educational component that promotes overall family safety. He also mentioned that there are other solutions in the space,

which is a good sign for the market. Interviewee #8 feels that credibility is important and by explaining the research you've done or the results you've measured one can show that your solution and website are credible.

Interviewee #1 and her team received funding from TELUS and physical devices from a group to connect clients who need them. She strongly feels that partnerships for hardware are important, especially for internet service, as many people may have smartphones without data plans and rely on Wi-Fi. In-home Wi-Fi is becoming increasingly important, and avenues for providing it are crucial, even though it's challenging to identify clients who need it without being able to see them in person.

Partnerships are valuable for not just funding but also to access research, health experts, and other resources. Interviewee #6) overcame research challenges by using resources like Mars Pronto, which provides access to research papers and articles on various topics for free. They also obtained government grants from programs like Ontario Centers of Excellence and IRAP, which don't require giving up equity in the company. They have plans to climb the ladder and eventually go after private funding that is equity-based. They initially started building a wearable device with the help of government organizations and local colleges and also received funding and resources to develop the initial prototype. They later worked with local innovation centers to develop a business model and receive guidance from industry experts on different business models with an aim of creating a win-win situation for everyone involved. Interviewee #12 suggests, “there're various organizations that support young tech companies..like J Labs, RBC Ventures.”

Technology-based collaboration could improve interoperability by adopting common data standards or it could be a social collaboration where trust is established among stakeholders through adoption of common ethical standards. Interviewee # 1 says that data is a significant challenge in healthcare, as data from various sources is not connected, making it difficult to have a cohesive picture of a patient's needs. According to them, patients are usually responsible for aggregating their own data, but it can be time-consuming and challenging. Remote caregivers have major benefits when data collected through these interventions is shared with health professionals, especially if they do not live with the care recipient, as it creates a continuous link between caregivers and clinicians, enabling easy communication with care providers to monitor one's own well-being or the well-being of the care recipient. Policy collaboration is also crucial to improving caregiver outcomes. A study suggests that due to their policy and innovation incentives regarding Dementia related caregiving and prevention, local governments and municipalities make an attractive context in which these interventions can be implemented (Christie et al., 2021).

There is also evidence that indicates that these interventions are also more likely to be adopted by external organizations when such partnerships are formed. Researchers of a study found that identifying with the developers of eHealth solutions may also affect caregivers' and health-care professionals' attitudes toward the intervention (Sztramko et al., 2022). Another analysis of business models of eHealth interventions in the Netherlands established that commercial collaboration is a big help (eg, marketing firms, information and communication technology companies, and sales and legal experts) (Christie et al., 2021).

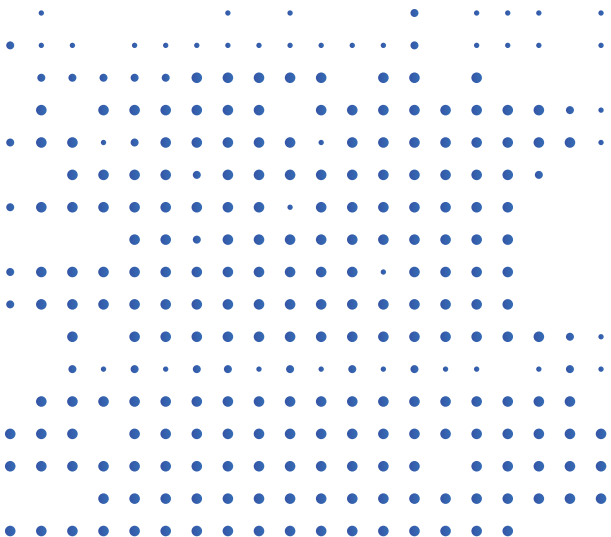
Partnerships are also important for delivery of eHealth solutions. Interviewee #10 mentions that developing partnerships with community agencies such as libraries and senior centers can be useful as they are places where people already go. In-person teaching can be conducted in such places, and staff can be trained to help people use the interface. It is important not to create new appointments and needs for caregivers who are already busy, but instead teach them where they are already going. Community health models, where there are nurse practitioners and social workers, can also be helpful in teaching caregivers.

## 3. Co-design

As caregiving transitions to home-based settings, the use of assistive devices is becoming increasingly consumer-focused. These devices aim to provide support and assistance for caregivers and their loved ones, making it easier for them to carry out their daily activities. As a result, there is a tremendous opportunity in involving consumers and other stakeholders in evaluations and codesign processes that drive improvement and stimulate change. One area where this approach can be particularly effective is in the development of new technologies that support caregiving at home. By involving caregivers, healthcare professionals, families, and patients themselves in the design process from the outset, it becomes possible to create solutions that are tailored specifically to their needs. This not only helps to improve outcomes but also ensures that these technologies are more widely adopted and used by those who need them most. It means embracing agile development, involving users in the whole process as much as possible and developing the interventions further based on user feedback. It is crucial to test for meaningful use among the intended audience when creating and deploying online educational interventions. This testing can assist in identifying any obstacles, ultimately reducing the high rates of attrition that literature reviews have highlighted (Sztramko et al., 2022).

It involves breaking down silos between different teams and working towards the common goal of optimizing user journey. Adopting digital technologies in healthcare will require a shift in organizational culture and mindset. As technology continues to advance, companies across various industries are designing platforms aimed at providing users with a seamless experience. However, as the number of these platforms grows, it becomes increasingly important for them to work together seamlessly. In today's world, users expect a connected experience regardless of which company they are interacting with. Achieving this level of integration requires careful planning and collaboration between different companies. Ecosystems need to be designed not just for individual companies but also for the collective benefit of all stakeholders involved. Healthcare organizations should shift away from lengthy product development lifecycles and focus more towards creating minimum-viable products, allowing teams to test early and learn quickly. A key learning from a study in the Netherlands examining a sample of case studies of eHealth interventions also suggests implementing and learning rather than waiting for designs to be perfected as the best approach to success (Christie et al., 2021).

As a Service Designer, Interviewee #11s' biggest challenge was starting with a product lens and a development team that focused too much on technical implementation, resulting in faster but flawed systems which led to budget and timeline overruns, and making conscious decisions about whether to reuse or start from zero became important. She highlighted the pitfalls of not investing in the discovery phase and making strategic decisions. Interviewee #8 believes that the key to developing comprehensive eHealth resources is to include perspectives from all sides, including medical, healthcare, Dementia, and caregiver perspectives and by doing so, the eHealth solution will have credibility and appeal to all parties involved. Interviewee #9 resonates with this and discusses the importance of understanding various aspects of healthcare, including the disease itself, the patient's experience of the disease, and the role of caregivers. He emphasizes the need to understand the concerns and

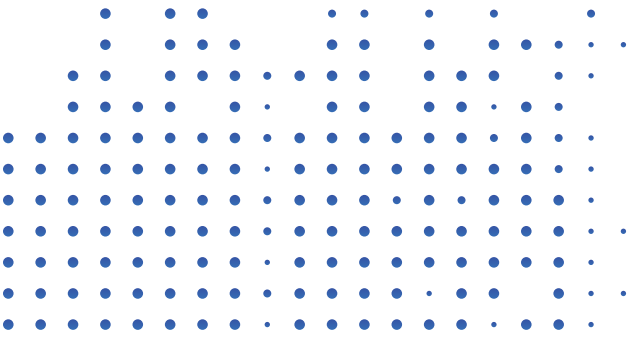


needs of both patients and caregivers to develop effective healthcare solutions that fit within the broader healthcare system.

Interview #12 suggests an approach which involves starting with privately funded healthcare organizations to test, learn and scale solutions on a small scale. As evidence is critical in healthcare this helps gather evidence to demonstrate the effectiveness of healthcare solutions. Interviewee #6 says that vision for a project can change over time as a result of learning and talking to industry experts. The end product may look different from the initial vision, which is a positive thing as it indicates growth and adaptation. Making pivots and changes along the way is also necessary. Interview #7 believes that the design should not only focus on the caregiver's needs but also involve PwD in the process. She feels that there is a stereotype that assumes PwD are in the late stages and cannot provide feedback. However, according to her, most PwD are still capable of making choices, and the design should consider their needs.

## 4. Hybrid Delivery

Remote professional support has become an important aspect of caregiver interventions as it provides quick and easy access to professional advice and support. Caregivers often face a range of barriers when seeking face-to-face appointments, such as feeling like a burden to the professional or feeling hesitant to ask questions or express their feelings (Guay et al., 2017). With remote support, caregivers have the reassurance that they can reach out for help whenever they need it, from any location. This flexibility and accessibility can alleviate some of the anxiety and worry that caregivers experience, knowing that they can quickly and easily connect with a professional who can offer guidance and support. Additionally, the rapidity of the answers received from remote support can further increase caregiver satisfaction and engagement in the intervention (Guay et al., 2017). By removing some of the traditional barriers to accessing support, remote professional support has the potential to improve caregiver outcomes and overall satisfaction with the intervention.



Results of a program review that Interview #1 was a part of, showed that online programs offer flexibility and allow clients to receive information in a way that is effective for them without the need for travel or leaving their loved ones. She also feel that while online sessions are convenient and useful, people still like to see other people and prioritize social interaction, and finding effective ways to replicate this online is necessary. According to her, in-person programs focused on social support, such as peer support groups or those led by social workers, have more value that cannot be replicated in an online space. She further added that the goal of creating rapport and making education fun within a group is much easier to establish in person, but hybrid models with some sessions in person and some online can be considered.

Providing interventions for caregivers online offers them flexibility as they are usually busy with caregiving tasks and may not have the time to attend in-person sessions. Some interventions may include live forums or "ask the expert" sessions where healthcare professionals lead and share information. The online setting can also foster a sense of community among caregivers, reducing their feelings of social isolation and loneliness. However, synchronous online interventions may not work for all caregivers, so it is recommended that the expert-led sessions be recorded and made available for later viewing. To protect the privacy

of other caregivers, the recordings should only feature the session speakers (Sztramko et al., 2022). In another study, participants praised the flexibility of the web-based course and their ability to participate on their own time (Rottenberg & Williams, 2021). They appreciated the self-paced nature of the course as they could complete it from the comfort of their own home or during work breaks. Some participants preferred to only review the most relevant information. The online delivery helped to overcome geographical barriers, making the course accessible to caregivers in remote areas. This also helped to reduce financial barriers.

Interviewee #8, however, says that caregivers for PwD are often overworked, and many of them are elderly and may not have much experience with online resources. Some available resources are only accessible online, which can make it difficult for those who are not comfortable with technology. This may result in confusion or the inability to access helpful eHealth initiatives for some individuals. Users of a web-based course reported a lack of peer engagement as a barrier to participating, since the discussion boards were perceived as lacking interactions between caregivers (Rottenberg & Williams, 2021). Therefore, a hybrid approach to delivery of eHealth solutions is crucial. Online programs often lack a sense of community. Community creation refers to forming and maintaining a community of intervention users who are in contact with each other through the intervention (Christie et al., 2019). Research suggests that group support from peers is a crucial factor in the effectiveness of online interventions for older adults and is one of the main reasons caregivers of people with cancer use the internet. Online support groups are viewed as a way for caregivers to share information, plan for the future, provide support in challenging times, and express their emotions (Guay et al., 2017).

One study found that people who have Dementia and their caregivers prefer information published in written form and support groups to healthcare professionals as sources of information and support (Soong et al., 2020). In spite of the fact that healthcare professionals are typically the first source of information about conditions, the information provided is often inadequate and inadequate. Individuals and caregivers were often left feeling unsupported and frustrated by follow-up appointments that did not always include further information. Consequently, it is essential that PwD and their caregivers have access to quality information and support. According to a study by Ploeg on a web-based transition toolkit called My Tools 4 Care, participants recommended the inclusion of a feature that would allow caregivers to connect with each other in real-time or asynchronously to exchange information, experiences, and caregiving strategies (Rottenberg & Williams, 2021).

Support groups and written information sources have become increasingly popular among patients as they offer a wealth of knowledge beyond just medical information. Patients facing chronic illnesses or major medical procedures often find themselves overwhelmed with the plethora of new information they must process, and having access to different resources can be immensely helpful. For example, reading about other people's journeys in dealing with their conditions might help patients gain perspective on their own challenges and give them hope for recovery. Patients who join support groups get to interact with others going through similar experiences and can share personal stories, coping mechanisms, and tips for managing symptoms. Allowing participants to have a direct web-based contact with other caregivers contributed to the effectiveness of the interventions. findings revealed positive effects on social inclusion and support from the interactive services that enabled communication among participants. all studies involving technology-driven interventions for caregivers that were reviewed had some positive findings, and each had an information and social support component (Rottenberg & Williams, 2021).

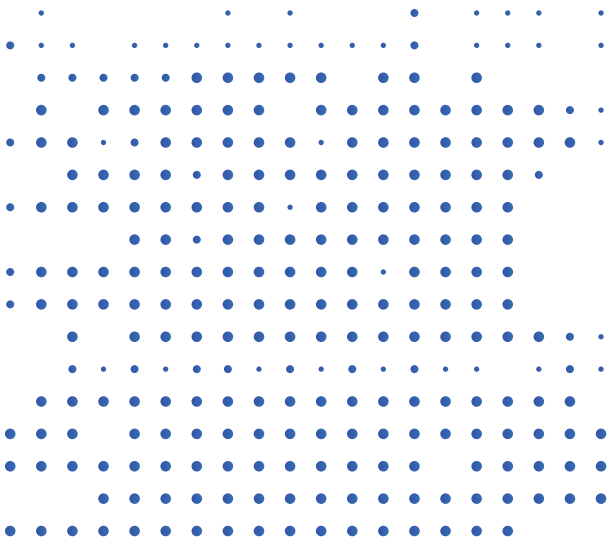
Interviewee #11 feels that the biggest challenge in the consumer space is connecting with the right customers, while balancing the value of the product with the effort

required for customers to maintain it which involves finding the right person at the right time and stage of their journey, and is a combination of marketing and timing. Such a mixed-methods approach may also prove to be useful in reaching more customers. Interviewee #9 suggests another interesting addition to this and feels that in order to make a significant impact and justify the business case, it is important to identify high-risk populations. Working with low-risk populations will not yield significant results, so efforts should be focused on those with a higher risk of developing a certain condition. This approach will provide the most value and make the biggest difference.

## 5. Tailored Content

Boots et al found that multicomponent internet interventions that combined tailored information with interactions among caregivers were the most promising for improvements (Rottenberg & Williams, 2021). According to Sriram et al, tailoring technologies to the specific needs of caregivers and individuals with Dementia was often necessary, and failure to do so resulted in high rates of abandonment (Sriram et al., 2019). The healthcare and care services landscape is complex and constantly changing. There are numerous organizations, both public and private, providing a range of care services to individuals in need. This includes hospitals, nursing homes, home care agencies, hospices, and various community-based organizations. With the rapid pace of change and innovation in healthcare technology and care delivery models, it can be difficult for individuals and their caregivers to keep track of what services are available to them. Moreover, the fragmentation of the healthcare system can lead to gaps in care, duplication of services, and inconsistencies in care quality. It is often the case that individuals have to navigate through a maze of services and providers in order to find the right care that meets their unique needs. In such a complex and fragmented environment, it can be challenging to get an up-to-date overview of available services, let alone determine which services are most appropriate for a given individual (Christie et al., 2019).

Interviewee #8 believes that the information provided online can be overwhelming and confusing for caregivers, especially if it is not tailored to their specific needs. Personalized information that is relevant to their situation is necessary, as generic information can be unhelpful and cause more confusion. The caregivers of PwD are mostly elderly and have varying degrees of experience with online resources. This creates a challenge for eHealth initiatives as some caregivers may find them confusing or inaccessible, especially those who are not used to using online resources. Providing evidence-based, stage- and problem-specific support across the caregiver journey is crucial to maximizing the diversity, complexity, and applicability of caregiving scenarios represented. Caregivers face a range of challenges as they navigate their caregiving journey. From managing medical appointments to providing emotional support and dealing with legal issues, caregivers need access to resources that can help them address these challenges effectively. Research has shown that interventions focused on specific stages in the caregiver journey can be particularly effective (Sztramko et al., 2022). For example, caregivers may benefit from educational programs during the early stages of caregiving when they are learning how to manage their loved one's health condition. Likewise, interventions aimed at addressing



emotional distress may be more beneficial during later stages of caregiving when feelings of burnout are more common. By providing targeted interventions at different stages along the caregiver journey, we can better equip caregivers with resources tailored to their needs.

Personalization of content and engagement of participants are important factors for the success of any intervention, including those aimed at providing support for caregivers. With the advent of internet-based interventions and internal algorithms, it has become easier to customize the content provided to caregivers. The use of interactive online activities further enhances the effectiveness of interventions by providing caregivers with a more engaging and personalized experience. By tailoring the content to the individual needs and situations of caregivers, internet-based interventions are able to address specific concerns and provide targeted support (Guay et al., 2017). This personalized approach allows caregivers to feel more supported and understood, which can improve their overall well-being and ability to provide care.
The interactive nature of these online activities also encourages greater engagement from participants. Caregivers are able to actively participate in the intervention, rather than passively receiving information. This helps to improve their knowledge and understanding of caregiving, and can lead to better outcomes for both the caregiver and care recipient.

## 6. Data security & privacy

In today's digital age, the exchange of patient data has become increasingly common. However, with this rise in data sharing comes a greater risk to patient privacy and security. It is crucial for healthcare organizations to prioritize security protocols when implementing data exchange systems, rather than treating it as an afterthought. Not only is this best practice from a patient care perspective, but it also ensures compliance with legal and regulatory requirements. Designing in security protocols involves implementing measures to protect sensitive information during transmission and storage. This can include encrypting data, restricting access to authorized personnel only, and implementing firewalls or intrusion detection systems. By taking a proactive approach to data security, healthcare organizations can minimize the risk of unauthorized access or breaches.

In addition to designing security protocols, establishing legal agreements between exchanging entities is also essential for ensuring patient privacy and security. In a world where data is king, it is imperative to know who will have access to your information and for what purposes. Whether you're using a social media platform or sharing personal information with an institution, being informed about the data shared can protect you from potential harm. It's important to understand the terms and conditions of any agreement that involves your data. Another important aspect of data security is being able to uniformly identify patients enabling better cross-referencing of medical records, reducing the chances of data mix-ups and improving patient safety. Another common issue is losing patient data during exchange or transforming it in the process. This can occur when transferring information between different electronic health record (EHR) systems or when converting data from paper-based records into digital format. Misinterpreting data due to semantic differences can also cause significant problems, particularly if clinical decision-making is based on inaccurate or incomplete information.

Privacy concerns are among the most significant barriers that prevent people from using technology to document their personal issues. For instance, many individuals may feel anxious about sharing their medical information online

due to concerns about data breaches or unauthorized disclosure of personal health information. Therefore, it is essential to address these barriers proactively by ensuring users' privacy rights are protected throughout the implementation process (Christie, et al., 2018). Interview #6 agrees that one of the biggest challenges in the healthcare industry is privacy concerns, especially with tracking or monitoring behavior analytics. Convincing people to consent to sharing their data is difficult, even with family members. To address these challenges, the company pivoted from a hardware device to a software solution that is more secure and transparent. They also partnered with Tellus cloud to ensure data stays within Canadian data centers. They have also accessed resources such as Mars Pronto and government grants to support research and financing.

As the internet has grown in popularity and accessibility, so too have concerns about privacy and security. Many people are understandably worried about accessing information online, especially given the high-profile data breaches that have occurred in recent years. "It's going to depend on their comfort level with privacy and security of accessing information online and being hacked," says Interviewee #10 in their interview. For some individuals, the potential risks associated with accessing information online simply aren't worth it. They may feel uncomfortable with the idea of putting their personal or financial information out there for others to see. Others may be more willing to take on these risks but will still want to ensure that they're doing everything possible to protect themselves against hackers and other threats.

## 7. Ease of accessing

Interview #1 believes that digital literacy training should be developed alongside e-Health initiatives and notes that some people may not have the functional capacity to engage with technology, which could hinder their ability to fully benefit from programs. She suggests providing in-person training to ensure that people are not only able to use technology but also feel comfortable and confident doing so. She also mentions the importance of understanding the target population and their devices' capabilities. In her experience having a device and connecting it to the internet can be a logistical challenge for some individuals emphasizing the importance of ease of access and use. Additional steps, such as logging in and creating an account, can create barriers for busy caregivers who may not have the time or capacity to engage with them. It is important to consider the caregiver's perspective in designing these tools. She says that some individuals pay for external support to help them with technology-related issues, even if they may not necessarily need it, creating a financial burden, especially for those who cannot afford to pay for such support. Additionally, the extra effort required to deal with technology can be a struggle for caregivers of any age, and it can become overwhelming and discouraging. She further adds that having access to recorded resources can be important for caregivers who may not have free time during scheduled live sessions. Caregivers appreciate the ability to join from anywhere, including their loved ones' long-term care homes, their own homes, or other locations, as long as they have mobile devices and access to the internet. Interviewee #12 also agrees with this and says that having an easy-to-use system and access to support when something goes wrong are important considerations for individuals with cognitive impairments, such as those with Dementia.

Designing user-friendly products and interfaces is crucial in today's digital age. Users are not necessarily experts, and it's vital to remember that whatever is designed needs to be intuitive and easy to use. These characteristics include the caregiver's expectation of use, their psychological state,

trust, autonomy, motivation, confidence, frustration, cyber rapport and privacy (Christie, et al., 2018). As the population ages, the number of PwD is also increasing. Caregiving for individuals with Dementia can be a challenging task that requires patience and understanding. Younger caregivers may have no problems using digital technology to assist them in their tasks. But some apps designed for caregiving may require a level of technological proficiency that many older individuals may not possess. One of the most important aspects of designing a user-friendly product or interface is the language used. It has to be approachable, clear, concise, and understandable by everyone. Caregivers who are partners or spouses of those with Dementia are more likely to be older themselves and may experience difficulties when it comes to using these technologies. This could lead to frustration and impede their ability to provide adequate care for their loved ones. Helpdesk and implementation support services supplied internally. A mixed methods evaluation study on web-based delivery of the caregiving essentials course for informal caregivers of older adults in Ontario highlight age-related factors, issues with navigating aspects of the course, and concerns about privacy and anonymity as some of the barriers to participation (Rottenberg & Williams, 2021).

Interviewee #9 also emphasizes the importance of considering whether a digital tool is easy to use and whether it feels like a companion or a chore for caregivers.

He further suggests that integrating the tool into the caregiver's workflow is crucial so that it does not become a burden but rather lessens the weight. This is also validated by a study that says that the tool must be easily accessible and consistent to facilitate optimal intervention learning and additionally, the resources that don't require a separate account creation or log-in could help reduce barriers to use (Sztramko et al., 2022). Interviewee #10 discussed the importance of using non-medicalized language in search functions to ensure that the terms used match those that regular people would use to describe their needs and experiences. She notes that physicians often use medical jargon, which can be different from the language used by patients or caregivers to describe the same thing. Interviewee #12 also stressed on the importance of ease of use and intuitiveness in e-health tools, particularly for users with cognitive, hearing, or sight issues citing privacy and data concerns as well as the need for accessibility without requiring a separate account creation or login to reduce barriers to use.

Participants in another research study identified lack of comfort with technology and web-based platforms as a barrier to participation. Suggestions to overcome this include more engaging communication methods and reorganizing content to reduce text. Web-based delivery was generally seen as accessible, but some participants cited limitations with navigation (Rottenberg & Williams, 2021).

## 8. Commercialization Model

In addition to introducing novel eHealth solutions, companies must ensure that these solutions are financially viable and have business models that will make sense. Otherwise, scalability of such solutions will be compromised or, at least, challenging, which is why business planning and commercialization are identified as facilitators of implementation (BCG Digital Ventures, 2022). Incorporating a long-term approach and commitment makes it possible to scale up solutions but sufficient and stable funding is critical for that. Costs associated with promotion and engaging individuals (which could be for marketing or operations) can add up over time and may prove to be a barrier to the implementation of eHealth interventions (Levinson et al., 2020). Furthermore, since external funding tends to focus on new research rather than sustainability and long-term implementation, which means most academically developed interventions reach only a small population of caregivers, it becomes more important to develop sources of revenue (Gitlin et al., 2015). A research study also points that reimbursement end points need to be agreed on and validated (Christie et al., 2019) as these kinds of eHealth interventions, that focus on education, make the most sense when they are linked to and integrated with the larger service delivery system.

Interviewee #6 certainly feels that monetizing the solution is a challenge for startups and explains that one of the challenges they faced in developing their solution was convincing people to spend money on it, especially in Canada where there is a belief that healthcare solutions should be provided for free by the government. He also mentioned the challenge of educating people about the value of the solution and the additional financial stress it may create for caregivers. He acknowledged that they faced challenges in monetizing their product and suggested that working with advisors earlier in the process may have been beneficial. According to him, the traditional approach of asking users to pay for a product right away may not be effective and suggested alternative strategies, such as offering a free trial period. He also emphasized the need for market-specific understanding, as healthcare approaches differ by geography.

Interviewee #13 also suggested using a freemium model to try out eHealth software and apps. The lack of resources to market or influence policy, as well as the need to validate data and show potential solutions, is a significant barrier to the implementation of eHealth solutions. It's essential to have the skillset and resources to push and promote these solutions and by offering free trial eHealth solutions can gather data that is required to understand that.

While it plays an important role, inadequate public relations resources due to budget constraints of smaller organizations, poses a challenge for implementation of sustainable interventions (Sriram et al., 2019). Several respondents in a study mentioned that having an implementation guidebook would be helpful for the management to facilitate the adoption, implementation, and maintenance of the intervention (Christie et al., 2021). This could be in the form of a package, consisting of an implementation protocol and premade templates for social media posts, posters, and flyers. Finding from another research on barriers and facilitators to implementing web-based Dementia caregiver education from the clinician's perspective also highlights that the participants noted that they could implement iGeriCare (an evidence-based, multimedia, web-based educational resource for family caregivers of people living with Dementia) immediately by distributing collateral promotional materials developed in advance or by simply sharing the URL of the website with caregivers (Levinson et al., 2020).

Interviewee #9 discussed the need to consider funding and interoperability when creating these solutions. By lowering costs and improving care, there can be an increased benefit for patients and healthcare providers which in itself is a commercialization model. Interviewee #10 believes that regulating the eHealth sector is more important than funding. They suggest that the sector needs to understand the legal

framework early on and not wait until the end of the project. They have experience with researchers who assume federal laws apply and only check legal questions at the end, but they should be doing their research at the beginning or before applying for a grant. The legal framework should be considered early on, and waiting for the law to change can take a long time. However there are tradeoffs and this requires important decisions to be made. Interviewee #11 worked with a startup whose technology was liked by doctors but the investors/purchasers wanted to know about FDA and EU compliance but the company was unable to answer those questions due to limited funding and being a small startup.

# Where to from here?

The world of healthcare is constantly evolving, and the integration of technology into caregiving is no exception. The findings of our research suggest that eHealth interventions for caregivers of PwD must be integrated into larger structures in order to be desirable, feasible, and viable. This means that these interventions need to have support from both internal and external sources, including ownership over content and development of information and communication technology services. In addition, offering fixed, low pricing, or free trials can make eHealth interventions more accessible to caregivers who may not have the financial resources to invest in expensive technologies. These findings highlight the importance of intersectoral collaboration between healthcare providers, technology companies, and caregivers themselves in order to develop effective solutions and to increase adoption rates. By working together to create integrated eHealth interventions that are affordable and user-friendly, lives of both caregivers and their loved ones living with Dementia can be improved while ensuring successful implementation of eHealth interventions. Collaboration with policymakers is also crucial in order to create an environment that supports innovation in healthcare delivery.

When it comes to thinking about the future, both internal and external factors should be considered. This can be especially challenging given the complex nature of modern business environments, which are constantly changing and evolving at a rapid pace. To ensure long-term sustainability, companies must be able to navigate these challenges while remaining true to their core values and mission. In order to achieve this level of sustainability, organizations must strike a delicate balance between focusing on internal strengths and addressing external threats. In order to ensure the desirability, feasibility, viability, and sustainability of eHealth interventions, these identities will be crucial in the analysis later.

Framing is an essential exercise that aims to highlight the significance of having a purpose, intention, and reason for creating scenarios. Without these elements, scenarios become pointless and do not serve their intended purpose. The framing exercise involves identifying the context in which a scenario is being created. It requires individuals to consider various factors such as the target audience, objective, and scope of the scenario. By doing so, we can develop a clear understanding of what is to be achieved from creating a specific scenario. Furthermore, it also helps create buy-in from stakeholders who may have different perspectives or priorities than those involved in creating the scenario. Overall, Framing ensures that scenarios are not only useful but also meaningful and impactful for all involved parties. When talking about the future, many people look to forces both inside and outside of themselves to determine their destiny. Therefore this gives a view of the inside. Any organization who can do all this would be able to ensure sustainability for a long time but difficult to do.

# 4. Scanning

## Introduction

Scanning is a process of identifying and analyzing potential future developments and trends expected to shape society and the economy in the coming decades helping inform decision-making in the present. The concept of "predetermined" forces is important to consider when looking at the future and refers to those factors that are entirely outside our control and will have an impact on any story we tell about what lies ahead (Wilkinson, 1995). One example of a predetermined force is demographics. Population growth, migration patterns, fertility rates and aging populations all play a role in shaping the future and cannot be changed by any individual or organization. Similarly, economic trends such as global markets, labor supply and demand, technological advances, resource scarcity and shifting geopolitical dynamics can also shape the future in powerful ways that we cannot control.

In foresight, megatrends, trends, and drivers of change are concepts used to describe the major forces that shape the future. Megatrends are long-term, global shifts that may not be always visible on the surface but have a profound impact on society, the economy, and the environment. Examples of megatrends include demographic shifts, technological advancements, climate change, and geopolitical power shifts. Trends are patterns of change that emerge in response to megatrends. They can be short-term or long-term and can be seen in consumer behavior, technology adoption, and cultural shifts. Drivers of change are the underlying forces that shape megatrends and trends. These can include social, technological, economic, environmental, political, and values as factors (STEEPV). For example, technological innovations can drive changes in consumer behavior, while demographic shifts can drive changes in social norms.

Identifying drivers of change in foresight is a multifaceted process that requires careful consideration and analysis. To identify drivers of change, one must look at the factors that are likely to shape the future and have the potential to disrupt the status quo. Their impact on the long-term success or failure of eHealth organizations is then summarized for clear and concise presentation. The STEEPV exercise is a useful tool for businesses and organizations to identify the major forces that could potentially shape their future operations, even if their ultimate effects and developments remain highly uncertain (Rhydderch, n.d.). Driving forces are the factors that shape and influence our world in ways we may not always be aware of. They are powerful, long-term forces that often operate outside of our immediate concerns, but can have a significant impact on our lives over time. By listing these driving forces, we can gain a better understanding of the larger trends and patterns that shape our world.

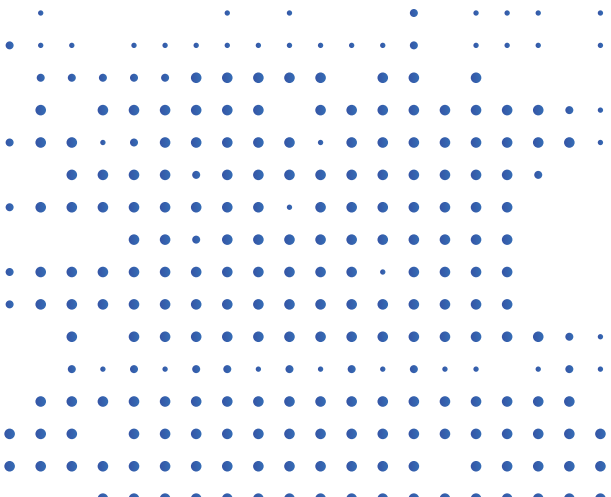
# Megatrends and Trends

With the aging population growing, the number of PwD is also increasing. A new national survey on aging-in-place revealed that over 78% of Canadians want to age in their current homes (News Wire, 2021). There is a trend towards helping seniors live independently for longer in their own homes and many PwD are being encouraged to live at home, either because they prefer to remain in familiar surroundings or because it is more cost-effective than living in a long-term care facility. The eHealth organizations can provide technological solutions to help caregivers and the aging population which is why technology-assisted living is becoming more common. This includes smart homes, wearables, and other technology-enabled solutions that can improve quality of life for PwD and provide peace of mind for caregivers.

Even though living at home can have benefits for PwD, it also places a significant burden on family caregivers, who often struggle to provide the level of care required by their loved ones. Informal caregivers, such as family members and friends, are increasingly recognized as playing a critical role in providing care for seniors and individuals with chronic and cognitive conditions. The services provided by these caregivers are often invaluable and are essential to avoid the high costs associated with professional caretakers or institutions. The importance of providing support and care to informal caregivers has been growing, with various initiatives and policies being developed to address this need (Government of Canada, 2022). There have also been significant shifts in family structures over the past few decades which has led to a greater adoption of virtual care as families seek out more convenient and accessible ways to access medical care and other support services. This can be particularly important for families with young children, elderly or disabled family members, or those with busy schedules that make it difficult to attend appointments in person.

The use of virtual care has skyrocketed in the last few years, with as many as 64% of global healthcare leaders saying they're currently investing heavily in it (Future Health Index, 2021). One of the most significant shifts has been towards remote patient monitoring and virtual visits which have become increasingly popular among healthcare providers looking to maximize access to care while minimizing transmission risks. The increasing use of virtual healthcare will not slow any time soon, given a number of COVID-related factors: the necessity for providers to see patients remotely; at-par reimbursement for in-person and remote consultations; and a broad acceptance by both patients and physicians that these remote conditions will continue for an extended period of time (BCG Digital Ventures, 2022). Virtual care has enabled healthcare providers to reach more patients and provide better quality care without the need for physical visits. Patients are increasingly seeking out specialized treatment options that are closer to home, which reduces travel time and expenses associated with long-distance travel for medical appointments.

The emphasis on preventive care has also been growing to help people maintain good health and avoid costly medical treatments. By providing tools and resources, eHealth organizations are helping people monitor their health, identify potential health risks, and take proactive steps to prevent illness and injury. These innovative solutions promote independence, safety, and well-being, enabling individuals to live with dignity which is also a growing megatrend shaping the future of eHealth organizations.



As the healthcare industry continues its shift towards preventive care, data-driven approaches are providing early warnings about potential health problems, allowing for proactive measures to be taken that help prevent more serious conditions. With more accurate predictions about a patient's condition or risk factors, doctors and other medical professionals are now better equipped to make informed decisions regarding treatment plans allowing for earlier interventions and ultimately better long-term health outcomes for patients.

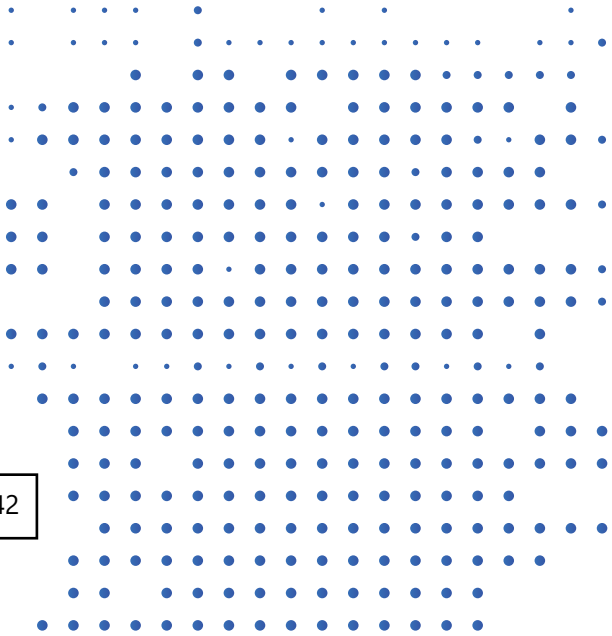
With the increasing demand for digital healthcare solutions, there has been a shift towards more personalized and user-centric designs that cater to individual unique and evolving needs (Padmanabhan, 2019). User-centered product design involves the process of designing products or services that focus on meeting the needs and preferences of the end-user. In the context of digital healthcare, this means designing solutions that take into consideration the diverse needs and requirements of patients, caregivers, and healthcare professionals. By focusing on the user, designers are able to create more effective solutions that are tailored to the needs of specific individuals or groups. This has led to increased patient engagement, improved treatment adherence, and better health outcomes. Additionally, user-centered design also helps to reduce costs and improve efficiency in the healthcare system. By designing solutions that are intuitive and easy to use, healthcare professionals can save time and resources, while patients can benefit from a more streamlined and personalized healthcare experience.

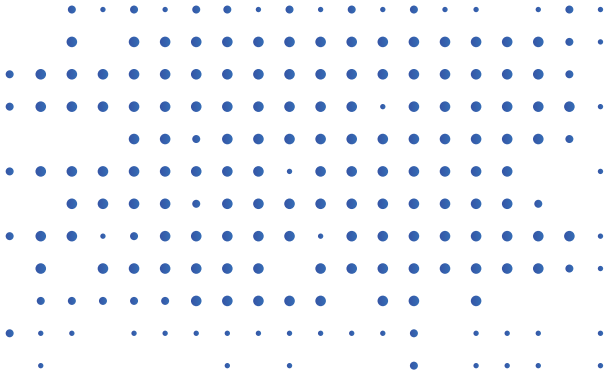
While digital healthcare provides new opportunities for patients to access healthcare services and resources, community support remains relevant and important. Digital healthcare cannot replace the human connection and emotional support that comes from being part of a community (Olsen, 2021) which plays a critical role in helping patients and caregivers navigate the complex healthcare system and cope with the challenges of chronic and mental illness. Community support provides patients and caregivers with access to peer support, information, and resources that are not available through traditional healthcare channels. Community-based healthcare initiatives provide education and training to help patients and caregivers better understand their conditions and manage their own health resulting in improved health and wellbeing of the community. They are able to better address social determinants of health, such as poverty, housing, and transportation, that can have a significant impact on health outcomes.

Despite the numerous benefits of advancements in technology, digital health has also resulted in a significant divide among people. While some individuals have access to advanced technologies that enable them to monitor their health remotely and communicate with healthcare professionals effortlessly, others are left behind due to socio-economic status, location, or digital literacy. For example, people living in rural or remote areas do not always have access to reliable or affordable internet or digital health devices, limiting their ability to use telemedicine services or access health information online. Similarly, older adults or people with disabilities face challenges in using digital health technologies, such as mobile apps or wearables, due to accessibility issues or

lack of familiarity with the technology. Moreover, the rapid pace of technological advancements has also led to the creation of new inequalities. For instance, the use of artificial intelligence and machine learning in healthcare has exacerbated existing biases as the data used to train these systems is not representative of the diverse populations they are meant to serve.

With widespread availability of social media platforms and the internet, it has also become increasingly important for individuals to critically evaluate the information they come across and to seek out reliable sources, such as healthcare professionals or trusted medical websites, to ensure that they are making informed decisions about their health. Healthcare providers are also becoming aware of the potential impact of misinformation on their patients and working to address any misconceptions or concerns that their patients may have (Merck Manuals, 2022). Misinformation in healthcare is on the rise and is having serious consequences for people's health, as individuals are making decisions based on false or misleading information (World Health Organization, 2022) and is therefore eroding trust in healthcare advice available online. Misinformation about health conditions or symptoms can also lead to delayed diagnosis or misdiagnosis, which can result in worsened outcomes or even death. For example, false claims about certain treatments or remedies can lead individuals to seek out ineffective or even harmful treatments, which can worsen their health condition or delay them from seeking effective treatment.





The integration of technology into healthcare has revolutionized the industry, making it more efficient, convenient, and accessible to patients worldwide and there has been a significant rise in investments and funding in digital health or eHealth. Moreover, governments globally are recognizing the value of investing in digital health infrastructure as part of their national healthcare systems. From telemedicine to remote patient monitoring, digital health technologies are playing an instrumental role in transforming traditional healthcare delivery models. This has made it possible for healthcare providers to streamline their processes, reduce paperwork, and automate administrative tasks. Furthermore, the rise in investments and funding in digital health or eHealth has created new opportunities for innovation and development in the healthcare industry. Virtual and digital health also enables healthcare providers to collaborate more effectively with each other, regardless of location, and to share information and expertise, leading to better patient outcomes. With more and more people turning to technology to help manage their health, there has been a growing interest in creating efficient, eco-friendly systems that are focused on collaboration and cooperation. This shift towards digital health is not only improving patient outcomes but also reducing costs and promoting sustainability.

As medical data is increasingly digitized and shared between various stakeholders, including healthcare providers, insurance companies, and researchers, the risk of data breaches and privacy violations have also increased significantly. With the increasing use of EHRs, medical

devices, and telemedicine, there is a greater risk of cyber-attacks and unauthorized access to patient data. In 2019, the healthcare industry experienced 41% of all reported data breaches, making it the most targeted sector for cybercriminals. People have the right to access and control their medical data, but they are not always aware of how their data is being used or who has access to it. Moreover, some healthcare providers and insurance companies use patient data for purposes other than providing healthcare services, such as marketing or research, which is a violation of patient privacy. Informed consent processes can be complicated and confusing, especially for people who are not tech-savvy or who may not fully understand the implications of sharing their data.

The success of these trends and megatrends relies on the driving forces that create and sustain them. To understand how and why a trend exists and grows, it is important to identify the driving forces. The underlying need or concept behind a trend determines its success over time - this can be anything from offering convenience to appealing to emotions. For example, the growing popularity of plant-based diets is driven by health benefits as well as ethical considerations for animal welfare; this sustains the trend in the long term. Similarly, athleisure clothing has gained traction due to its comfortable yet stylish appeal; this allows consumers to transition from casual activities such as running errands into more formal settings with ease. When conducting foresight activities, it is important to analyze each driver individually to determine its potential effect on the overall objectives. This analysis focuses on how each driver could contribute to potential positive or negative outcomes for the organization in question. This helps to ensure practitioners are able to make informed decisions about scenarios and strategies for coping with changes in the future environment. An overview of the categories and drivers that have been identified is shown in Table 1.

# Drivers Forces

| S.No | Name | Summary | Category |
|---|---|---|---|
| 1 | Tech Therapy | Capabilities of digital therapies and immersive experiences provides expanded options for treatment, diagnosis, and support but also brings in various challenges. | Technological, Social |
| 2 | Hello Homespital | Technology innovations enabling aging in place, increasing burden on informal caregivers and leading to demand, expectation, and support for hospital-quality care at home | Economic, Social, Technological |
| 3 | Robots to the Rescue | The emergence and acceptance of elder care robots as people live longer and with shortage of caregivers which is also exacerbating current health disparities. | Technological, Values, Social |
| 4 | Cyber Savvy | Learning new tools is accelerated by a growing interest in digital health and the need to manage health using technology. | Technological, Social |

| S.No | Name | Summary | Category |
|---|---|---|---|
| 5 | Mentally Wealthy | Increased attention to mental health and wellbeing to achieve better public health outcomes and driven by multiple factors | Social, Political |
| 6 | Big Eye | The rise of government surveillance and monitoring has sparked debates about the balance between privacy and societal benefits, emphasizing the need for new regulatory frameworks and increased transparency. | Political, Technological |
| 7 | Fluctuating Financial Fuel | Inconsistency in funding patterns for digital health as pressure to meet payer demand expands quickly creating opportunities, innovation, along with challenges | Economic |
| 8 | Shared Caring | The rise of senior cohousing providing an intentional communal living environment for elderly individuals seeking social support, shared caregiving responsibilities, and lower living expenses | Values, Social, Economic |
| 9 | Speakified Future | Voice technology is changing the nature of human-machine communication helping overcome barriers existing in text-based information exchange or complex system operation | Technological |
| 10 | Block For Cure | Blockchain solving interoperability and resource navigation challenges by enabling real-time access to authentic information in a highly-secure digital environment | Technological |
| 11 | 5G transformation | Faster internet and data transfer speeds to facilitate remote collaboration, diagnosis, analysis of data resulting in a connected, intelligent, and integrated network | Technological, Social |
| 12 | Winners Zone | Tech giants expanding their digital healthcare footprint leading to increased competition and the race to build the best platform to capture a significant share of the healthcare market and generate substantial revenue | Economic, Social |
| 13 | Green Health Tech | Demand and concerns around energy consumptions of data storage servers and electronics leading to development of environment friendly digital healthcare products | Environmental, Social, Political |
| 14 | Legislative Lift | Governments worldwide are promoting the adoption of digital healthcare systems while streamlining regulatory protocols | Political |
| 15 | Age of Health Influencers | Influencers on social media platforms share their knowledge and experiences on various health-related topics but are also responsible for spreading false information | Social, Values |

| S.No | Name | Summary | Category |
|---|---|---|---|
| 16 | DataNomics | Technology being used to analyse vast amounts of data from different sources in healthcare however, data privacy and security concerns are growing | Technological |
| 17 | Data Democratization | Making data meaningful and accessible for everyone reducing system inequalities and increasing opportunities for communities to thrive. | Social, Economic |
| 18 | Connected Care | Data sharing and virtual collaboration paving the way for a software-defined healthcare system that is comprehensive, integrated, and coordinated | Social, Technological, Economic |
| 19 | Easy Split | Emerging payment model innovations transforming the industry and offer more flexibility and convenience to customers helping healthcare organizations to remain competitive and promote long-term sustainability | Economic, Social |
| 20 | Data Market | In the digital age, some people are willing to share their data for certain benefits or for monetary gain. | Social, Economic |
| 21 | Trust-A-Check | Healthcare organizations are prioritizing data privacy and security measures to protect patient data and are becoming more transparent with patients about how their personal information is being used | Political, Social |
| 22 | Cloud Care | Flexible, scalable, efficient demand for computing and data storage pushing healthcare organizations to use cloud platforms | Technological, Economic |
| 23 | Value Vantage | Digital health products investing in measurable outcomes and impact as proof of value due to increasing competition, need for acceptance, and adoption | Economic, Social |
| 24 | Co-designing a Future | Using culturally appropriate eHealth strategies that address unique characteristics of various racial/ethnic groups (language, geography, poverty) | Social, Values, Economic |
| 25 | Reach Out, Together | Mobilizing community partnerships and action leveraging digital health enabling timely and individualized delivery of interventions | Social, Economic |

Table 1 - Overview of the driving forces and the STEEPV categories they belong to.

# 1. Tech Therapy

## Description

The use of Digital Therapeutics (DTx) apps and programs in conjunction with medical or psychological treatments is becoming increasingly more common for people living with Dementia. Digital therapeutics can offer valuable insights into behaviour patterns, monitor progress over time and provide support to caregivers as well as individuals living with Dementia. As a result, more and more primary care physicians are recognizing the capabilities of these digital tools for helping individuals manage their condition (Harrington et al., 2021). Studies have shown that properly designed digital therapeutic interventions can lead to improved symptoms of depression, anxiety and agitation. The ability to quickly share information between physicians, family members, professional caregivers and other healthcare providers involved in providing care is also a key benefit of using digital therapeutics.

Virtual Reality (VR) and the metaverse are two technologies that offer a variety of potential applications in the field of Dementia caregiving. While traditional therapies still remain important for Dementia patients, VR and the metaverse are being used to supplement these efforts with digital therapeutics. These technologies can provide meaningful activities to help people living with Dementia cope with stress, anxiety and other emotions associated with their condition. VR is being used to create immersive environments where users can interact with virtual objects as if they were in the real world. This can be used to provide physical exercise and cognitive stimulation tailored specifically to individual needs. In addition, VR has been shown to improve coordination, balance, memory recall and other skills useful in daily life. The metaverse is an online world where people can connect online via avatars. The virtual worlds created by these technologies allow people to connect with others in a way that resembles real-world interactions.

## Category

Technological, Social

## Signals

The DTx products developed in the past decade have proven very beneficial, particularly in the treatment of individuals with high-burden mental disease. Between 2010 and 2019, over 500 clinical trials were conducted, with around 180 of them being interventional clinical trials and approximately 40% of these trials were carried out in fields broadly associated with mental health, such as psychiatry, addiction, neurology, and sleep medicine (Licholai & Feuerstein, 2021).

Under a new law in Germany, doctors are now authorized to prescribe mobile apps that have successfully undergone the application process. Manufacturers of digital health applications are eligible for reimbursement by German statutory health insurers. As of the end of 2021, nine apps had already been approved (Olesch, 2021).
A hospital in Italy has made particular strides in the field of rehabilitation by putting new emphasis on virtual reality as a resource for the treatment of neurological disorders (Mastrolonardo, 2016).

## Implications

The rise of digital therapeutics has made it easier to gain insights into patient behavior and treatment effectiveness. This is possible through the generation of large amounts of data, which can be analyzed to provide meaningful information about individual health and wellbeing. By leveraging this data, companies in the eHealth space can develop more effective treatments for patients, as well as

personalized care plans that are tailored to each individual's needs. For instance, eHealth organizations could benefit from partnering with a company using digital therapeutics to gain access to more relevant and personalized information. This type of data analysis could provide useful insights into how patients respond to different medications or therapies, which would allow for optimized treatment plans specific to their condition. Through such partnerships, caregivers and healthcare providers can also keep track of progress more easily and accurately evaluate the effectiveness of different interventions over time.

PwD and caregivers rely on unreliable app store reviews or Google search but will require trustworthy guidance to navigate the vast digital health market. It will become important to distinguish high-quality healthcare apps that meet safety standards and have proven health benefits which will also allow doctors to confidently recommend apps to their patients, knowing they are safe and effective.

### Related & Counter Trends

Hello Homespital, Robots to the rescue, 5G transformation, Legislative Lift, Big Eye, Fluctuating Financial Fuel

# 2. Hello Homespital

### Description

As policymakers recognize the potential benefits of providing care to elderly individuals in their homes rather than in institutions they are increasing investments in homecare. In 2016, Ontario invested approximately $100 million to enhance support for home care clients with high needs and their caregivers (Ontario newsroom, 206). Homecare is often less expensive than institutional care, as it does not require the same level of staffing, infrastructure, and equipment. Governments can save money by investing in home care rather than in more costly institutional care options. Advances in technology are also making it possible to provide high-quality care to patients in their homes. The growing availability of home health care services coupled with remote monitoring technologies, self-management tools, and new business models will enhance patients' perception of the home setting as an adjuvant for health care. These services are especially vital for people living in rural and underserved communities.

> **I hope that we're going to move away from long-term care and more towards home care**
>
> **- Interviewee #12**

Many countries are experiencing shortages of healthcare workers, making it difficult to provide care in institutions. Investing in home care can help to alleviate these shortages and ensure that patients receive the care they need. As the global population ages, there is a growing demand for elder care. Elderly individuals often prefer to receive care in their own homes, as it allows them to maintain their independence and quality of life. Homecare can help

to meet this demand and ensure that elderly individuals receive the care they need while remaining in their homes. The move from hospital-centric to locally delivered care makes it easier for patients to access quality healthcare closer to home.

## Category

Economic, Social, Technological

## Signals

Remote Patient Monitoring (RPM) and virtual care will continue to evolve. According to the Insider Intelligence report by eMarketer, the number of patients using remote monitoring in the US increased from 23.4M (9.0%) to 25.8M (9.9%) from 2020 to 2021. It is projected that RPM solutions will be used by 30M people (11.2%) by 2024 and that the global market will be worth over $1.7B by 2027 -- an increase of 128% over the present (BCG Digital Ventures, 2022).

The Ontario government plans to expand home care by investing an additional $1 billion over the next three years, to help seniors and recovering patients stay in their homes. This funding will benefit nearly 700,000 families who depend on home care annually, by reducing unnecessary hospital and long-term care admissions, and shortening hospital stays. Expanding home care will provide Ontarians with the choice to remain in their homes, while also supporting hospital capacity and keeping the province open (Ontario newsroom, 2022).

## Implications

Demand and expectation of hospital-quality care at the patient's home through wearable technology, remote patient monitoring, advanced analytics, and machine learning powered by artificial intelligence (Pennic, 2021). In response, eHealth organizations will need to invest in new technologies and expand their services to meet patient demands for high-quality care at home.

By employing caregivers from local community eHealth organizations will also be able to boost smaller economies. When someone from the community is hired they have a vested interest in providing high-quality service as they are part of the same community. This helps in creating a mutually beneficial relationship that can be characterized by trust and respect, and is an excellent way to expand the circle and form connections that could prove useful in other areas of business as well.

In addition to reducing hospital-based staffing needs, home hospital programs can support increased inpatient capacity, decrease exposure to viruses like COVID-19 and influenza for patients and healthcare professionals, and improve patient and family experiences (Pennic, 2021).

## Related & Counter Trends

Legislative Lift, Cyber Savvy, Tech Therapy, Data Democratization, Easy Split, Trust-A-Check, Robots to the Rescue, Age of Health Influencers, Big Eye

# 3. Robots to the rescue

## Description

A robot can provide PwD with a degree of independence and autonomy that a caregiver may not be able to offer due to physical or emotional challenges. The use of robots, such as personal assistant robots, can also help reduce the stress and fatigue experienced by Dementia caregivers. The use of robots to support caregivers is becoming increasingly popular, as they provide an efficient way to manage patient care and create meaningful interactions (Persson et al., 2021). They can be programmed to remind patients to take medications, ensure meals are served on time, help them move throughout the facility safely and securely, and even interact with patients during activities such as music or dance therapy. Robots can provide companionship by engaging in conversation or providing emotional support when needed. This helps keep the patient engaged while freeing up time for caregivers to do other tasks or spend more quality time with their charges. Additionally, they can provide an opportunity to stay connected with family members who are unable to visit due to geographic distance or other life commitments.

As robots become more involved in elder care, there may be questions about who is responsible for their actions. It is important to establish clear lines of accountability and to ensure that users are protected from harm. The use of robots for elder care could exacerbate existing health disparities, as those who cannot afford robotic care may be left behind. It is important to ensure that access to robotic care is equitable and that it does not widen existing health inequalities. Patients may not fully understand the implications of using robots for their care, and may not have provided informed consent for their use. It is important for patients to be informed about the use of robots and to have the opportunity to provide informed consent.

## Category

Technological, Value, Social

## Signals

The eldercare-assistive robots market is set to see impressive growth over the next decade, according to a new report. The study reveals that the global market for eldercare-assistive robots is currently valued at US$ 2,263.6 Mn in 2022 and is anticipated to grow at a CAGR of 12.2% up until 2032, when it will reach a valuation of US$7,150.0 Mn. The market for older individuals is spurring the development of robots offering eldercare assistance (Future Market Insights, 2022).

The Canadian Centre for Caregiving Excellence (CCCE) has released a white paper that sheds light on the critical need for caregivers and care providers in Canada's health-care and social systems. The report highlights the significant contributions made by these individuals, who work tirelessly to ensure that the needs of our most vulnerable populations are met. However, it also points out that caregivers and care providers are at a breaking point due to a lack of support, resources, and policies and in need of alternate means to close gaps that jeopardize the mental, physical and economic well being of caregivers, care providers and those in need of care (Canadian Centre for Caregiving Excellence, 2022).

## Implications

Robots can collect data and use it to personalize care for patients. This could lead to the development of more personalized eHealth services that are tailored to the individual needs of caregivers and people they are caring for. It could be an exciting new development in patient-centered care that can help enhance communication between medical providers and patients.
Robot-assisted data collection and analysis has the potential to make healthcare delivery more efficient, accurate and cost effective but as robots become more involved in caregiving, there may be ethical considerations that arise related to privacy, autonomy, and informed consent. Digital health services may need to consider these ethical issues and develop appropriate policies and procedures to ensure that patient rights are protected.

## Related & Counter Trends

Tech Therapy, 5G transformation, Speakified Future, DataNomics, Easy Split, Big Eye

# 4. Cyber Savvy

## Description

Digital literacy is an essential tool for improving health and equity. It helps individuals understand the power of technology to access medical information, connect with healthcare providers, and manage their own health. By having the knowledge and skills to navigate healthcare systems, individuals can make informed decisions about their care (EuroHealthNet, 2019). Organizations such as the World Health Organization (WHO) are promoting digital health literacy worldwide as a way to bridge existing gaps in access to quality healthcare services. Digital literacy enables people from all walks of life – particularly those living in underserved communities – to obtain reliable and timely information about their own health status or that of family members. With this knowledge, they can become better-informed patients and more actively engaged in decision-making related to their care. Additionally, by increasing digital access for marginalized populations, it provides them with greater control over how they manage their health conditions going forward.

Interviewee #1 thinks that a lot of distrust in technology for people comes from lack of knowledge and exposure to use technology which could be a factor of paucity of time due to caregiving burden or just them not having worked with technology ever. While she thinks in-person engagement allows for better knowledge transfer even for the use of technology, there are a lot of avenues to merge both online and in-person support for caregivers of PwD. Interviewee #10 says that the issue of literacy is a common topic in their conversations, as research shows that older generations have lower literacy rates, and immigrants may not be able to read in any language. This becomes a significant barrier when relying on online information as the only means of accessing information.

## Category

Technological, Social

## Signals

Canada Health Infoway, an independent, federally funded, not-for-profit organization tasked with accelerating the adoption of digital health solutions across Canada, launched the Digital Health Learning Program in 2021, which features information and materials for Canadians to enhance their digital health knowledge and healthcare experience (Canadian Healthcare Technology, 2020). The Government of Canada has revealed an increase in funding for digital literacy skills training, which will offer assistance to not-for-profit organizations that provide digital literacy instruction to Canadians who confront obstacles to accessing the digital world. This funding will benefit several groups, including seniors, individuals who have not completed high school, Indigenous people, those who do not speak English or French at home, individuals with disabilities, newcomers to Canada, low-income individuals, and those residing in northern, rural, and remote regions (Government of Canada, 2022).

## Implications

As more people become digitally literate, there may be an increased demand for eHealth solutions. Patients and caregivers who are comfortable using digital tools may be more likely to seek out healthcare providers who offer such services, while healthcare providers who are digitally literate themselves may be more likely to adopt new digital health solutions. As eHealth solutions grow, data privacy and security will become increasingly important and healthcare providers will need to understand and comply with data privacy and security regulations.

People who are digitally literate are likely to be more engaged in their healthcare and feel more empowered to take an active role in managing their health. This could lead to better health outcomes and increased patient satisfaction. Healthcare providers who are digitally literate are likely to be more efficient, productive, and will be able to support the caregivers by using digital tools and platforms to streamline workflows, communicate with colleagues and patients more effectively, and access patient data more quickly and easily.

## Related & Counter Trends

Data Market, Age of Health Influencers, Tech Therapy, Big Eye, DataNomics

# 5. Mentally Wealthy

## Description

Mental health and well-being is an essential aspect of our overall health that requires attention as issues such as anxiety, depression, and Dementia can lead to a decline in cognitive functions, memory loss, and even the inability to perform daily activities. It has become increasingly important to understand mental health issues in order to prevent its consequences. To address this stigma, many mental health advocacy groups and organizations have launched campaigns to raise awareness and encourage people to seek help (Stuart, 2016). These campaigns often focus on promoting the message that mental health issues are common and treatable and that seeking help is a sign of strength, not weakness. They also aim to educate the public about the warning signs of mental illness and the importance of early intervention and treatment. In addition

to awareness-raising campaigns, there has been a push to increase access to mental health services and resources. This includes expanding access to mental health care in underserved communities, increasing funding for mental health research, and improving access to evidence-based treatments such as psychotherapy and medication. Many employers are also recognizing the importance of mental health and are offering employee assistance programs and other resources to support their workers' mental well-being (Torous & Rodriguez-Villa, 2021) including implementing employee wellness programs and providing training for managers to identify and support employees with mental health issues.

However, there is still a lot of work to be done to fully address the mental health crisis. Stigma and discrimination around mental health issues remain a significant barrier to people seeking help, and many people still do not have access to adequate mental health care (Moukheiber, 2019). Furthermore, the COVID-19 pandemic has highlighted the need for increased attention to mental health, with many people experiencing increased stress, anxiety, and depression due to the pandemic's impact on their lives. Many governments around the world are recognizing the importance of mental health and well-being and are taking steps to improve support for individuals struggling with mental health issues. This recognition is fueled in part by the growing understanding of the impact of mental health on overall health and well-being, as well as the economic and social costs associated with untreated mental illness. Governments are investing in mental health services and resources to improve access to care for those in need. This includes funding for mental health clinics, hospitals, and community-based services that provide counseling, therapy, and medication management. In some cases, governments are also partnering with private organizations and nonprofits to expand mental health services and improve access to care.

## Category

Social, Political

## Signals

To improve access to mental health and substance use support, and other essential resources, the Ontario government has allocated $4.75 million towards expanding the number of Youth Wellness Hubs. This initiative aims to make it more efficient and convenient for young people to access the services they need and are apart of Ontario's Roadmap to Wellness plan, which aims to improve the quality and access to mental health supports while shortening wait times and removing gaps in service (Ontario newsroom, 2023).

According to an article In Harvard Business Review, more employees believe that mental health is prioritized at their company compared to other priorities, with 54% of respondents saying so, up from 41% in 2019. Additionally, more employees believe that their company leaders are advocates for mental health at work, with 47% of respondents saying so, compared to 37% in 2019. Also, 47% of respondents believe that their managers are equipped to support them if they have a mental health condition or symptom, up from 39% in 2019 (Greenwood & Anas, 2021).

## Implications

As people become more aware of the importance of their mental wellbeing and seek support from organizations that understand this need, eHealth organizations have a unique opportunity to demonstrate their commitment to mental health and position themselves as trustworthy and credible service providers. By showing they prioritize mental health, eHealth organizations can attract more customers leading to an uptick in demand for their services, including those who may have been hesitant to try online healthcare

services in the past. The convenience and anonymity of eHealth services can make them popular among individuals who may be hesitant or unable to seek traditional forms of mental health care.

As more people seek help for mental health concerns, there may be a greater need for mental health professionals and resources to meet the demand. The provision of evidence-based support may pose a potential challenge for eHealth organizations, and these organizations may need to invest in training and resources to ensure that their mental health support programs are effective and of high quality.

Additionally, there may be concerns about data privacy and security as more people seek mental health support online and eHealth organizations will need to ensure that they are taking appropriate measures to protect the privacy and security of their users' data, which may require significant investments in technology and infrastructure.

## Related & Counter Trends

Data Democratization, Connected Care, Legislative Lift, Shared Caring

# 6. Big Eye

## Description

As data privacy concerns rise, government monitoring and surveillance have become a trending topic of conversation. The vast amount of personal information available to governments has enabled them to monitor citizens more closely than ever before, prompting heated debates about the extent of such surveillance. The advent of the COVID-19 pandemic has spurred digitalization and cooperation between the state and corporations, resulting in the development of contact tracing apps and other digital surveillance technologies that offer societal advantages but also augment privacy infringement (Westerlund et al., 2021).

By improving security, compliance, resource allocation, innovation, and public health response this change could have benefits for digital healthcare. It will be important to strike a balance between the need for patient privacy and data security and the need for efficient and effective healthcare delivery. As the level of surveillance rises, citizens' concerns regarding surveillance data and the government's large use of personal data will also increase. This may require new regulatory frameworks and increased transparency around how patient data is being used and shared.

## Category

Political, Technological

## Signals

Artificial Intelligence (AI) surveillance technologies are spreading at an increasing rate to a wider diversity of countries than is currently understood. At least eighty-five out of 176 countries globally have adopted emerging technologies for surveillance (Feldstein, 2019). Employers in Ontario are now obligated to reveal their electronic monitoring policies to their employees, regardless of whether they work on-site, in remote locations, or from home (Rachini , 2022). This progressive measure encourages transparency among employers, and if

other provinces adopt similar policies, they may eventually be enacted at the federal level.

## Implications

Government data monitoring and surveillance could lead to increased data sharing between government agencies and healthcare providers. While this could lead to more efficient and effective healthcare delivery, it could also raise concerns about the use of personal health data for non-medical purposes. Patients may also have trust issues with healthcare providers if they believe that their personal health data is being shared with government agencies without their consent. This could erode the trust between patients and healthcare providers, making it more difficult for providers to deliver effective care.

Increased government monitoring and surveillance could also lead to increased regulation of digital healthcare technologies. This could be a result of patient concerns and hesitation to use digital healthcare services if they feel their personal health data is not secure leading to a decrease in adoption of these technologies. While the regulations and transparency could improve patient safety and data security, it could also stifle innovation and slow down the development of new eHealth technologies.

## Related & Counter Trends

Connected Care, DataNomics, Tech Therapy, Trust-A-Check, Data Market, Data Democratization, Block For Cure

# 7. Fluctuating Financial Fuel

## Description

Investments and funding in global digital healthcare have been increasing in recent years. According to data from CB Insights, global digital health funding reached a record high of $30.6 billion in 2020, a 34% increase from 2019. However, while funding for digital health has been increasing in recent years, it is worth noting that there may be fluctuations from year to year, and some analysts predict that investors may become more selective with their money in the future (CB Insights, 2023) depending on various factors such as regulatory changes, market trends, and the overall economic climate. Funding has dipped in 2022 and is expected to remain similar in 2023, according to Tom Cassels, CEO of digital-health seed fund Rock Health's consulting arm (Sohail, 2023). Nonetheless, the long-term growth potential of digital health remains strong, and many experts predict that it will continue to play a significant role in the transformation of the healthcare industry. Venture capital and private equity will continue to support population health tools and services. There are many investors in the market with deep pockets and pressure to expand quickly to meet payer and patient demand. The increasing focus on value-based care and patient-centric healthcare models is also driving the growth of digital health investments. Digital health solutions that can demonstrate improved patient outcomes, reduced hospitalizations, and cost savings are more likely to attract funding from investors.

## Category

Economic

## Signals

Digital health startup Ro raised $500 million in a funding round, valuing the company at $5 billion. The company provides telemedicine services, online pharmacy, and at-home health testing kits to patients. Ro, co-founder, has experienced rapid growth since its founding in 2017, and the latest funding will be used to expand its offerings and hire more employees (Jennings, 2021).

The digital health company LetsGetChecked has raised $150 million in a Series D funding round led by Casdin Capital. LetsGetChecked offers at-home health testing kits and virtual consultations with healthcare professionals, allowing patients to monitor their health remotely. The company plans to use the funding to expand its product offerings and invest in research and development (Hackett, 2021).

## Implications

While the funding can certainly help to accelerate the development of innovative digital health solutions and improve healthcare outcomes, it's important to ensure that these solutions are integrated and coordinated effectively. Consolidation can be one approach to addressing the confusion that can arise from a crowded and fragmented market. By bringing together different digital health organizations and solutions, it may be possible to create a more streamlined and cohesive ecosystem that offers clear benefits to users. Consolidation can also provide opportunities for economies of scale, allowing organizations to pool their resources and expertise to achieve greater impact. It's also important to ensure that consolidation does not stifle innovation or limit competition in the market.

The rise of digital health technologies promises to revolutionize the healthcare industry, with benefits ranging from improved patient outcomes to increased efficiency and cost-effectiveness. However, despite advances in technology, there still exists a significant digital divide between those who have access to these tools and those who do not. This gap is particularly pronounced in low-income or elderly populations, where lack of resources or technological literacy can prevent individuals from taking advantage of critical healthcare services. One major concern is that increased funding for digital health organizations may actually exacerbate this divide by further widening the gap between those who have access to technology and those who do not. As eHealth becomes more ubiquitous, patients without access to these tools may find themselves increasingly marginalized within the healthcare system. Additionally, concerns over data privacy and security may further dissuade certain populations from using digital health platforms altogether.

## Related & Counter Trends

Hello Homespital, Tech Therapy, Cyber Savvy, Speakified Future, 5G Transformation, Winners Zone, Big Eye, Legislative Lift,

# 8. Shared Caring

## Description

Shared living is becoming an increasingly popular option for elderly individuals who are looking for a supportive and social living environment. This trend is often referred to as "senior cohousing" or "senior co-living" and involves groups of older adults coming together to form intentional communities. One of the main reasons why senior cohousing is on the rise is because it provides a solution to the isolation and loneliness that many older adults experience. Living in a communal setting allows individuals to build relationships and social connections with their peers, which can have a positive impact on their mental health and well-being. The sharing of common areas was not a new concept, as it's just in recent years that this type of living has become far more widespread (McCord, 2021).

In addition to providing social support, senior cohousing communities also offer practical benefits such as shared caregiving responsibilities and lower living expenses. Members of the community can pool their resources to hire caregivers, share meals, and maintain common areas. While shared living can be a rewarding experience, it also comes with its own set of challenges. Living in close quarters with others can be difficult, and conflicts can arise over issues such as finances, household responsibilities, and personal boundaries. However, many people find that the benefits of communal living, such as increased social connections and a sense of purpose, outweigh the challenges.

Shared living can take many forms, from intentional communities where members live together in a single household to co-housing communities where individuals or families live in separate units but share common spaces and resources. Some communities are centered around a particular philosophy or interest, such as spirituality, environmentalism, or social justice. Interviewee #12 thinks that there's going to be more of such living and mentions that the city of Toronto has done some pretty interesting stuff by renting out apartments at lesser rates to young people in senior homes.

## Category

Values, Social, Economic

## Signals

Wellness co-living is an idea that is rapidly becoming big with several factors contributing to its growth; rising urban cost of living, cultural shift towards health and wellness, concept of sharing economy. Co-living could also offer sustainable, affordable housing options for many (Katz, 2019).

UOA Group has opened the largest co-living and wellness facility for senior citizens in Southeast Asia, located in Kuala Lumpur. The facility aims to create a secure and interactive community for seniors with access to medical and care services, allowing them to age actively with physical and mental well-being support. The facility seeks to avoid unsettling and disruptive moves for seniors due to changing care needs (CodeBlue, 2022).

## Implications

While communal living may provide some benefits in terms of increased access to digital healthcare services, there are also potential negative impacts related to privacy, technological challenges, and cybersecurity. When multiple individuals are sharing living spaces and resources, there may be a higher risk of unauthorized access to personal health information. This could be particularly problematic

for individuals with sensitive health conditions or who require specialized care. Communal living environments may also present challenges in terms of cybersecurity. Shared internet connections and devices could potentially be more vulnerable to hacking and other cyber threats, which could compromise personal health information and other sensitive data.

In communal living environments, residents may be able to share resources and infrastructure such as high-speed internet connections and devices. This could make it easier for individuals to access eHealth services which can improve access to care and information needed to manage their conditions. For those with chronic illnesses or disabilities, having access to this type of service may be invaluable, particularly if they have limited mobility or difficulty accessing traditional healthcare systems. With the increased use of technology in healthcare, having high-speed internet at home can help them keep up with medical appointments and ensure that they are able to stay informed about their condition.

## Related & Counter Trends

5G Transformation, Mentally Wealthy, Hello Homespital, Legislative Lift, Age of Health Influencers, Data Democratization, Easy Split, Co-designing a Future, Reach Out, Together

# 9. Speakified Future

## Description

Voice technology has revolutionized the way humans interact with machines everywhere, and healthcare is no exception. With voice-activated AI assistants like Siri and Alexa, users can now talk to their devices to obtain health information at any time. Whether it's searching for a doctor or pharmacy, following up on recent lab tests, scheduling an appointment, or consulting symptom checkers, voice technology makes everything much easier and more accessible. Voice interfaces also have the potential to optimize users' experience, helping them overcome barriers that exist in text-based information exchange or complex system operation (Chen & Decary, 2019).

This change in human-machine communication has made it simpler for people to access accurate health information quickly and securely. Voice commands allow users to ask questions in natural language rather than typing them out. With a voice interface, users can interact with their device by providing natural speech commands that are then understood by the underlying AI platform. This allows users to navigate complicated systems without needing to know specific commands or complicated menus. Additionally, voice interfaces provide flexibility in terms of language use which can be particularly helpful for those who may struggle when using English as a second language or those with visual impairments. The results are presented in an organized manner that can be easily understood by the user – meaning more informed decisions about healthcare are being made without having to search through multiple websites or wait on long phone lines anymore. One potential challenge with voice-controlled solutions is ensuring that the technology is accurate and reliable. There is also a risk that personal health information could be overheard or recorded by unauthorized individuals.

Voice changes can occur due to various conditions affecting the lungs, heart, brain, muscles, or vocal cords. In the near future, it may become possible to identify respiratory conditions like asthma or COVID-19, as well as neurodegenerative disorders and mental health issues like depression or anxiety, by detecting vocal biomarkers through digital tools analyzing recordings (Georges, 2023). Similar to how vocal recognition algorithms learned to comprehend spoken language through millions of sound samples, vocal biomarkers can be detected through analysis of recordings.

## Category

Technological

## Signals

Recently, two studies have demonstrated that AI algorithms can effectively detect early-stage Parkinson's disease or severe COVID-19 infections in the lungs by analyzing individuals' voices. The researchers have created a smartphone app named Aum that uses these algorithms to diagnose and monitor the conditions (Hampson, 2022). Ellipsis Health has launched the Rising Higher mobile app, which is a clinical decision support tool designed to enable healthcare providers and payers to remotely monitor symptoms in high-risk patient populations. The app utilizes dual acoustic and semantic-based assessments of patient speech to detect depression and anxiety symptoms and create behavioral health vital signs. It provides critical behavioral health screening and monitoring between clinical encounters to improve health outcomes (Pennic, 2020).

The use of voice search has grown significantly from a statistical zero to 10% of all search volume and has accelerated further, with 20% of all searches having voice intent, according to Google. Recent data also shows that 25% of searches on Windows 10 taskbar are voice searches. The improved accuracy of voice commands is considered a key factor in the growth of voice technology (Young, 2016).

## Implications

Without a doubt, the COVID-19 pandemic has had a long-lasting and devastating impact on healthcare systems. In order to recover from losses and accelerate growth, hospitals are looking for ways to streamline operations, improve triage and throughput, and increase capacity. One solution that is helping them achieve this goal is voice-controlled solutions. Voice-controlled solutions allow new or reassigned care team members who are unfamiliar with personnel, processes or the location of supplies to quickly connect to the right person, group or information through simple voice commands. This eliminates the need for these members to worry about knowing names or numbers and allows them more time for patient care activities. Furthermore, intelligent communication systems can also help automate administrative tasks which improves overall operational efficiencies (Pennic, 2021).

Voice-controlled solutions are changing the way individuals with mobility impairments or disabilities access eHealth services. With the development of voice control technology, these individuals can now interact with healthcare apps without needing to physically be able to use them. This opens up a world of opportunities in terms of getting timely, accurate and personalized health information and care. Voice-controlled solutions could revolutionize how those with physical impairment access healthcare services by allowing them to easily interact with medical applications from anywhere at any time. Simply using their voice, they can get fast answers to their questions, set health goals for themselves, receive reminders for taking medications or other treatments that may have been prescribed by a physician and more. The potential benefits of this type of technology are numerous as it eliminates many barriers that were previously preventing those with special needs from accessing eHealth services.

### Related & Counter Trends

Cyber Savvy, Hello Homespital, 5G transformation, Trust-A-Check, Data Market, DataNomics,

## 10. Block For Care

### Description

Jimmy Nguyen, Founding President at Bitcoin Association, expects that there will be an increase in the use of public blockchain systems to incentivize honesty in clinical research. Healthcare organizations are recognizing the benefits of blockchain technology, such as eliminating data silos, providing real-time access to patient information, and returning control to patients for their personal data in a secure digital environment (Pennic, 2021). Blockchain technology is a revolutionary tool that enhances trust and collaboration in the world of digital healthcare. This innovative technology has the potential to automate various processes, hence reducing errors and inefficiencies in healthcare delivery. Blockchain also provides a secure platform for sharing sensitive medical data without compromising patients' privacy. With blockchain, individuals are empowered to control their medical information, giving patients greater autonomy over their health. Moreover, blockchain enables greater accountability from all parties involved in the healthcare system - including providers, payers, and patients. The technology establishes an immutable record of every transaction or exchange of data within the network. This ensures that any fraudulent activity is easily detected and dealt with quickly. Blockchain's transparency also reduces administrative overheads and allows for more efficient monitoring of resources by authorities.

Blockchain networks provide transparency and privacy, allowing access and sharing of sensitive patient data as needed while keeping it concealed. They are protected by advanced security solutions, making it difficult for attackers to target a blockchain-powered network. This severely limits the frequency, possibility, and effectiveness of attacks (Morey, 2021). Blockchain technology provides several advantages for healthcare IT, such as open-source software, commodity hardware, and Open API's, facilitating faster and easier interoperability between systems, scalability, built-in fault tolerance, disaster recovery, and data encryption using widely accepted industry standards for cryptography.

## Category

Technological

## Signals

University Health Network (UHN), a research hospital based in Toronto, is collaborating with IBM, eHealth Ontario, and the Blockchain Research Institute to develop a health records platform using blockchain technology. The platform will record consent directives on the blockchain, and patients will be able to grant access to authorized parties through a mobile app (Insights, 2020).

Guardtime, a data security startup, has partnered with the Estonian eHealth Foundation to deploy a blockchain system that will secure over 1 million patient healthcare records within Estonia's eHealth program. The system will use Guardtime's keyless signature infrastructure (KSI) blockchain and provide real-time visibility into the state of patient records (Palmer, 2016).

## Implications

Blockchain technology allows patients to control their data, granting or revoking access to their health records, enhancing privacy, security, and autonomy. It uses a decentralized ledger system that expedites verification processes by removing intermediaries, improving efficiency. Consumers can own their data and choose to allow third parties to access and verify their authenticity, even getting paid for it (Rijmenam, 2019). This gives consumers more control over their data and promotes transparency in the healthcare industry.

The use of blockchain technology for health information raises regulatory challenges regarding data privacy, security, and compliance. These challenges may vary across different jurisdictions, requiring significant efforts to ensure regulatory compliance. There is also uncertainty regarding how the technology should be deployed and how it fits with state, national, and international privacy laws (Miliard, 2018).

## Related & Counter Trends

Big Eye, Winners Zone, Green Health Tech, DataNomics, Connected Care, Cloud Care,

# 11. 5G Transformation

## Description

The advancements in high definition image sensing and ultra-low latency 5G mobile networks are set to revolutionize the concepts of remote work and telecommunications. With reliable and speedy data transfer rates, critical communications can be supported, creating new possibilities for precise, real-time services.

Telemedicine will have wider applications and the point-of-care will gradually move from hospitals to homes (Benoit, 2020). Patients in remote areas will now be able to receive medical care that was previously unavailable. The use of such technology also reduces the need for patients to travel long distances to access medical care. The speed and

reliability of 5G networks mean that remote consultations can take place without any lag or interruption. Patients can communicate with their doctors via video conferencing from the comfort of their homes, which saves time and money while providing efficient healthcare services.

The availability of 5G connectivity will lead to a convergence of AI, sensors, chatbots, virtual/augmented reality, and other interactive media, allowing real-time monitoring and treatment optimization based on historical and current data (Chen & Decary, 2019). This will create a nationwide digital health ecosystem that supports medical decision-making, clinical research, and patient education and care at home. Health leaders must plan their AI strategies and infrastructure with a focus on both present and future needs (Chen & Decary, 2019). 5G has a much greater capacity than previous wireless technologies, meaning that more devices can be connected to the network simultaneously. This is important for healthcare organizations that need to manage multiple connected devices, such as wearables, medical devices, and sensors.

As the healthcare industry continues to evolve, clinical trials have become increasingly complex and data-driven. However, with the advent of 5G technology, conducting more efficient and faster clinical trials has become a reality (Rutherford & McNamara, 2022). The high-speed connectivity offered by 5G can facilitate the collection of large amounts of data from remote locations, streamlining the process involved in conducting clinical trials. With its ultra-low latency capabilities and high bandwidth capacity, 5G technology can enable researchers to access real-time data from patients located anywhere around the globe. This means that researchers can conduct remote patient monitoring efficiently during clinical trials in different geographical locations without having to depend on physical visits. By collecting vast amounts of data remotely, researchers can gain insights into how drugs interact with people across diverse populations while reducing costs.

## Category

Technological, Social

## Signals

Indian companies are creating 5G-enabled ambulances with the latest medical equipment, patient monitoring applications, and telemetry devices that transmit patient health data to hospitals in real-time. The ambulance is equipped with cameras and headgear for paramedics and can facilitate real-time communication between doctors and patients without any delay, thanks to the 5G network (ABP Live, 2022).

Zemplee is an AI-based monitoring system designed for elderly people that uses sensors placed around the home to evaluate their health, safety, well-being, and comfort by tracking vitals, movements, falls, and activity. The technology helps reduce risk and allows elderly individuals to stay at home (Fielding, 2022).

## Implications

The integration of 5G technology and AI has the potential to revolutionize the healthcare industry. With the ability to process vast amounts of medical data quickly and accurately, doctors and healthcare providers can make more informed decisions about patient care. By utilizing machine learning algorithms, AI systems can analyze patterns in data that may not be apparent to humans, leading to improved diagnoses and personalized treatment plans. I systems can monitor vital signs continuously, alerting caregivers if a patient's condition changes significantly. This technology could save lives by catching warning signs that may otherwise be missed.
5G networks require extensive infrastructure to deliver high-speed connectivity, and this may not be available in all areas (Davey & Nicholson, 2021). This could lead to unequal access to eHealth services, particularly in rural or remote

areas. Implementing and maintaining 5G infrastructure can be expensive, and this cost may be passed on to patients or healthcare providers. This could make it difficult for some people to access eHealth services. As more devices become connected to the 5G network, there is a greater risk of cybersecurity breaches and data privacy concerns. Sensitive patient data transmitted over the network could be vulnerable to hacking or other types of attacks.

## Related & Counter Trends

Cyber Savvy, Hello Homespital, Tech Therapy, Speakified Future, Legislative Lift, Age of Health Influencers, DataNomics, Connected Care, Trust-A-Check, Cloud Care

# 12. Winners Zone

## Description

The healthcare industry is a massive market, and eHealth platforms offer the potential for significant improvements in patient care, reduced healthcare costs, and increased efficiency. As a result, there is intense competition among tech companies to build the best eHealth platform, as it represents a significant growth opportunity for them. Big tech companies like Amazon, Microsoft, Apple, Google, and Salesforce are expanding their presence in the healthcare industry and competing to build the winning healthcare platform. Microsoft acquired Nuance to offer voice-based assistance and AI for clinical support, Salesforce launched a remote monitoring tool, and Oracle made a push to acquire Cerner to play a role in the provider space. The competition is expected to intensify as the digital healthcare market grows and companies leverage their existing relationships and market access (BCG Digital Ventures, 2022).

This has been driven by a number of factors, including the aging population, rising healthcare costs, and advances in technology. As consumers become more tech-savvy and comfortable with using digital tools to manage their health, there is a growing need for platforms that can provide comprehensive and personalized healthcare services. Large companies are well-positioned to capitalize on this trend because they have the resources and expertise needed to develop innovative solutions that meet these changing needs (Ozcan & Dinckol, 2022). Companies that can build successful eHealth platforms have the potential to capture a significant share of the healthcare market and generate substantial revenue.

## Category

Economic, Social

## Signals

Top technology companies are investing significantly in digital health, with Google Ventures, CapitalG, and Gradient Ventures being the most active investors. According to an article there is potential for big tech to transform the healthcare industry and improve patient outcomes (Insider Intelligence, 2023).

Amazon Web Services' (AWS) is increasing focus on the healthcare industry, with hospitals and health systems considering moving their data to AWS, Microsoft, or Google. AWS will also unveil 10 start-ups that are part of its healthcare incubator program, which aims to help small health tech companies prepare for listing on AWS by integrating more applications (Lee, 2021).

## Implications

As tech companies continue to pour investment into eHealth platforms, the pressure on eHealth organizations to innovate more quickly and aggressively will mount. With the rise of telemedicine and other digital health solutions, change will happen at an unprecedented pace. This means that eHealth businesses must keep up or risk being left behind. In order to stay competitive, eHealth organizations will need to bring new products and services to market more quickly than ever before. This could lead to a virtuous cycle of innovation as companies race each other to be first-to-market with cutting-edge solutions. With this rapid pace of development comes greater adoption rates for emerging technologies like artificial intelligence (AI) and machine learning (ML), which are already being integrated into some digital health platforms.

As the healthcare industry continues to shift towards digitalization, tech companies will eye opportunities to expand their offerings by acquiring smaller eHealth organizations. While this may seem like a mutually beneficial arrangement, it could also result in a loss of identity and control for these smaller companies. This trend has been growing rapidly over the past few years as more and more startups emerge in the eHealth space. One benefit of being acquired is gaining access to resources that were previously unavailable. This includes funding, connections, expertise, and technology that can help these smaller eHealth organizations grow faster than they would have on their own. Additionally, joining forces with a larger company can give them access to a broader customer base and increased marketing reach.

## Related & Counter Trends

Value Vantage, Cloud Care, Data Market, Easy Split, Data Democratization, Legislative Lift, Green Health Tech, 5G transformation, Robots to the Rescue, Hello Homespital, Tech Therapy

# 13. Green Health Tech

## Description

Growing recognition of the gravity and urgency of climate change and ecological destruction has brought environmental sustainability to the forefront. Nearly every industry is confronted with mounting environmental concerns. A report by Johnson and Johnson on 'The Growing Importance of More Sustainable Products in the Global Health Care Industry' suggests that sustainability is becoming a defining feature in the healthcare industry as it becomes increasingly obvious how greener operations lead to better health and lower operating costs (Johnson & Johnson, n.d.). Eco-health products and services will become more widely available as companies respond to the demand. Clinics and hospitals are increasingly demanding eco-friendly products. An abundance of innovation in menstrual health has already begun to reduce the use of single-use sanitary products as a result of this trend (BCG Digital Ventures, 2022).

Most improvements would come from moving to renewable energy and improving the lifetime energy efficiency of healthcare devices and systems (Philips, 2022). There are many benefits associated with digital health interventions, such as their low cost and ability to provide tailored person-centered care in communities

worldwide, yet environmental implications of digital health are often overlooked. The digital health industry produces a great deal of data, whether through EHRs, biometric data collected through wearable technology, or online health searches. Large servers used to store data require immense amounts of electricity to run and keep cool, especially when data is stored in the cloud which requires higher energy consumption than saving directly to devices (Thompson, 2021). While companies in the eHealth sector may take their time in adopting greener approaches due to the safety of people as the highest priority, there will be opportunities to both create new products and facilitate circular economies across the health care network.

## Category

Environmental, Social, Political

## Signals

NHS England will be the first health service in the world to have a detailed plan for achieving net-zero by 2040 for everything the NHS controls and 2045 for everything it purchases (Smith, 2021).

The healthcare industry generates as much as 30% of all stored data in the world (Huesch & Mosher, 2017). Growing awareness and understanding of negative environmental impacts due to digital healthcare software and products.

## Implications

Government policies and regulations that place an emphasis on incorporating environmental factors into digital health development and implementation, as well as penalizing failure to do so.

Digital health interventions to be audited for their environmental impacts, including device manufacturing and lifespan, data collection practices, usage of renewable energy, and efficient computation.

There is a government incentive to invest in more environmentally friendly digital health technology.

## Related & Counter Trends

Cyber Savvy, Shared Caring, Winners Zone, Legislative Lift, Age of Health Influencers, DataNomics, Connected Care, Cloud Care

# 14. Legislative Lift

## Description

In recent years, there has been a growing push towards the adoption of digital healthcare systems by governments across the world. This push has been driven by a variety of factors, including rising healthcare costs, an aging population and an increasing demand for more efficient and effective healthcare services. To this end, many governments have implemented regulations and reforms aimed at promoting the use of digital technologies in healthcare. In response to the COVID-19 pandemic, many temporary measures have been introduced to

reimburse telehealth and virtual health services which has led to increased adoption of these services by healthcare providers, as it is now a financially viable option. Governments are also streamlining the regulatory approval process for digital health products making it easier for startups and established companies to bring new digital health products to market. In order to be effective, healthcare systems must be able to communicate with each other. As a result, standardized data formats and protocols are emerging, making it easier for healthcare providers to share patient information across systems. Governments are introducing strict data privacy regulations to protect patient information. This has led to the adoption of digital healthcare systems that are designed to protect patient data

As suggested in the report by Inter-American Development Bank, transforming the health system digitally requires a long-term strategy. It is also critical to establish clear, precise, and explicit planning objectives. Using these objectives as criteria for evaluating the performance of directors and professionals is the best way to make these objectives precise and explicit. Digital health strategy must be linked to the health strategy, be included in it, and receive the necessary funding, which means it has been allocated the appropriate budget. Budget plans should span several years because the duration of the plan is measured in years. Among other things, funding should cover infrastructure, connectivity, interoperability, standards, change management, and training for digital health professionals (Carnicero & Serra, 2020).

## Category

Political

## Signals

Governments, especially in Europe and the United States, have modified regulations to ease the use of digital technologies for healthcare purposes. The healthcare industry has long been plagued by data silos that hinder the ability of practitioners to provide effective end-to-end care. However, recent regulatory changes promise to improve interoperability of EHR data and increase rate transparency for consumers. These changes are expected to go a long way in eliminating the barriers that have traditionally prevented comprehensive care analytics (Forecytdx, 2022).

Experts in Canada have identified major gaps in the way health information is used, leading to poor health outcomes, avoidable deaths, and inefficient use of resources. The Canadian government's multi-billion dollar health funding includes measures to compel provinces and territories to make significant changes to the way health data is collected, shared, and reported. Improving the gathering and sharing of medical information is necessary to address systemic gaps in care and understand the reforms needed in Canada's health system, according to Laura Rosella, an epidemiologist at the Dalla Lana School of Public Health in Toronto (Wright, 2023).

## Implications

By implementing government reforms, eHealth organizations can benefit from regulatory support that helps them improve their operations and build trust with clients. Regulatory support ensures that eHealth organizations are following guidelines set by government bodies such as HIPAA regulations, which protect patient privacy and confidentiality. Adhering to these regulations not only helps safeguard patient data but also improves the overall reputation of eHealth organizations. Furthermore, regulatory support through government reforms can help eHealth organizations capitalize on opportunities for growth while minimizing risks associated with non-compliance. The regulatory landscape can be complex and ever-changing, posing significant challenges for eHealth organizations trying to keep up. Government reforms aimed at streamlining regulations can provide much-needed clarity and standardization across the industry. This not only reduces the compliance burden but also enables

companies to allocate resources more efficiently toward innovation and expansion efforts.

With new regulations and standards, eHealth organizations may face increased compliance costs and this can be a burden, especially for smaller organizations with limited resources. They will need to implement new technologies and processes to comply with government reforms that can be challenging and time-consuming. With increased regulation and standardization, eHealth organizations may also face limited opportunities for innovation. This can be a disadvantage for organizations that rely on innovation to stay competitive.

## Related & Counter Trends

Reach Out, Together, Cloud Care, Trust-A-Check, Data Market, Connected Care, Data Democratization, Green Health Tech, Mentally Wealthy, Hello Homespital, Big Eye

# 15. Age of Health Influencers

## Description

Health influencers are individuals who use social media platforms to share their knowledge and experiences about various health-related topics, including fitness, nutrition, mental health, and lifestyle. These influencers often have a large following and use their influence to promote healthy habits and wellness products. The popularity of health influencers can be attributed to the growing interest in health and wellness among the general population, as well as the accessibility of social media platforms that allow influencers to connect with their audience and share information in real-time. Many people turn to health influencers for advice, motivation, and inspiration on their own health and wellness journeys.

However, while health and fitness influencers can be inspiring role models for many people seeking to improve their physical well-being, they are also accountable for spreading false information within their online communities. Some influencers may make unsubstantiated claims about the benefits of certain diets or exercise routines without providing any scientific evidence to back up their assertions. Others may promote harmful weight loss practices that could cause serious health problems over time. While some healthcare professionals have found success in using these platforms to dispel misinformation and provide accurate information, others have used the platforms to spread false or unproven information (Ohlheiser, 2020). Another article argues that social media algorithms and design features, such as "likes" and "shares," incentivize the spread of content that is sensational or controversial, regardless of its accuracy and that people are more likely to believe and share information that aligns with their existing beliefs and biases, which can contribute to the spread of misinformation (Keer, 2022).

## Category

Social, Values

## Signals

The Washington Post reports that wellness influencers on social media platforms, such as Instagram and TikTok, are spreading misinformation about vaccines to their followers (Maloy & Vynck, 2021).

A significant number of Gen Z (33%) and Millennials (26%) use social media to discuss illness, with TikTok being the top platform for Gen Z and Facebook for older generations. Individuals with chronic health conditions also rely on social media for health information, with many using specific groups and healthcare influencers (Benjamin, 2023).

## Implications

Influencers and eHealth organizations both aim to use social media platforms as a means of educating individuals about health-related topics and promoting evidence-based products or services. This competition for attention on social media can make it difficult for eHealth organizations to effectively reach and engage their target audience. One of the biggest challenges faced by eHealth organizations is the potential harm caused by endorsements from health influencers that are not evidence-based or may have harmful effects. The endorsement of such products or services can cause controversy among audiences, leading to a loss of trust in both the influencer and any associated eHealth organization.It can also lead to confusion among individuals seeking health information and undermine the authority of eHealth organizations.

Health influencers can amplify the message of eHealth organizations and help increase the reach of their content. Influencers can help eHealth organizations raise awareness about health issues and encourage healthy behaviors among their followers. They can collaborate with eHealth organizations to promote healthy behaviors, products or services that align with evidence-based health information and can add an authentic voice to healthcare related messages and can help make health information and advice more relatable and accessible to their followers. The influencers can also provide social proof of the effectiveness of eHealth products or services by sharing their personal experiences, and thus helping to establish trust among their followers.

## Supporting, related, & counter trends

Cyber Savvy, Mentally Wealthy, Big Eye, 5G transformation, Speakified Future, Data Democratization, Co-designing a Future, Reach Out, Together

# 16. DataNomics

## Description

The advent of machine learning and artificial intelligence has opened up new possibilities in healthcare. These technologies can analyse vast amounts of data from a variety of sources, including patient medical records, laboratory results, and imaging studies. Big Data is not limited to medical issues but also has sociological and societal applications (Olesch, 2018). This wealth of information can be used to create computer-controlled systems that are far more capable of assessing a situation and adapting quicker than their human counterparts.

The ability to analyse different sorts of information and make relevant connections will be crucial in ensuring that healthcare needs are addressed. Big Data is able to detect health problems in advance and help us make more accurate prognosis. "Algorithms are needed to understand patients' needs and forecast their upcoming needs based on data", says interviewee #9. As we move into the future, healthcare data is set to revolutionize the industry. Over the next decade or so, companies will invest an incredible amount of time and resources cataloging and analyzing healthcare data. The goal is to be able to feed this data into machine learning algorithms that can provide automatic recommendations and error-prevention protocols for health care providers (Benoit, 2020). Healthcare providers are able to identify patterns in patient data and the insights enable them to create more personalized patient care plans while reducing errors, costs, and inefficiencies across the board.

Federated learning is another interesting innovative machine learning approach that allows healthcare organizations to collaborate and share data while ensuring the privacy of patient information. In traditional machine learning, healthcare providers must share their data with one central entity, which can be a risk to patient confidentiality. Federated learning addresses this issue by allowing different organizations to train models on their local data sets without having to share it with anyone else (Rahman et al., 2022). This new approach has many benefits for eHealth organizations. Furthermore, federated learning eliminates the need for massive centralized databases, which can save time and money for participating organizations. Interviewee #10 also says that professional training is required for organizations to make sense of this data.

Increasing reliance on technology has led to a proliferation of data collection and usage. There is also growing concern about how businesses misuse sensitive user data without their consent, which can result in negative consequences for users. Today's digital age raises serious ethical concerns about privacy and security when such sensitive data is used without consent. Companies must take steps to ensure the safety and security of user data at all times.

## Category

Technological

## Signals

There have been notable instances where highly confidential information has been mishandled, with the case of Loris AI being a prime example. This company leverages artificial intelligence to create chatbot-driven customer service solutions, but it was discovered that they had utilized data from over 100 million Crisis Text Line interactions without the consent of the participants. The data was utilized to assist service representatives in comprehending customer attitudes and refining their services (Gooding & Kariotis, 2022).

The market size of big data in healthcare worldwide was valued at USD 32.9 billion in 2021 and is projected to grow to USD 105.73 billion by 2030, exhibiting a CAGR of 13.85% between 2022 and 2030 (Straits Research, 2022). North America leads the global Big Data Analytics in Healthcare Market owing to the proliferation of IoT and the growing need for analytical models that leverage patient data to enhance service delivery, as well as regulatory compliance.

## Implications

Big data can be messy and incomplete, which can lead to inaccurate analyses and incorrect treatment decisions. The eHealth organizations need to ensure that the data they collect is of high quality and usable for their intended purposes. Collecting and storing large amounts of sensitive health information can put patients' privacy at risk. Becoming more reliant on technology and big data can lead to increased vulnerability to cyberattacks and other

technology-related disruptions. Big data can reflect biases and discrimination present in the healthcare system. This can lead to unfair treatment and exacerbate existing health disparities.

By analyzing individual patient data, eHealth organizations can develop personalized treatment plans based on a patient's unique medical history and genetic profile. With access to large volumes of patient data, healthcare professionals can make more accurate diagnoses and develop more effective treatment plans. By analyzing data on treatment outcomes and resource utilization, eHealth organizations can identify ways to reduce costs without compromising on quality of care.

### Supporting, related, & counter trends

Value Vantage, Data Market, Connected Care, Legislative Lift, Green Health Tech, Winners Zone, Big Eye, Fluctuating Financial Fuel,

# 17. Data Democratization

## Description

Healthcare consumers have traditionally navigated a fragmented landscape where customer communications are impersonal, complex, and time-consuming. The demand for a better patient journey has been rising, as consumers expect the same level of experience and convenience from healthcare interactions as they get from other digital experiences. They prefer more engaging, equitable, and accessible digital communications. Data democratization means making data accessible to everyone regardless of their background or access to special software. Linking people to personal health services and ensuring the provision of healthcare is crucial for promoting good health, preventing diseases, and reducing healthcare costs. By putting information in the hands of communities, it empowers them to improve structures and overcome barriers to increase opportunities (Deloitte Centre for Health Solutions, 2015). It can shift the feeling from distrust to confidence as communities become part of the decision-making body that directs how data are used. Healthcare players need to create a patient-focused digital front door that provides a seamless channel for patients to access all their communications, reach providers, find doctors, access healthcare records, schedule visits, etc

The democratization of data in healthcare is a critical step towards achieving more equitable and accessible healthcare for all (McKinlay, 2020). Historically, marginalized communities have been underrepresented in healthcare data, resulting in inadequate care delivery and insufficient research that perpetuates health disparities. By democratizing data, more accurate and representative insights can be gained on underserved populations, enabling better targeted interventions to address their unique needs. Additionally, the democratization of healthcare data ensures that patients have greater control over their own medical information and provides them with the ability to share their records with medical professionals and researchers who can use it to improve treatment options and further scientific advancements. Patients also benefit from having access to a wider range of available treatments that are tailored to their individual needs

instead of relying on generalizations based on limited demographic information.

## Category

Social, Economic

## Signals

New federal rules were passed in 2022 under the 21st Century Cures Act in the US, which require healthcare organizations to give patients complete and immediate access to their health records in digital format. This is aimed at empowering patients by giving them control over who they share their health data with, eliminating delays, the need for fax machines, and excessive charges for printed copies (Ross, 2022).
Public Health Ontario is supporting Ontario's Open Government commitment by making government data available to promote transparency and innovation. This is achieved through the Open Data Directive, which requires provincial agencies to publish a list of their datasets and the data inventory lists all its datasets and indicates whether they are open, in the process of being opened, or exempt from release due to privacy, security, legal, confidentiality, or commercial reasons (Public Health Ontario, n.d.).

## Implications

When data is accessible to a larger number of stakeholders, it is more likely to be reviewed, validated, and cleaned. This can lead to improved data quality, which can be used to inform better decision-making and improve patient care. This can lead to better resource allocation, improved patient outcomes, and increased operational efficiency and can enable innovation by providing a platform for collaboration and experimentation. With more individuals and organizations accessing healthcare data, new insights and ideas can be generated, leading to the development of new products and services by eHealth organizations.
To enhance user engagement, eHealth organizations can provide patients and caregivers with better access to their health data. This can lead to better patient outcomes and increased patient satisfaction. Access to health data allows patients and caregivers to be more informed about their healthcare needs, treatment options, and potential side effects of medications. It also enables them to track progress over time, which can help identify trends or patterns that may require further attention from a healthcare provider. Patients who are actively involved in managing their own care tend to have better outcomes than those who rely solely on medical professionals.

## Supporting, related, & counter trends

Mentally Wealthy, Big Eye, Cyber Savvy, Shared Caring, Block For Cure, Legislative Lift, Data Market, Co-designing a Future

# 18. Connected Care

## Description

Healthcare providers are increasingly embracing data sharing to improve patient care and outcomes. Through real-time data sharing, healthcare organizations can visualize untapped capacity, which allows them to better manage patient care and allocate resources more efficiently. This is particularly important in an era where healthcare systems are often stretched beyond their limits due to increasing demand for services. Data sharing also helps healthcare providers proactively facilitate transitions of care from one setting to another. By having access to a patient's medical history, prior treatments, medications and other relevant information, providers can make more informed decisions about the most appropriate level of care needed for a patient at any given time. This not only improves the quality of care but also reduces the likelihood of readmissions or unnecessary hospitalizations. This trend is generally viewed as impacting the relationship between patients and providers, but the rise of virtual collaboration among providers themselves also offers exciting opportunities. Multidisciplinary care teams, today, are struggling to keep track of all relevant information pertaining to their patients - from subspecialty reports, to demographics, to current conditions. A central role for health platforms will be to transform chaotic health care into comprehensive, integrated, and coordinated care, thereby improving the quality of life for patients (Olesch, 2021).

A sense of community will grow within the healthcare industry with more touch points between healthcare providers, life sciences companies, technology providers, and other suppliers. Collaborations based on existing data assets, data-driven analysis, and innovative software enhancements will become increasingly common. By improving patients' health and ensuring that local laws and regulations regarding data use and privacy are automatically adhered to, these networks are paving the way for a software-defined healthcare system (Pennic, 2021). For example, image-guided minimally invasive procedures performed by interventional physicians have also begun to take advantage of virtual collaboration platforms to provide remote peer-to-peer guidance and education. Access to specialized care, affordability, and consistency in quality of care are three of the major reasons why virtual collaboration is expected to grow significantly in the coming years, resulting in a single system of care that is coordinated (Philips, 2022). By collaborating with healthcare professionals in other locations, remote healthcare providers can gain access to expert advice and knowledge. This can help improve the quality of care they provide to their patients. Connected care can help healthcare providers in remote areas provide better care to their patients, as they can more easily communicate with and monitor their patients.

## Category

Social, Technological, Economic

## Signals

In the field of Cardiology, integrated diagnostics and smart algorithms are being used to provide insights and optimize patient care enabling care teams to make faster clinical decisions (Philips, 2021). British Telecom, launched Encircle, a Connected Care platform that monitors the health of loved ones with discrete sensors (BCG Digital Ventures, 2022).

With the aid of a collaborative ultrasound platform, experienced sonographers can remotely assist their local counterparts with exams while colleagues can discuss patients' medical conditions (Philips, 2022).

## Implications

The healthcare landscape will constantly evolve and change and will increasingly be disrupted by players with non-traditional brands, reach, and customer knowledge. Those who are entering the field must be prepared to adapt and innovate. One of the most important ways in which eHealth organizations will benefit is through strong partnerships with incumbent networks. These established networks have years of experience and expertise in the industry and can provide invaluable insights into how to improve and deliver better service. By partnering with these networks, new entrants into the healthcare industry can learn about best practices, technologies, and strategies that have been proven effective in improving customer satisfaction. Incumbent networks also have extensive data sets that can help identify areas where improvements are needed. By working together with these established players, those new to the industry can gain a competitive advantage while also contributing to much-needed innovation.

Training the health workforce in new digital solutions will require a convergence of solutions to support the end-to-end professional development journey. This includes creating personal development plans, courses, education programs, and completing certifications and recertifications. The availability of virtual education platforms will make it easier to access education online in this domain.

## Supporting, related, & counter trends

Cloud Care, Trust-A-Check, Reach Out, Together, Value Vantage, DataNomics, Legislative Lift, Green Health Tech, 5G transformation, Block For Cure, Big Eye, Mentally Wealthy

# 19. Easy Split

## Description

Over the past few years, digital solutions have witnessed several payment model innovations that have revolutionized the way transactions take place. Subscription-based models have emerged as a popular payment model for digital solutions like software-as-a-service (SaaS) platforms, online streaming services, and online courses. Under this model, customers pay a monthly or yearly fee to access the service and can cancel or upgrade their subscription anytime. Other innovative payment models include Freemium, Pay-per-use, In-app purchases, Cryptocurrency payments, and Microtransactions. All of these models provide customers with more flexibility and convenience while allowing digital solution providers to monetize their offerings in new and innovative ways. Cryptocurrency payments, in particular, offer faster, cheaper, and more secure transactions compared to traditional payment methods. These payment models have transformed the digital industry, opening up new possibilities for businesses and customers alike. As health care systems recover from the COVID-19 pandemic, many will struggle with huge waiting lists–at time of writing the UK faces a backlog of over 7M patients. There will be an opportunity for private medical providers to offer new financing or payment models to those who previously would not have been covered by private medical insurance, particularly in markets where systems are predominantly state-run (BCG Digital Ventures, 2022).

These innovative payment models may help healthcare providers and organizations to remain competitive in a changing healthcare landscape by promoting efficiency, reducing costs, and improving the quality of care. Community-based health insurance or microfinance models may help healthcare organizations to attract and retain patients who may not have been able to afford healthcare services otherwise. By providing access to affordable healthcare, these models may help to build patient loyalty and promote long-term sustainability of healthcare organizations. While innovative health payment models are not specifically designed to combat competition or lower profits, they can improve access to healthcare services and promote sustainability of healthcare systems. Interviewee #13 suggested a potential business model where insurance companies could cover the costs of caregiving and incorporate it into health care benefits allowing caregivers to apply funds towards respite care, resulting in them being more productive at work since they would not have to take time off to care for their loved ones. Such a model, according to him, could potentially benefit both caregivers and businesses.

## Category

Economic, Social

## Signals

Spark Therapeutics introduced three payer programs, including an outcomes-based rebate arrangement, an innovative contracting model, and a payment plan proposal for LUXTURNA, a one-time gene therapy. The company aims to bring innovation and ensure that eligible patients have access to the therapy through collaboration with payers, health benefit providers, physicians, and treatment centers. According to Spark Therapeutics' former CEO, Jeffrey D. Marrazzo, access to therapy is a shared responsibility and the company is committed to challenging existing conventions in the healthcare sector (Estes, 2022).

Philips and Jackson Health System have entered into a strategic long-term partnership centered around the Enterprise Monitoring as a Service (EMaaS) model. This collaboration aims to facilitate Jackson's drive to improve patient safety and achieve continuous monitoring throughout its network. With the adoption of advanced patient monitoring systems available for a per-patient fee, the health system will be able to standardize patient monitoring across all levels of care settings in its network, without any upfront costs. The innovative EMaaS business model will create a smoother experience for both patients and staff (Royal Philips, 2018).

## Implications

Innovative payment models can be complex and require significant administrative and technical resources to implement and maintain. This can divert resources away from patient care and impact the overall efficiency of the organization. Some payment models, such as capitation payment, can expose eHealth organizations to financial risk if they do not manage patient care effectively. This can lead to financial losses and impact the sustainability of the organization. Payment models that require data sharing may raise concerns about patient privacy and data security. This can lead to legal and ethical issues for eHealth organizations that are responsible for protecting patient information.

Innovative payment models can incentivize eHealth organizations to focus on preventive care rather than just treating illnesses. This can result in improved health outcomes for patients and reduced healthcare costs in the long run. Incorporating patient feedback or satisfaction

scores can encourage eHealth organizations to prioritize patient-centered care leading to better patient engagement and satisfaction. Payment models that incorporate value-based care can encourage eHealth organizations to improve their processes and streamline their operations. This can result in more efficient use of resources and reduced costs.

## Supporting, related, & counter trends

Hello Homespital, Robots to the Rescue, Fluctuating Financial Fuel, Shared Caring, Winners Zone, Legislative Lift, Value Vantage, Co-designing a Future

# 20. Data Market

## Description

In today's digital age, personal data is being generated at an unprecedented rate through online activities, social media, and other digital platforms. This data can include personal information such as name, address, email, phone number, as well as more sensitive data such as financial information, health records, and browsing history. There is a thriving market for personal data, with companies and organizations purchasing this data for a variety of purposes, such as targeted advertising, market research, and product development. However, selling personal data can also have negative implications for privacy and security, as it can expose individuals to identity theft, fraud, and other forms of exploitation. It is important for individuals to be aware of the types of data they are sharing and with whom, and to take steps to protect their personal information and privacy. This can include using strong passwords, enabling two-factor authentication, being cautious about sharing personal information online, and using privacy tools such as virtual private networks (VPNs) and anti-tracking software.

Some people are becoming more comfortable sharing their personal data online in exchange for certain benefits or services. For example, many people willingly share their personal data with social media platforms, search engines, and other online services in exchange for access to their services. Additionally, there are growing markets for the sale of personal data, and some people may be willing to sell their data for monetary gain. Data brokers, companies that collect personal information about people based on their online habits and build profiles about them, silently collect private information and put it up for sale. These profiles contain a wealth of information, such as name, address, phone number, email address, age, gender, income level, education level and more. Data brokers use sophisticated algorithms to mine data from various sources including social media sites, search engines and other websites. The problem with data brokers is that they operate in a legal grey area which makes it difficult for consumers to protect their privacy. Many people are unaware that these companies exist and do not realize how much personal information they have already gathered on them. By selling this information, individuals are essentially surrendering their privacy and opening themselves up to potential security breaches or identity theft.

Interviewee #6 also says that the question of whether people will become more comfortable with sharing their data and using technology is not a simple yes or no answer, but depends on factors such as how the data is used, what people get in return, and transparency in the use of data.

There is a growing concern about data privacy and the misuse of data, which could lead to people being hesitant to share their data. To address this, organizations need to be transparent about how data is used and stored, who has access to it, and provide a consent process where people can understand the benefits of sharing their data. It is important to consider what type of support would have enabled building a better or more effective solution.

## Category

Social, Economic

## Signals

There has been an increase in start-ups attempting to exploit this vulnerability by purchasing access to our social network accounts and banking data. Datacoup, a platform that allows users to connect their apps and services via APIs in order to sell their data, offers to pay its customers up to $8 per month for access to their personal data. Users can sell only the data they want and decide who buys their data. The linked data is stripped of personal identifying details and sold to advertisers. The company aims to make consumers aware that their personal information has real value to corporate interests and by connecting with various third-party applications, such as fitness trackers or financial management tools, users can create a comprehensive profile of their personal habits and preferences that is valuable to companies seeking insights into consumer behaviour (Allen, 2014).

Recent studies show that many people are willing to share their personal data with companies in exchange for cash. Over half of the 9,000 people surveyed worldwide said they would do so, while 42% of 13-17-year-olds in the UK would prefer cash for their data over earning money from a job. Additionally, 56% of consumers surveyed said they would give up personal data if they received some form of economic compensation (Parra-Arnau, 2017).

## Implications

By collecting and analyzing patient data, eHealth organizations can identify patterns and trends that can help reduce healthcare costs. Gaining a better understanding of a patient's medical history, current health status, and any specific health concerns enables eHealth organizations to provide more accurate diagnoses, personalized treatment plans, and preventive care measures, ultimately leading to better healthcare services. By selling their personal data to eHealth organizations, patients can become more empowered in managing their own health. They can gain access to their health data, track their progress, and make informed decisions about their health and wellbeing.
The potential benefits of using personal health data for research are enormous. For starters, it allows researchers to gain insights into the factors that contribute to certain health conditions. This includes everything from genetic predispositions to lifestyle choices such as diet and exercise habits. Armed with this knowledge, researchers can develop targeted interventions that address the root causes of these conditions. This treasure trove of information can be used to conduct research on a wide range of health conditions, their causes, and effective treatments. By analyzing this data, researchers can identify new medical breakthroughs and develop new drugs and treatments for various health conditions. Moreover, eHealth organizations can use personal health data to track the effectiveness of various treatments over time.

## Supporting, related, & counter trends

Trust-A-Check, Connected Care, Data Democratization, DataNomics, Legislative Lift, Block For Cure, Shared Caring, Fluctuating Financial Fuel, Big Eye, Cyber Savvy

# 21. Trust-A-Check

## Description

In recent years, healthcare organizations have been investing more in data privacy and security measures to protect patient data. This is because the increase in cyber threats has made it imperative for these institutions to safeguard sensitive information from unauthorized access, theft or misuse. Regular assessments of security protocols are conducted to identify potential weaknesses in systems and rectify them before they can be exploited. Another way healthcare organizations are enhancing data privacy is by granting patients greater control over their own health records. Healthcare organizations are becoming more transparent and open about their data privacy and security policies. Patients now have the right to access their own medical history and can choose whether or not their medical information should be shared with third-party providers. In the past, patients were often left in the dark about how their personal information was being used and who had access to it. However, with increased awareness of data breaches and cyber threats, healthcare organizations have recognized the importance of being transparent with their patients. The development and adoption of standards and guidelines for digital health solutions are helping to increase trust in governance of digital health. Better governance has enabled organizations to sustain and as a result of the healthcare reforms, digital healthcare solutions have achieved a greater level of market penetration (BCG Digital Ventures, 2022).

As AI becomes more integrated into our daily lives, it has become increasingly important to ensure that these systems are trustworthy and transparent. In response to these concerns efforts have been made to develop standards for evaluating the safety and effectiveness of these systems, as well as measures to increase public awareness of how they work. The FDA has now cleared many devices with some form of AI/ML-based algorithm embedded. These developments will start to overcome the lack of transparency and increase trust in the operation of these systems: scrutiny of the datasets for AI/ML training; examining inherent biases within the models; improved simulation and training for correct operation by HCPs; stricter lifecycle- based change control; and having a human mediate the personalized results for patients (BCG Digital Ventures, 2022). Karim (Interview Participant 9) believes that the government has a role in creating markets and that better licensing agreements are needed, using the pharmaceutical industry as an example. The industry typically owns the patent to the drug, does the research and development to discover the drug, and conducts all the clinical trials to bring it to market.

## Category

Political, Social

## Signals

Estonia's digital health platform has become a global model for increasing trust in digital health among patients and healthcare providers. The platform, called "e-Health," allows patients to access their medical records, book appointments, and receive e-prescriptions. One of the key features of the platform is its focus on transparency and accountability. Patients have control over their own data and can choose who has access to it. The platform also provides detailed information on how patient data is being used and who is accessing it. In addition, the platform is designed to be secure and to protect patient privacy. The system uses encryption to ensure that data is protected from unauthorized access, and access to the system is tightly controlled. The success of the e-Health platform has helped to increase trust in digital health among patients and healthcare providers in Estonia (Stone, 2021).

## Implications

When patients trust that their personal health information is being protected and managed appropriately, they are more likely to adopt digital health solutions. This can lead to increased usage of eHealth services, resulting in more revenue for eHealth organizations. In order to build trust with patients, eHealth organizations must be transparent about how they collect and use patient data. They must also be proactive in protecting this information from unauthorized access or theft. This means implementing strong cybersecurity measures such as encryption and multi-factor authentication. It also means regularly reviewing policies and procedures to ensure they are up-to-date with the latest regulations.
With the COVID-19 pandemic accelerating the adoption of digital health solutions, investors are beginning to see a massive opportunity in this space. As trust in digital health governance increases it will encourage more investors to put money into eHealth organizations. Increased investment can lead to more funding for research and development, better technology, and more innovation in the digital health space. To build trust, stakeholders must come together to develop strong regulatory frameworks that prioritize transparency, accountability, and patient safety.

## Supporting, related, & counter trends

Cloud Care, Value Vantage, Connected Care, Data Democratization, DataNomics, Legislative Lift, Big Eye

# 22. Cloud Care

## Description

The emergence of new models of care and the increasing use of shared data have put increasing pressure on digital health systems to respond quickly to changing circumstances and adopt efficient models of implementation. It is imperative for them to capture more data and maintain consistency without burning through their budget. There is a growing trend for eHealth organizations to implement 'as a service' business models which give doctors, staff, and even patients the ability to access data remotely, share critical insights in real time, and collaborate more effectively, leading to better care coordination (Philips, 2021). The end-user can therefore 'pay as they go,' allowing for greater predictability in their costs. Another advantage is the overall energy efficiency, since cloud based companies utilize servers at an average of 65% compared with just 15% on-premises. There are a number of ways that circular, service-oriented models can be used to reduce waste and carbon emissions and moving to a cloud based service is just one of them (Philips, 2022).

As data is spread across multiple systems and devices, such as servers, PCs, and mobile phones, cloud data security is more complicated than security in traditional information systems, increasing the chances of a data breach. Data security is a significant barrier to the adoption of cloud computing, which is accompanied by issues such as compliance, privacy, trust, and legal issues (Sun et al., 2014).

## Category

Technological, Economic

## Signals

Increasing focus on healthcare digitization projecting the Global healthcare cloud computing market to reach $64.7 billion by 2025 (Healthcare Cloud and Computing Market, 2022).

Technology giants like Google, Amazon, Apple, IBM, Dell, Salesforce provide enterprise platforms focusing on cloud computing for the healthcare industry (Dignan, 2021).

## Implications

To enable maximum adoption of digital health services, cloud environments must be made trustworthy and security concerns of users must be addressed. Government policies around data privacy, protection, availability, location, and secure transmission can enhance this trust.

By reducing the time spent on managing IT infrastructure and software tools, healthcare organizations can devote their staff to strategic new initiatives and innovations (Philips, 2021) which could also lead to greater collaboration.

Development of infrastructures that enable eHealth organizations to integrate informatics applications that can be combined and scaled depending on the emerging needs, thereby simplifying and accelerating the adoption of innovation.

## Supporting, related, & counter trends

Hello Homespital, 5G transformation, Big Eye, Fluctuating Financial Fuel, Green Health Tech, Legislative Lift, DataNomics, Connected Care, Value Vantage, Reach Out, Together

# 23. Value Vantage

## Description

The value of offering fine-grained outcome data is on the rise as the healthcare industry transitions away from fee-for-service models and towards value-based care (Kimpen & Osnabrugge, 2020). In order to demonstrate the value of healthcare services, compare treatment options, and uncover opportunities for improving or even redefining care, it will be essential to be able to measure and report outcomes in detail. The need for proven results increases as healthcare companies are pressed to take action to protect people's and the planet's health.

The success of healthcare technology trends and sustainability commitments will depend on whether or not they translate into measurable outcomes. In addition to clinical outcomes, healthcare organizations are increasingly measuring social impact and environmental sustainability outcomes, including proof of carbon-neutrality and reliance on renewable energy. Eventually, those methods that will demonstrably improve lives will rise to the top (Philips, 2022).

## Category

Economic, Social

## Signals

Growth in private capital investment to value-based care companies rose more than fourfold between 2019 and 2021, while investment in the legacy model of care delivery, hospital construction, remained flat over the same period (Abou-Atme et al., 2022).

## Implications

As digital health continues to evolve, there will be an increased emphasis on clinical outcomes for digital health companies. This means that companies will need to demonstrate the effectiveness of their products and services in terms of real-world outcomes for patients. In the near future, this focus on clinical evidence is likely to become a key factor in determining which digital health solutions are successful and which ones are not. As digital health companies flood the marketplace competing for the same pool of patients and customers they will have to show strong clinical outcomes in order for their services to be taken up by patients and providers. To establish and validate their clinical claims, digital health companies will implement clinical studies to help them become more appealing (BCG Digital Ventures, 2022).

## Supporting, related, & counter trends

Co-designing a Future, Data Market, Easy Split, Connected Care, Data Democratization, Green Health Tech, Winners Zone, Shared Caring, Fluctuating Financial Fuel, Mentally Wealthy, Hello Homespital

# 24. Co-designing a future

## Description

In the modern economy that prioritizes services, showcasing the worth of an organization heavily relies on the customer experiences it provides. As these experiences have evolved to become more intricate and fluid, there is no room for makeshift remedies. A collaborative approach to design helps create synergy within an organization and ensures that all voices are heard. This approach also helps address the ethical standards of inclusivity in design. Co-design means bringing together people with different perspectives, backgrounds, and expertise to create something truly unique. By working together, designers can tap into each other's strengths and develop a more holistic understanding of the problem they are trying to solve. This results in better outcomes for clients and customers alike. At the same time, collaboration promotes inclusivity by ensuring that everyone has a seat at the table. When diverse perspectives are represented in the design process, solutions can better reflect the needs of a wide range of individuals, including those who may have been traditionally excluded from certain products or services.

A research study reveals that codesign enhances customer attachment to products and company identification. The emotional connection with the company, rather than the product, influences codesign expenditures. Consequently, investing in codesign toolkits can benefit companies as it leads to increased customer-company identification and codesign expenditures (Teichmann et al., 2022). Furthermore, the community is involved throughout the design process, from ideation to implementation which helps ensure that the design is culturally appropriate and

responsive to the needs of the community. Codesign involves actively listening to and understanding the needs and perspectives of others. This can help designers develop empathy for the experiences of people from diverse cultures and ensure that the design is inclusive.

## Category

Social, Values, Economic

## Signals

In New Zealand, mental health and lifestyle electronic screeners have undergone a transformation through codesign to become more relevant and effective for their users. The Case-finding and Help Assessment Tool (CHAT) has been modified and tailored to suit the context of different populations. Through codesign, these tools were assessed for feasibility and acceptability with users before making necessary changes. These modifications ensured that each population has access to a personalized tool that addresses their unique challenges in mental health and lifestyle. The use of technology has allowed these tools to be easily accessible, functional, and user-friendly while providing accurate results that can help in early detection of mental health issues (Goodyear-Smith, 2021).
The PATH project brought together health and community care partners to improve patient and caregiver experiences in Cobourg, Ontario. The team made improvements that addressed common healthcare frustrations, resulting in high patient satisfaction and reduced anxiety levels. The project also influenced the mindset of the local healthcare community, leading to improvements in other processes and program redesigns (Fooks, n.d.).

## Implications

As eHealth technology continues to revolutionize the healthcare industry, it is crucial for designers to prioritize the needs of all stakeholders in the design process. Codesign, a collaborative approach that involves end-users, healthcare professionals, and other stakeholders throughout the design process, will prove to be an effective strategy for promoting engagement and ownership among these groups. By working together from ideation to implementation, codesign allows all stakeholders to share their unique perspectives and contribute their expertise throughout the entire development cycle. This ensures that eHealth solutions are tailored to meet the specific needs of end-users while also addressing critical issues facing healthcare professionals. As a result, stakeholders feel empowered to take ownership of these solutions, which can lead to increased adoption rates and sustained use over time. Moreover, codesign fosters a sense of collaboration and shared responsibility among all parties involved in eHealth solution development.

For the eHealth industry, codesign can help identify potential implementation issues early on in the design process, which can ultimately reduce costs associated with making changes later on. By involving end-users, healthcare providers, and other stakeholders in the design process, eHealth organizations can create solutions that are more effective and efficient. Allowing for greater user involvement and feedback throughout the development process ensures that eHealth solutions are designed to meet the unique needs and preferences of end-users. Additionally, by involving healthcare providers in codesigning eHealth solutions, organizations can better understand their workflows and processes. This understanding can then be used to develop tools that fit seamlessly into existing routines and workflows.

## Supporting, related, & counter trends

Hello Homespital, Cyber Savvy, Mentally Wealthy, Shared Caring, Winners Zone, Green Health Tech, Legislative Lift, Data Democratization, Easy Split, Trust-A-Check, Value Vantage

# 25. Reach Out, Together

## Description

By gathering data on the specific healthcare needs of a given community, organizations are able to better understand the challenges they face and work collaboratively to overcome them. This might involve developing targeted interventions or programs that address key risk factors or provide resources for at-risk populations. By mobilizing community partnerships, public health officials can help raise awareness of health issues and increase understanding of the factors that contribute to them. This can help people to take action to protect their health and prevent the spread of diseases. Community partnerships bring together diverse stakeholders, including government agencies, community-based organizations, healthcare providers, and individuals, to work collaboratively to identify and address health problems. This collaboration can lead to more effective and sustainable solutions than working in isolation. For example employers face many challenges in addressing the health needs of their employees while also containing costs attached to new healthtech solutions. Employers are now looking for aggregated offerings through existing players, allowing them to reduce the number of vendors they must manage and focus more on improving their employees' engagement and experience (BCG Digital Ventures, 2022).

By working together, community members can build trust and relationships with each other, which is critical for addressing health and wellness issues. When people feel connected and supported by their community, they are more likely to engage in healthy behaviors and seek out medical care when needed. We have seen an increased focus on health and wellness in the workplace also, and a growing recognition that the health of employees and customers is critical to the success of any business (Olesch, 2021). Many health and wellness issues are influenced by social determinants of health, such as access to healthy food, safe housing, and quality education. Working together can help to identify and address these underlying factors, which can improve the overall well-being of people in the community. Partnerships can bring together a wide range of stakeholders, including healthcare providers, government agencies, non-profit organizations, and individuals, to leverage their resources and expertise. Furthermore, community partnerships can help to ensure that these initiatives are equitable and accessible to all members of the community. This is particularly important for underserved and marginalized populations, who may face additional barriers to accessing healthcare and other resources. Community Health Centers (CHCs) in Ontario are non-profit organizations that provide a variety of primary healthcare and related services to their communities by prioritizing specific groups of people and are managed by community boards that include members who provide health and social services (Parkdale Queen West Community Health Centre, 2022). This governance approach ensures that CHCs address the most pressing needs of the community.

## Category

Social, Economic

## Signals

Chicago's West Side has a 16-year shorter life expectancy than the Loop neighborhood just a few miles away. The West Side United program is made up of several Chicago hospitals and civic groups and is working to address health equity issues that contribute to this disparity. Hospital-community partnerships like West Side United, the Centers for Medicare and Medicaid Services' Accountable Health Communities program, and the American Hospital Association's Hospital Community Cooperative are growing in number and aim to promote healthier communities by addressing social needs and referral to community services (Kuehn, 2019).

Lambton Public Health collaborates with various community partners to address health issues in their community. The partnerships include service clubs and agencies, first responders, the justice sector, for-profit corporations and workplaces. Lambton Public Health works with partners like St. Clair Child and Youth Services, Canadian Mental Health Association, and the Sarnia-Lambton Ontario Health Team, to improve mental health promotion and treatment, healthcare journey, and enhance overall health. The organization also works with planning groups such as the Community Homelessness Initiative Network, Lambton Children's Planning Network, and Erie-St. Clair LHIN to bring public health expertise into community-level plans and decisions (Lambton Public Health, 2022).

## Implications

The healthcare industry is increasingly turning to digital solutions to improve patient outcomes and streamline processes. However, eHealth organizations face challenges in achieving widespread adoption of their digital health solutions. By leveraging existing community networks and resources, eHealth organizations can reach a wider audience, achieve greater impact, and increase scalability. Collaborating with community partners allows eHealth organizations to tap into established relationships that are built on trust and credibility. This can help overcome barriers to adoption such as skepticism or resistance from patients or healthcare providers. In addition, community partnerships provide unique opportunities for co-creation and co-design of digital health solutions that are tailored to the needs of local populations. This approach can be particularly effective in addressing health disparities or other complex social determinants of health.

Digital health has become increasingly important in the healthcare industry, but its adoption and integration have been slow. By partnering with community organizations, eHealth organizations can amplify their message and raise awareness of the importance of digital health. This will help to promote policies that support its adoption and facilitate collaboration between healthcare providers. Community partners can help eHealth organizations to reach a wider audience through their established networks. Community organizations often have direct access to patients, which makes them valuable allies in promoting digital health initiatives. By working together, they can create educational programs that target specific populations or communities, making it easier for people to understand how digital health can benefit them.

## Supporting, related, & counter trends

Data Democratization, Cloud Care, Legislative Lift, Co-designing a Future, Winners Zone, Connected Care, Shared Caring, Mentally Wealthy

# From scanning to scenarios

Strategic foresight is a vital aspect of any successful organization. It allows leaders to anticipate future challenges and opportunities, and take proactive steps to prepare for them. However, despite its importance, strategic foresight can often feel abstract and intangible – particularly when it comes to putting it into practice. To truly benefit from strategic foresight, tangible thinking is required (Hines & Bishop, 2015) a deep understanding of the drivers of change that affect the organization and how these drivers will shape the future landscape in which the eHealth organizations operate is required. Drivers are essential to understanding the potential future of any given industry or market. They provide valuable insights into what could happen and help businesses prepare for different scenarios. At the same time, drivers can be disruptive in nature, as they challenge assumptions about the present. Businesses need to be aware of these disruptions and adapt accordingly if they want to remain competitive

In today's ever-evolving market, change is the only constant. As new technologies emerge, consumer preferences shift, and geopolitical landscapes transform, companies that fail to recognize these change agents early on may find themselves struggling to keep up with changing market demands. Therefore, it is essential for organizations to have a deep understanding of what is really driving change into the future. Identifying these key drivers helps businesses gain insights into potential future scenarios and prepare accordingly. Investigating the drivers is essential if we want to understand the developments and whether they will continue at the same pace or slow down, reverse, move in new directions, or interact with each other. By doing so, we can shift our strategic focus away from simply predicting what will happen next and towards anticipating potential discontinuities and alternative future contexts (Hines & Bishop, 2015). Many different factors contribute to these developments, ranging from technological advancements to cultural shifts to economic factors. As such, it's important not only to consider individual drivers but also how they interact with one another. This requires a holistic approach that takes into account multiple perspectives and disciplines. Consequently, we gain a better understanding of how change operates and what possible future developments may occur.

Exploratory conversations about strategic drivers can help organizations gain unexpected insights into the future significance of certain factors. These discussions can reveal potential obstacles, opportunities, and factors that may affect strategic outcomes. Through this process, assumptions underlying strategies are made clear, and the organization's willingness to adapt to change becomes evident (Hines & Bishop, 2015). Exploratory conversations also facilitate a deeper examination of current trends and patterns that may impact future outcomes, and foster collaboration among stakeholders by promoting open communication and diverse perspectives.

# 5. Forecasting

## Introduction

Forecasting involves creating alternate futures, a key tenet of strategic foresight which states that the future is unforeseeable and attempts to get it right are futile (Hines et al., 2015). The idea of forecasting is to assess how situations may play out based on current conditions and trends identified. Forecasters create plausible scenarios in order to prepare and plan for possible futures, enabling organizations to respond flexibly as events unfold. These scenarios will serve as test conditions, demonstrating how well the strategy performs in various environments (Heijden, n.d.). Uncertainties about the future are both numerous and unknown. It is, however, necessary to identify the most significant uncertainties because together they are powerful indicators of the most viable alternative futures.

The driving forces that have been collected in the previous step are analyzed through trend analysis in order to come up with predictions about the future. These are sorted to make sure they are critical uncertainties which essentially means that it is an uncertainty that is key to our focal issue - ensuring long-term sustainability of eHealth organizations. Ultimately, the goal is to be able to forecast scenarios with accuracy while also having insight into causes and effects of these driving forces. With all this knowledge in hand, a future with less uncertainty could be achieved - one where businesses can confidently make decisions knowing the risks involved or even take preemptive measures when needed. At the same time, we also focus on the most significant uncertainties that we consider to be most relevant to the subject and most difficult to foresee. In the beginning, all uncertainties seem unique, but as we analyze them, we are able to partition them on a single scale, an axis of uncertainty (Wilkinson, 1995).

The first step in understanding uncertainties is identifying what drivers are likely to have the greatest impact. This helps to provide clarity around which of these factors would most likely change the baseline should they actually occur. The second characteristic is uncertainty itself which is something that may be important to the eHealth organizations in the future, but whose trajectory is difficult to predict as it could take a variety of forms in the future (Hines & Bishop, 2015). Drivers with both these characteristics are referred to as “critical uncertainties” and looking for those with high impact are the best key uncertainties. Figure 4 shows how the key uncertainties were determined by mapping the drivers using two criteria: impact and uncertainty. Critical uncertainties that score the highest (shaded in Figure 4) are considered the starting point.

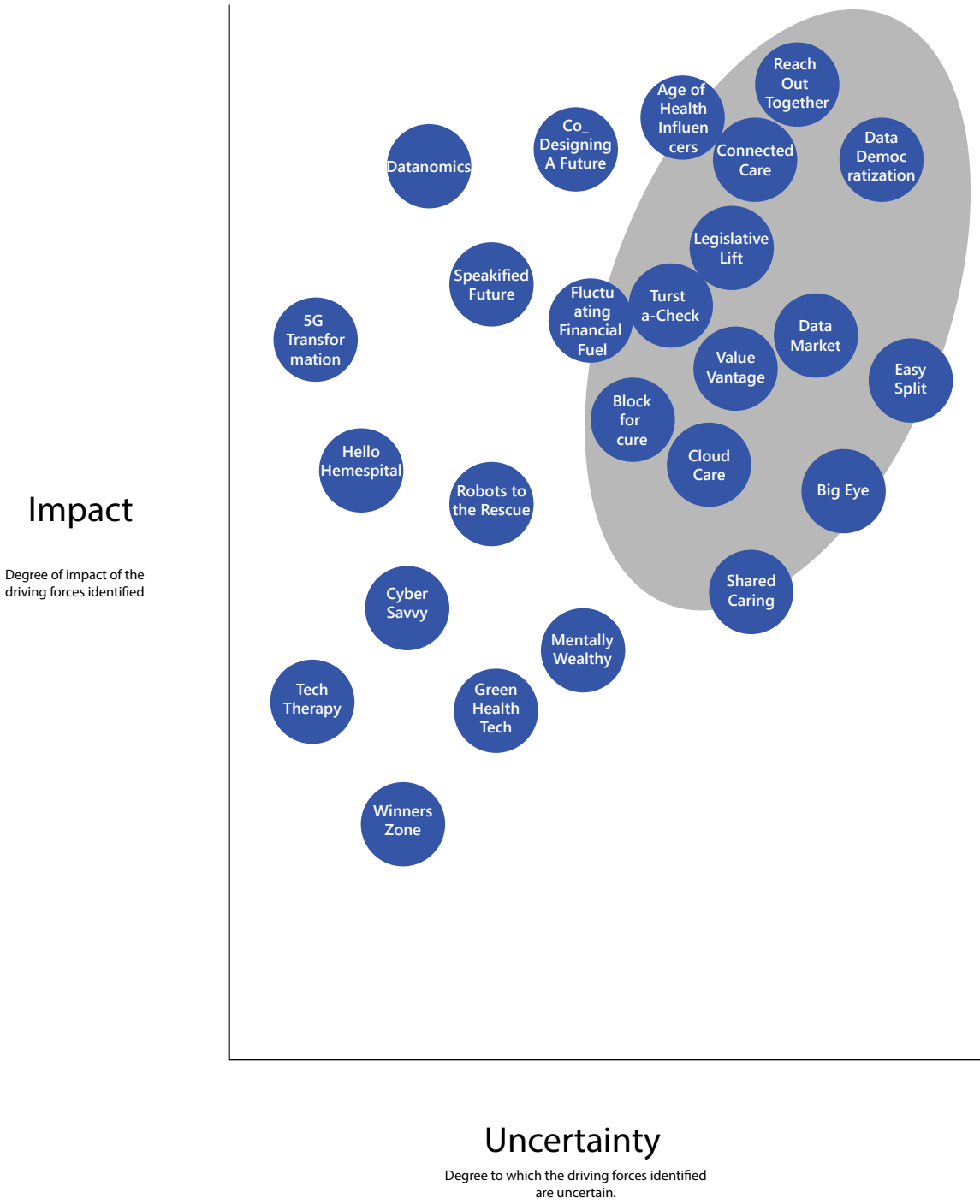



Figure 4 - Drivers of change mapped relatively on a XY graph with uncertainty on X-axis and impact on Y-axis to identify critical uncertainties (high in uncertainty and impact) which are shaded

We simplify the entire list of uncertainties into two orthogonal axes to examine their relevance and interest to our focal issue by creating a matrix that allows us to define four very different, but plausible, quadrants of uncertainty based on different pairs of axes taken from the critical uncertainty zone. We use these corners as a basis for exploring different logical futures, which help us discover implications for eHealth organizations. Using combinations of our forces, we could create hundreds of scenarios. However, it is important to remember that pursuing every single possibility is not feasible and narrowing down options yields better results than attempting to do too much all at once. Therefore, it is essential to carefully consider which directions offer the best opportunities for exploration. With this approach, the scenario quadrants that result from the intersection of both axes depict engaging and distinct areas to explore the central issue (Rhydderch, 2017).

It is important to note that choosing two critical uncertainties represents a broad range of relevant future scenarios and does not imply the devaluation of other drivers. Instead, it's more accurate to think of these two driving forces as establishing the corners of plausible futures rather than telling four stories. The goal is not to pick one scenario that will come true but instead to create an amalgam of all four scenarios. It's important to note that these four stories are exaggerated and represent outer limits for what is feasible. Also, we must remember that no single outcome will ever be exactly like any specific scenario since it's impossible for us to accurately predict the future with certainty. By understanding this concept, we can maximize our potential in creating a better future by considering multiple outlooks and possibilities rather than just one storyline.

It is possible that the uncertainty surrounding whether governments will be proactive or reactive in reformations and laws for digital healthcare will continue into the future and that forms the first axis of uncertainty (Figure 5). The pace of technological advancement in digital healthcare is rapid and can sometimes outpace the ability of governments to keep up with regulations and policies. Additionally, the regulatory environment for digital healthcare is complex and subject to political and economic factors that may impact the speed and scope of reforms. However, it's also possible that governments will continue to recognize the importance of digital healthcare and take proactive steps to ensure the safety, privacy, and security of patients while promoting innovation and accessibility. This could include investing in research and development, enacting laws and regulations, and partnering with healthcare providers and technology companies to support the adoption of digital healthcare solutions. Ultimately, the extent to which governments are proactive or reactive in reformations and laws for digital healthcare will depend on a wide range of factors, including technological advancements, political priorities, economic conditions, and cultural attitudes.

On the other hand, there is a growing trend towards empowering individuals to take control of their own health and well-being through self-care practices and digital health tools. This trend is fueled by advancements in technology, the increasing availability of health information, and a desire for greater autonomy and personalization in healthcare. On the other hand, healthcare is a complex and expensive system that requires significant resources and infrastructure to manage. Big organizations such as hospitals, insurance companies, and government agencies will continue to play a critical role in providing and managing healthcare services, particularly for those with complex medical needs. It's possible that there will continue to be some uncertainty around whether people will manage their own care or if it will be managed by big organizations in the future and the uncertainty around how healthcare will be managed forms our second axis with corporate managed care on one side and self managed care on the other (Figure 5).

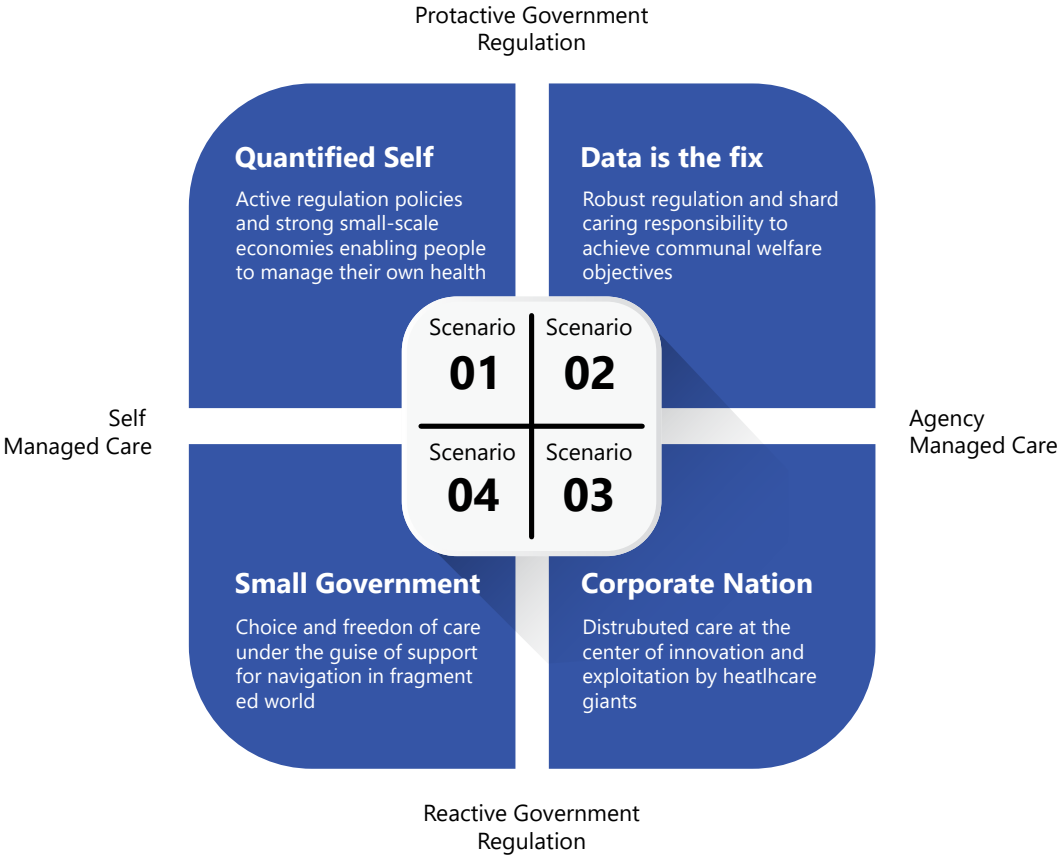



Figure 5 - Critical uncertainties mapped on a 2x2 matrix to determine four different scenarios

# What is backcasting?

It is important to define the concept of backcasting before we proceed with our scenario analysis. The process of backcasting involves creating a shared vision of a desirable future state that meets specific criteria. Once this vision has been established, practitioners work backwards from there by generating narratives that describe how different conditions could lead to those futures. This helps identify potential risks and opportunities along the way. Backcasting also involves identifying specific pathways or roadmaps that highlight the key drivers, actors, and factors necessary for achieving the desired future state. The goal is to create a plan that is realistic and feasible, while also identifying potential points of failure. Backcasting can also help to identify potential investments or resources that could be leveraged to support the process. Additionally, it can help to build consensus among stakeholders and create a shared understanding of the desired future state.

We will now discuss the narrative of our scenarios.

# Scenario 1 - Quantified Self

Figure 6 - A woman's arm with a smartwatch on it showing various types of health data icons | Image sourced from Freepik.com

## Description

In this world of quantified self the user will be at the center of the eHealth services rather than the agencies and organizations that drive the support system today. Wearables, implants, and smartwatches with more accurate medical sensors are tied to personal health records for real-time awareness of individuals' healthcare needs. These tools along with a high rate of digital literacy provide personalized insights and recommendations that enable people to manage their own care and the care of their loved ones more effectively. For a range of clinical trials across different therapeutic areas, hybrid decentralized

## Backcasting

2023

Public attention has been drawn to mental health and well-being since the COVID-19 pandemic. A growing staff shortage, long wait lists, and a lack of information have led to people taking charge of their health. Preventive care and at-home diagnostics companies see increased adoption.

studies have become a standard option that include on-site visits, home visits, and virtual visits from the comfort of a patient's home. Such technology advances and increased regulatory support has enabled providers to move out of clinics and into the home, giving a customer choice of providers.

People are using artificial intelligence (AI) to lead a more personalized lifestyle, predict health problems, and live longer. As health data becomes more comprehensive, blockchain solutions form the backbone of users' ownership, management, and monetization of their data solving challenges of a fragmented healthcare information system. Machine learning (ML) and rich data capture, which supports people in planning and managing their care better, has become the center of value-based care conversations and is an essential part of negotiations when it comes to health care costs. Digital innovations and direct-to-consumer (DTC) offerings are awash in the market, all independent of one another and backed by regulatory support, but the ones that deliver the best value are thriving. The market has responded with a plethora of products and services that cater to various health needs. While this is a positive development, it also means that the competition is fierce, making it challenging for companies to stand out. However, there are nuances that can be leveraged by new players or existing ones looking to reevaluate their strategies. For instance, some consumers prefer general care options that provide them with guidance on how to manage stress or anxiety. Others may require specialized offerings such as those catering to postpartum depression or management of conditions. Companies that have identified these nuances and tailor their offerings accordingly are better positioned to succeed in this competitive landscape.

By ensuring that national and international norms and laws are upheld, committing to do no harm, and declaring cyberespionage and intelligence collection against digital data as illegal, the Canadian government

2025

By being able to select providers from the comfort of their own homes and having an ever-increasing amount of health data at their fingertips through wearable devices, consumers are more likely to choose a provider that works best for them, however this also gives access to their data to these companies.

2027

Support and offerings for mental health and well-being has ushered in a wave of digital offerings. Issues around personalization, quality and convenience are addressed by many boutique healthcare companies that have started leveraging blockchain and AI technologies. Fixing the transparency, affordability, and incentive issues that have plagued these private eHealth solutions will become the focus for the next few years and there will be more calls for giving the power back to consumers.

2029

Ontario government modifies health insurance rules to give generous coverage for digital consumer products and eHealth solutions. Basic caregiver support policies offer financial assistance while promoting digital literacy among older adults to help them age in place.

has paved the way for data privacy, security, transparency, and innovation for eHealth solutions. The economy is transparent, fair, open and consumer-driven. With government enforcement programs, instruction acknowledgement and understanding are ensured before users interact with digital solutions. Strong government policies have enabled customers to access information about their data easily, securely, which in turn has heightened trust in web-based solutions. In the face of rising global concerns, government support and push for eco-friendly digital solutions has led to development of more energy efficient and sustainable eHealth solutions. Ontario health insurance covers digital consumer solutions generously and government-led innovation initiatives in local communities are strengthened to ensure participation and transparent governance in our increasingly complex world. Policy initiatives aimed at providing caregivers with the support they need also facilitate small-scale economic growth in regions. Customers prioritize engagement, access to health information, and having control over health and health communication decisions in order to ensure sustainability of welfare in local communities.

After a while, however, the magic fades and is soon replaced by irritation as the incompleteness of the solutions become apparent. Various solutions are available, each offering a different level of information, and eHealth has become increasingly interdependent to provide a holistic view for users. Giving users access to power has become easier through digital literacy, but users still lack the knowledge of how to make the data meaningful. Users have started paying for services with their data or out of pocket which has led to new forms of financing that are becoming more and more popular, as well as becoming a cause of economic disparities.

**2031**

As healthcare data privacy and security take center stage, the Canadian government will implement and enforce laws intended to protect data. Local markets are subject to social regulation to ensure high-quality environments.

**2033**

Players developing eHealth solutions will become mindful of how they approach data access and usage and new entrants pairing medical care with consumer wellness have become more viable. They provide the support the population needs to age in place and allow independent living without any concerns.

**2035**

As data is collected in a highly-secure digital environment, caregiving information and knowledge will become more holistic, accessible, and equitable. By using blockchain, digital health solutions utilizing multiple data streams can be developed with more honesty and transparency.

**2038**

Self-service in eHealth will be revolutionized with innovation. Customer empowerment will be facilitated by interoperable health data, digital communication hubs, and artificial intelligence. It is easy to imagine a centralized hub that would enable a patient to conduct a diagnostic test at home, verify the diagnosis, order the prescription needed, and have it delivered to them.

# Scenario 2 - Data is the Fix

Figure 7 - A person using a laptop with healthcare related data icons coming out of it | Image sourced from Freepik.com

## Description

Strong data privacy laws have been passed enabling rapid data processing and management, boosting user confidence in health data security. Health Canada has thoroughly scrutinized and heavily regulated the safety and efficacy of critical applications of adaptive/learning systems like artificial intelligence. By using digital health, continuous monitoring will be undertaken, with individual consent and confidentiality, allowing for early identification of risks and preventative measures to be taken. The healthcare industry is rapidly changing, and one of the biggest drivers of that change is better consumer data analysis. With vast amounts of patient data available, healthcare professionals are

## Backcasting

2023

COVID-19 has made people more comfortable with virtual consultations, telemedicine services as patients as caregivers are able to receive medical advice from their homes, eliminating long wait times at clinics and reducing the risk of exposure to contagious illnesses in public spaces. Technology innovations provide insights and access to important healthcare information to consumers empowering patients to become involved in the decision making process.

now able to study and predict outcomes in ways never before possible. This information can be used to drive improved performance outcomes that benefit patients both clinically and financially.The key developments have allowed these systems to become more trustworthy by overcoming the lack of transparency. The Government of Ontario has recognized the importance of understanding Social Determinants Of Health (SDOH) for better healthcare and is investing in unlocking this data on a broader scale in order to assist vulnerable populations to access intervention and services for better treatment decisions. The concept of sharing data and resources seamlessly and obtaining a centralized view of operations in real time resonates throughout society and the markets and people can be controlled by various regulatory and norm-based mechanisms.

Active public policy and national cooperation are thought to be the best means of achieving community welfare objectives.The traditional approach of the physician as the sole decision-maker has been replaced with a collaborative approach where patients are now considered partners in their care. This new wave of healthcare allows for better engagement and understanding between doctors and patients, resulting in better health outcomes. Democratizing healthcare results in better communication and patients can now make informed decisions regarding their treatment options. They can also provide feedback on what works best for them, which is essential when developing personalized treatment plans that cater to individual needs. Care responsibility is shared among the patient, the doctor, the payer, and the state. Chatbots powered by machine learning provides guidance to patients, helping them choose the most cost-effective treatments to avoid bankruptcy, so that doctors and engineers can devote more time to research, thinking, and developing new treatments. In an effort to improve exchange and access to different types of caregiver information related to patient healthcare needs, a new data strategy

2025

Significant strides are made in the passage of robust data privacy laws aimed at improving data security, interoperability, and management across various industries, including healthcare. In particular, these laws have had a profound impact on medical data management by creating an environment of trust between patients and their healthcare providers. The focus of healthcare has shifted towards cooperation - both between medical professionals and between doctors and their patients due to a growing awareness of the importance of overall patient wellness.

2027

Artificial Intelligence (AI) has revolutionized the healthcare industry with large health systems and funders investing tens of millions of dollars into developing and implementing these technologies. Its ability to filter out human error and take on routine tasks in every sector has significantly reduced the likelihood of mistakes or oversights that could lead to negative outcomes for patients. Automation and streamlined efficiencies decrease the costs associated with healthcare services delivery while also centralizing care in fewer and larger health clinics allowing for better resource allocation and greater access to specialized care for patients in remote or underserved areas.

has been implemented. With blockchain technology, government agencies with a mandate to improve health outcomes for healthcare providers and citizens can track data more easily. With a focus on preserving health and well-being by providing ongoing support and advice, the healthcare industry has shifted from 'sick care' to 'well-being'.

As technology advances, more organizations have turned to predictive solutions to stay ahead of the curve. By investing in building these models that can be used to infuse intelligent next best actions into workflows, businesses across industries have been able to streamline their operations and improve their bottom line. This is particularly true for eHealth organizations who are looking for ways to manage the health of their patient member populations more effectively than ever before. With access to advanced analytics tools and machine learning algorithms, healthcare providers are leveraging predictive solutions to identify patients at risk of developing health issues before they become serious problems. This early intervention not only improves patient outcomes but also reduces healthcare costs overall. Moreover, by adopting these solutions, small and mid-market players are now able to compete more effectively with larger organizations that have traditionally had greater resources at their disposal. A focus on health plans and providers understanding what works, why, and how to allocate resources to improve outcomes and lower costs has led to effective value-based care and network management. These transformations have been so significant that consumers easily recognize that they are receiving higher value. Device connectedness and IoT will continue to mature, and better enable disease management, wellness, and other healthy lifestyle habits for caregivers and consumers.

Having tested and developed preferences for new delivery models of care, consumers have developed preferences. As a result, providers will have to redefine

2029

Careful scrutiny of safety and efficacy of critical applications of AI has led to an increased transparency and trust with Health Canada having cleared many non-medical, patient-facing devices and apps with some form of AI/ML-based algorithm embedded. Security by default and security by design is embraced by companies and are constituent elements in product creation.

2031

Digital therapeutics (DTx) is empowering individuals to take charge of their health and well-being, as people strive to create thriving communities that embody shared values. DTx has now become eligible for reimbursement in certain therapeutic areas such as mental health and specialty care as studies have demonstrated the effectiveness of mobile apps and online platforms in managing conditions by providing patients and caregivers with access to self-management tools and personalized coaching.

2033

With rapid evolution of the digital health ecosystem and with a surge in funding, there will be an influx of innovative digital health companies that are API-first and have a strong focus on innovation, which is driving them to work together cohesively to provide better healthcare solutions. As these companies continue to gain traction and grow in popularity, there will be more streamlined and user-friendly healthcare experiences with modern solutions that prioritize patient

their delivery models throughout the care continuum, engaging caregivers to improve outcomes. The healthcare organizations that prioritize customers and provide a delightful customer experience earn their trust and thrive in this future. The agencies that analyze the data and provide services could charge a premium for providing highly personalized care. Further along in the digital transformation journey, providers will utilize their interconnected assets more effectively, putting the healthcare consumer at the core of this highly integrated ecosystem. Digital therapeutic products will only be reimbursed if they demonstrate both efficacy and are superior to, or comparable with, alternatives. The government's push for sustainability is driving innovation within the digital therapeutics industry and helping to transform it into a more eco-friendly sector. The push for sustainable design stems from public demand for environmentally-friendly products and services, as well as increasing concerns about the impact of waste on the environment. To meet this demand, companies in the eHealth industry are exploring new ways to reduce waste and promote sustainability. Companies are also investing in research and development to create innovative solutions that reduce energy consumption, minimize packaging waste, and promote responsible sourcing.

Assuming that central institutions and government have the resources and expertise needed to ensure that all privacy protocols are being followed, people will willingly give away their information without giving it much thought. This could be because they believe that their personal data will only be used for good purposes or because they feel like they have no other choice but to comply with these institutions' rules. However, there is a risk of subtle data harvesting in such scenarios which can lead to unintended consequences. It will be essential to maintain transparency, trust, and vigilance to prevent any negative consequences.

convenience and efficiency.

2035

Intelligent data strategy has enabled healthcare providers to collect and analyze large amounts of disparate data from various sources. Better data exchange and access to different health data types has empowered researchers to conduct studies on large datasets with greater accuracy and speed than ever before while policymakers can develop evidence-based policies that are improving public health outcomes leading to an increased trust in government.

2038

Healthcare companies redefining their delivery models to combine physical and digital offerings has helped further minimize in-person follow-ups while servicing new health needs, thereby improving patient outcomes. By leveraging technology, healthcare providers can connect with patients seamlessly, making it easier for them to access care while insurance coverage has made it possible for these individuals to receive the care they need without having to worry about financial constraints helping reduce inequalities. There is also a significant benefit for patients who live in underserved areas due to health disparities.

# Scenario 3 - Corporate Nation

Figure 8 - A stethoscope sitting on top of a pile of money | Image sourced from Freepik.com

## Description

In a time of reduced government subsidies and funding, eHealth organizations and other agencies supportive of the scaling and development of digital solutions have been forced to turn ownership over to private venture businesses, technology giants, and pharmaceutical companies. A lack of regulation in the health applications market has made it easier for companies to capture and process medical data without proper consent from patients. This unregulated market also poses risks for vulnerable populations who may not fully understand how their medical data is being used or may be coerced into giving up this information by insurers or

## Backcasting

2023

Technology players such as Amazon, Google, Apple, and Microsoft are increasingly turning their attention to the healthcare industry with significant investments in healthcare-related services and technologies that promise to make healthcare more accessible and user-friendly. While some tech giants focus on building enterprise-focused infrastructure that streamlines data sharing and communication between providers, others are creating apps

employers seeking to use it against them. It has become imperative to understand the patient's environment and how they live, and the government relies on private companies to share research data that benefits society while companies use that data to create monopolies for their own benefits. As virtualized health care expands widely, organizations that broadly incorporate social determinants of health into their servicing model stand to benefit from a more effective means of reaching vulnerable patients and optimizing care while capturing their personal data.

Due to numerous benefits eHealth applications offer they have become an indispensable tool for healthcare providers and patients alike. While the use of these applications has been on the rise for years now, there have been occasional reports of privacy abuses by some providers. In spite of occasional abuses, eHealth applications continue to reap benefits, and essential steps to increase transparency in privacy policies need to be taken in order to strengthen consumer confidence in these apps. Once smaller companies start to generate new revenue streams, they'll be purchased by big technology companies or big pharmaceutical companies. Corporate entities will eventually acquire health data and private investors have begun exploiting public data for their own gains, potentially leading to further public backlash or regulation. The government of Ontario is mulling over appropriate procedures to detect abuses and introducing transparency in privacy policies, while in the meantime, many companies are building in-house autonomous technologies that utilize widely available data to their advantage. In order to benefit from eHealth services, users will have to download apps or connect to the cloud, and sign away privacy in 'Terms & Conditions' by being enticed by benefits. Mistrust and conspiracy theories are at an all-time high as the data gets in the hands of big companies. Health applications have been subject to abuses in capturing and processing medical data on a large scale due to a lack of regulation. These apps

and products designed to enable direct access to patient data.

2025

There is a surge in digital health startups which are driven by the hope of securing funding or getting acquired by larger corporations. With the lack of proper regulation, these startups are able to access and capture our personal data with ease. This coveted information allows them to offer targeted products that claim to alleviate our medical conditions. There has been a rise in lawsuits against digital health startups over their handling of sensitive medical information.

2027

As smaller companies in the healthcare industry continue to explore new revenue streams, they may find themselves becoming acquisition targets for larger tech or pharmaceutical corporations. It raises questions about the control of personal health data by a few large entities who may not have the best interests of patients at heart. There is a growing pushback from both consumers and regulators regarding how this data is collected, shared and used.

2029

As the digital health industry grows, competition among innovators is becoming increasingly intense. With this growth comes a pressing need to address disparities in virtual and digital health utilization across different populations requiring an understanding of

collect sensitive medical information without proper consent or knowledge from users and without proper security measures in place to protect against hacking attempts or data breaches large amounts of private medical data is vulnerable to cyber-attacks putting both individuals and healthcare systems at risk. This data often falls into the wrong hands and is used for malicious purposes like identity theft or insurance fraud. A rise in litigation costs, the severity of claims, and stricter reimbursement mandates put a strain on the bottom line.

Smart businesses claim to offer high-quality products and healthcare insights that treat ailments by accessing personal data. With the growth of direct-to-consumer health models, the government is now faced with the challenge of how to tie these home testing solutions into a broader care model. Direct customer engagement is a big opportunity and marketing approaches previously only found in retail markets have benefited pharma and biotech companies in doing that. Higher-income, higher-educated, and more digital savvy consumers will be the most likely to adopt teleHealth and disparities will need to be addressed. Although telehealth has become a standard tool patients expect to be able to use, lack of clarity remains regarding reimbursement policies for such services. The decision regarding what aspects and features of telehealth are reimbursed will affect the extent to which providers integrate emerging technologies such as AI into their systems.

The lack of interoperability between different healthcare information systems has led to significant inefficiencies, further adding to the workload of healthcare professionals. The accumulation of various types of data, such as clinical notes, lab results, medication records, and patient history, has made it challenging for clinicians to access the right information when they need it. The need to switch between

both the unique needs of specific populations as well as the factors contributing to disparities.

2031

Large companies see this as an opportunity and start to collaborate with governments in order to better understand social determinants of health and how they can work together towards improved health equity. This collaboration often involves sharing valuable data on everything from population health trends and disease prevalence rates to community engagement efforts and public policy initiatives aimed at improving overall well-being and to gain the trust of citizens.

2033

After years of the public becoming critical of the ways in which health data is collected and used the government is now considering new regulations to address these issues. This backlash has been fueled by numerous high-profile data breaches, as well as concerns about privacy and government surveillance. This results in innovative implementation models and a focus on transparency, data privacy, and data protection in health data collection.

2035

The rapidly evolving healthcare landscape is witnessing the emergence of new companies that are creating innovative extensions to existing platforms and devices, and developing entirely new offerings that can be leveraged by both healthcare providers and patients alike.

different systems to access patient data is time-consuming and can result in errors. The ever-increasing pressure to cater to a growing population, coupled with a shortage of staff, has put an enormous burden on frontline healthcare workers. The lack of proper regulation and standardization in healthcare data management has led to a significant increase in the workload of frontline healthcare workers.
The difficulty in managing and interpreting such data has led to increased stress and burnout among healthcare professionals, which negatively impacts their physical and mental health. Physician burnout is becoming an ever-growing problem and it's no surprise that many clinicians are leaving the profession or struggling with mental health issues.

2038

Direct customer engagement has proven to be a major opportunity for large digital healthcare companies and provides an opportunity for healthcare providers to differentiate themselves from competitors. These companies have begun implementing different marketing approaches and they've been very successful at doing so as more digital-savvy consumers adopt new technologies.

# Scenario 4 - Small Government

Figure 9 - Two mobile phones with one showing a doctor holding a medicine and the other showing an ill woman. A stethoscope connects the two phones with the ill woman being examined. | Image sourced from Freepik.com

## Description

Individual liberty and autonomy are valued above all else, and the role of government is seen as limited to protecting individual rights and maintaining a basic framework of laws and regulations. Personal freedoms are prioritized and provision of goods and services is privatized wherever possible based on the belief that the private sector is more efficient and effective in delivering goods and services than the government. The principle of 'minimal government' has led to reduced government spending on research in healthcare & medicine. Providing remote healthcare is a very open field, and

## Backcasting

2023

The COVID-19 pandemic has forced researchers to put their heads together and there has been a surge in collaboration between companies and institutions, as they join forces with the goal of creating effective treatments. With privatization becoming more prevalent in the eHealth sector, we see more innovation and competition as companies

there are countless opportunities to innovate in this area. These free markets are driving and accelerating the advancement of various technologies. Health-aware IoT devices, like smart watches, are coming together with the advanced capabilities of healthcare technologies such as AI to give users the ability to monitor and providers the ability to intervene. By providing consumers with information and tools to manage their conditions, direct-to-consumer has expanded access to care. This has, however, left out populations who were without access to smart devices or who lived in areas with a low level of internet penetration, thereby hurting those with economic disadvantages or racial inequalities.

Medical device and pharmaceutical companies are providing AI chatbots that can answer consumers' questions before a procedure or guide them through at-home instructions. But a lack of regulation in the health applications market has resulted in abuses of capturing and processing personal data. New apps with hidden data collection goals have been created under the guise of usefulness and functionality. While American companies strive to learn what will sell in Asian markets, a handful of Chinese companies become major players. Privacy, ownership, and ethics are among the concerns spawned by this new era of openness and AI, which is spreading widely, becoming a means to dupe. Many eHealth solutions cleared by Health Canada can be prescribed, while data from the devices is linked to an app on users mobile, keeping it theoretically private; however, the anonymized data is mined and sold. These high cost "non-diagnostic" solutions are also sold by subscription to people who do not have insurance, posing significant barriers to access for individuals without insurance, exacerbating health inequalities. Under the guise of helping patients navigate the growing complexity of the healthcare system, eHealth solutions are gathering data from consumer-facing AIs for their own benefit.

seek to provide consumers with efficient and effective services. This has led to faster development of new technologies that can improve health outcomes for patients. The potential for innovation is vast - from personal health aware IoT devices such as smartwatches, temperature sensors and blood pressure monitors, to advanced healthcare technologies with monitoring and intervention capabilities for providers.

2025

With so many healthcare providers using different systems and protocols, it is difficult for eHealth organizations to collect data from different sources that are not compatible with one another and harmonize everything into a standard format to provide the best possible care for their patients. Without standardized regulations and with individual liberty on what data they want to share, collecting and analyzing this information can be a daunting task. New eHealth apps have emerged with promises of improved patient care and management with some hidden data collection goals lurking beneath the surface.

2027

From telemedicine and wearable devices to artificial intelligence and machine learning, innovations are bringing remarkable improvements in patient outcomes and overall health management. However, as we enter a new era of openness, there are growing concerns around ethics. Consumers do not fully understand the privacy risks associated with

With the introduction of newer models of advertising, businesses that were slow to adapt find their sales suffering. Many e-health organizations have partnered with the entertainment industry for the purpose of delivering medical disinformation to disenchanted patients who are seeking to improve their experiences. Corporations fight to gain market share by adding unique care tips and incorporating additional support. As a result of fragmented markets for direct-to-consumer apps and healthcare apps along with growing competition, there are consolidations in the healthcare market, leading to the creation of a few more healthcare unicorns, higher prices, and reduced access for consumers. Sharing information will have major implications on ethics as the data will be placed in the hands of businesses that may not know how to protect it. The healthcare sector's fragile digital infrastructure and weak cybersecurity regime, due to lack of regulation, are conducive to increasing and evolving cyberattacks.

A growing number of wearable health devices are hitting the market, promising to revolutionize healthcare by providing real-time data collection and analysis. But while some of these devices may be classified as medical devices, their claims for diagnostic quality will be limited. This means that they will not need to go through clinical trials and manufacturers will be released from any liability associated with their use. Unfortunately, this lack of regulation also means that providers miss out on opportunities to provide the best possible care for their patients. This coupled with the fragmented nature of the industry lacking information about patients' care events makes it difficult for healthcare professionals to make informed decisions about treatment options. Those living with chronic conditions or mental illness, as well as those with economic disadvantages or racial inequities, are especially affected.

using certain technologies, which can lead to breaches of their confidentiality. This has led many experts to argue for stricter regulations regarding data protection and sharing within the healthcare sector.

2029

Increasingly, insurance companies offer patient information about treatment options, privacy concerns, and differences in cost between providers to improve patient understanding. This move is not only aimed at providing better health care but also enhancing patient satisfaction. Patients will be able to make informed decisions about their healthcare needs based on accurate information provided by these insurance companies. However, this advancement in eHealth services raises concerns about disparities in access to these services. Individuals with greater resources may be able to afford more advanced or specialized services that offer better data protection and ownership.

2031

Government intervention becomes crucial in setting standards and guidelines for eHealth technologies. Legal frameworks for companies operating in the eHealth sector will be established, which can help ensure that companies are held accountable for any breaches or violations of individual rights. Additionally, governments will provide support to consumers by offering resources such as information on how to protect their personal data from cyber threats.

2033

The ever-growing digital health market has led to a proliferation of direct-to-consumer (D2C) and healthcare apps, creating an overwhelming number of options for consumers. Consumers often have to navigate through fragmented markets with varying levels of quality and reliability making it difficult to decide on the best eHealth solution for their needs. There have been calls for consolidations in the industry to help reduce confusion among consumers and create more standardization across different platforms.

2035

Consolidations will lead to increased competition and consolidation of power among a few dominant players in the market leading to limited innovation and diversity in the market. This has forced eHealth organizations to reevaluate their survival strategy, methods of reaching customers, and delivering medical information. With clickbait headlines and misleading information on media platforms, consumers will be exposed to inaccurate or sensationalized health information that could harm their well-being.

2038

The healthcare sector has become one of the prime targets for cybercriminals due to its fragile digital infrastructure and weaknesses in cybersecurity. These data attacks have been increasing and evolving with time as hackers come up with new tactics to breach security defenses. Consumers will choose to seek out healthcare providers that have a reputation for strong cybersecurity measures and a commitment to protecting patient data while educating themselves on cybersecurity best practices.

# Summary

As we set our sights on the year 2038, it's important to recognize that predicting the future is not a simple task. Rather than simply painting a snapshot of what we believe the world will look like in 15 years, the scenarios take a broader view. The researcher has emphasized steps, processes, and developments that could realistically lead us from today's world to one with different outcomes. In today's world, it is crucial for businesses to stay ahead of possible threats and opportunities. Understanding the potential risks and opportunities facing eHealth organizations will help make informed decisions and create effective strategies to mitigate any negative impacts or capitalize on positive ones.

This approach helps simplify the process of assessing and planning for possible threats and opportunities. By adopting a proactive approach to risk management, companies can identify potential issues before they become major problems. As we move towards an uncertain future, taking a multidimensional approach to our analysis and considering different angles and perspectives is critical to develop a comprehensive understanding of the various factors that affect the organizations. This means keeping up with new developments in our field, understanding current market trends, and tracking the actions of our competitors. The next step involves exploring the implications of these scenarios for eHealth organizations.

# 6. Visioning

## Introduction

The goal of this phase is to identify potential barriers to achieving the desired future and generate ideas for innovative solutions which can serve as a guide for decision-making and action. The visioning stage of foresight involves considering different possible future scenarios, identifying the transformational factors that are likely to affect organizations, and developing strategic recommendations for each scenario. To do this effectively, it's important to challenge conventional wisdom, avoid short-term thinking, and consider the potential unintended consequences of different decisions and actions (Hines & Bishop, 2015). Understanding the transformational factors will enable the development of flexible, adaptable, and future-proof strategic recommendations. An organization may have to invest in new technologies or develop new skills if a technological breakthrough occurs, for example. Organizations may need to focus on developing products and services that meet customers' changing needs if they encounter demographic changes, such as an aging population. As an essential part of foresight, the visioning phase helps organizations develop long-term strategies that are robust and effective by anticipating future developments.

### Scenario 1 - Implications for eHealth organizations

#### THREAT

The rise of eHealth organizations has made healthcare more accessible than ever before, but it has also raised customer expectations who expect nothing but the best when it comes to their healthcare needs. Customers will no longer settle for subpar experiences offered by eHealth organizations and will actively seek out providers that meet their needs. This shift in consumer behavior can be attributed to the increasing awareness of patient rights and the ease with which they can access information about different providers. Customers are now well-informed about what they want from a provider and are not afraid to speak up if their expectations are not met. They demand transparency, quality care, easy access to information, prompt responses to queries, and personalized services tailored to their individual needs. The healthcare industry will no longer be the same as it used to be and having a

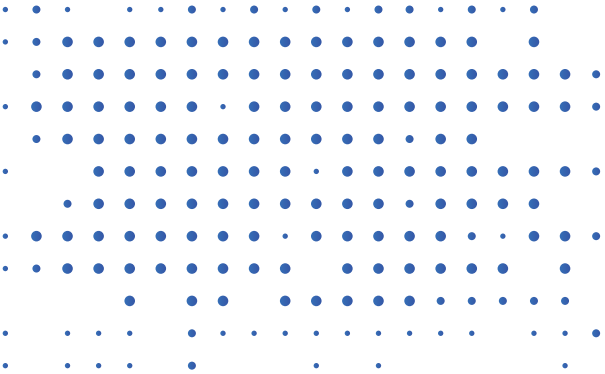
good product or service will no longer be enough to stay ahead. Companies will face an increasingly competitive landscape, with more players entering the market and monopolies becoming a thing of the past. This means that eHealth organizations will need to focus on building loyalty amongst their customer base. The new era of competition and lost revenue demands more from companies than ever before. With the increasing popularity and availability of virtual healthcare services, eHealth organizations will need to go beyond just offering virtual convenience to remain relevant and competitive in the market. By focusing on building trust, understanding customer needs and preferences, and providing personalized care, eHealth organizations can create a loyal customer base and attract new customers through positive word of mouth. As the companies aim to remain relevant in this new landscape, they will have to focus on building strong relationships with their customers.

## STRATEGY - Marketing Mavens

Companies that want to maintain their position and have traditionally eschewed many of the cutting-edge marketing techniques used in other industries must focus on developing strong relationships with customers through effective marketing and excellent customer service. This can be achieved through effective marketing campaigns that highlight the company's unique value proposition and differentiate it from its competitors. Effective CRM strategies can help healthcare organizations improve patient engagement, loyalty, and satisfaction, ultimately leading to better health outcomes and financial performance. Ultimately, it's all about creating a seamless experience for patients from start to finish - from booking an appointment online or through mobile apps to receiving quality care at the hospital or clinic. Customer research, surveys, and feedback can help eHealth companies develop a deep understanding of their customers' needs and preferences to offer tailored services that meet their requirements. Social media platforms provide an excellent opportunity for eHealth companies to connect with customers and build relationships. Companies can use social media to offer helpful tips, answer customer questions, and share updates and news about their products and services. Additionally, eHealth companies can encourage customer loyalty by offering incentives and rewards such as discounts, referral programs, and loyalty programs. This can help customers feel valued and appreciated, leading to stronger relationships and increased customer retention. Developing strong relationships with customers through effective marketing and excellent customer service will require eHealth companies to understand their customers' needs, provide personalized experiences, prioritize customer service, and build a strong brand identity. By adopting this strategy, eHealth organizations can build a loyal customer base and remain competitive in the dynamic healthcare industry.

## OPPORTUNITY

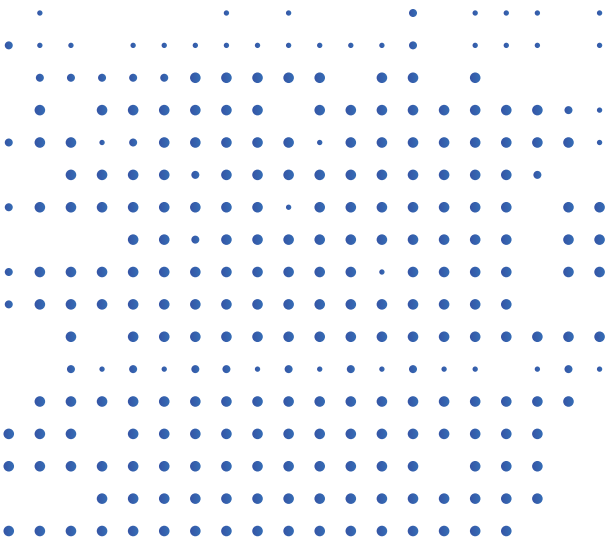
Advancements in technology, such as wearables, mobile apps, and EHRs will provide valuable insights into individual health, allowing for a more detailed and accurate understanding of one's health status. In addition, there is a growing trend towards personalized medicine, which relies on the collection and analysis of individual health data to create targeted treatment plans tailored to an individual's specific needs. One of the key factors that payers will consider when evaluating healthcare services is effectiveness. Payers will need assurance that they are paying for high-quality services that will provide significant value and help them achieve their objectives at an affordable price point. It will become essential for eHealth organizations to gain a more precise understanding of the factors that determine the value and affordability of their products and services from a payer's perspective. With the proliferation of digital technologies, eHealth organizations will have access to more personal data than ever before to help caregivers plan and manage care better. Adding artificial intelligence (AI) to this data will also play a crucial role in cost structure dialog and negotiation. Patients are increasingly seeking out providers who can offer



them a more personalized experience throughout their healthcare journey. With value-based care, providers have a greater incentive to engage with patients proactively and tailor their services to meet individual needs. This not only enhances the patient experience but also improves outcomes by promoting better adherence to treatment plans and reducing unnecessary hospital readmissions. This approach to care delivery is centered on ensuring patients receive high-quality, personalized care that focuses on improving outcomes and reducing costs. The abundance of data presents a unique opportunity for these organizations to build robust data governance and distribution models that can help them deliver more targeted and effective services to caregivers and PwD. Moreover, there are laws that protect patient privacy and security which ensure that this sensitive information is handled with utmost care.

## STRATEGY - Data optimization boost

To keep up with the evolving landscape, these companies will need to shift away from outdated fee-for-service models and embrace more value-based care options which focus on patient outcomes and emphasizes preventative care, early detection, and patient engagement. To do this, they must leverage technologies like artificial intelligence, predictive analytics and machine learning algorithms that can help them better understand their customers. As a result of predictive solutions, healthcare providers will be better able to understand their patients' needs. A provider can identify patterns and trends through the analysis of electronic medical records, claims information, and other sources of data. Utilizing this information, targeted interventions can be developed to improve health outcomes for individuals and populations alike. This transition will, however, require significant investments in infrastructure and to successfully navigate this shift, healthcare executives must build technology capabilities and work closely with IT teams on data governance and distribution planning. It requires a deep understanding of how data flows through different systems, as well as an ability to make frequent ad-hoc decisions based on real-time information from multiple sources. More than ever before, eHealth providers will need to rely on enterprise data streams to inform their decision-making processes and ensure that they are providing high-quality analysis that enables care while managing costs effectively. Providers must be willing to invest in new systems and tools to help them manage patient data more effectively, improve patient outcomes, and reduce costs. It will, however, be necessary to plan and execute meticulously when building such models in order to ensure compliance with various data usage regulations as well as effectively managing complex datasets. In addition, they must ensure that personal health information (PHI) is protected from being accessed or used by third parties without authorization. Furthermore, they should establish clear guidelines for collecting, storing, analyzing, and sharing PHI among different stakeholders within the company.



# Scenario 2 - Implications for eHealth organizations

## THREAT

Virtual care startups and other small players will have the potential to expand access to healthcare services for underserved populations or those living in remote areas. They can offer care at a lower cost than traditional healthcare providers due to their lower overhead and more efficient use of resources. Additionally, they can improve patient choice and experience, which can lead to their growth and disrupt traditional players who may be slower to adopt new technologies or burdened by complex legacy systems. However, with the digital care industry being highly regulated, small players must navigate complex legal and regulatory frameworks to operate and scale in this space. They will need to comply with various regulations and state-specific licensing requirements, among others. Moreover, these larger companies may have more resources, funding, and established relationships with customers to help them survive long-term and may not be easily displaced. They can also have advantages in terms of negotiating power and economies of scale, which can help them lower costs and offer competitive pricing. Therefore, small players may face challenges in sustaining their businesses in the long run as they compete with incumbents posing a challenge to their sustainability.

## STRATEGY - A world of APIs

Small eHealth startups will need to think beyond siloed operations. Instead, they will need to have technical capabilities that allow them to partner thoughtfully with other companies in the industry. Building Application Programming Interfaces (API) can be a game-changer for small eHealth companies in terms of survival and competitiveness in the market. This can help smaller eHealth startups to level the playing field with larger organizations by enabling them to integrate with existing systems, offer enhanced functionality, reduce costs, increase agility and form partnerships with larger players enabling them to survive and thrive in a highly competitive market. An API is essentially a set of protocols and tools that enable different software applications to communicate with each other. Companies can use APIs to gain a competitive advantage by integrating various services, automating processes, and creating new products.

APIs will enable small eHealth startups to integrate their services and solutions with existing systems used by larger organizations. This allows them to expand their reach and offer their services to a wider customer base. By building APIs, smaller eHealth startups can offer enhanced functionality that complements what is already available in the market and the services provided by larger organizations. This can give them an edge in terms of differentiation and help them attract and retain customers. Building on top of existing infrastructure without having to develop everything from scratch will result in cost-effective solutions that are easier to develop, deploy and maintain. APIs will enable smaller eHealth startups to be more agile and responsive to changing market needs. They can quickly adapt to new technologies and trends, and offer innovative solutions that are in sync with the evolving needs of their customers. By supplementing the underlying system's capabilities, smaller eHealth startups can create a strongly integrated third-party system and that will increasingly become the strategy of choice for survival.

The API economy is a new paradigm for businesses that are looking to create value for their customers. By sharing data and services in exchange for money or other benefits, like improved customer experience or brand loyalty, companies can deliver more personalized and customized experiences to their users. This new business model is all about digital transformation and leveraging technology to adapt to changing market conditions. To stay ahead of the competition, businesses need to embrace an API strategy that allows them to be flexible and agile. With an API-first approach, companies can quickly respond to customer needs and changes in the market. Being the first to market with an API can be a huge advantage as it gives a head

start over your competitors. It also allows you to build relationships with customers by providing them with access to your services through third-party applications.

## OPPORTUNITY

The healthcare industry has seen a significant transformation over the years, and the digitization of healthcare has played a vital role in improving both interpersonal and interface communication. While healthcare providers and organizations have taken several measures to fix what healthcare is lacking most, improving patient data interoperability, those who are able to engage consumers meaningfully will be best positioned for success. Patient engagement encompasses interventions that are designed to increase activation and promote positive behavior in patients. One of the key benefits of patient engagement is improved health outcomes for patients. When patients are more engaged in their care, they are more likely to take an active role in managing their health conditions. For example, patients who are engaged may be more likely to take their medications as prescribed or make lifestyle changes that can improve their overall health. Another benefit of patient engagement is increased patient satisfaction with the healthcare system. When patients feel like they have a voice in decisions related to their care, they may be more satisfied with the care they receive. There are multiple factors that can contribute to low patient engagement in this future scenario. Patients or caregivers may simply lack the motivation to engage with digital healthcare platforms, especially if they are not fully aware of the benefits or if they do not feel that their participation will make a significant impact on their health outcomes. Health literacy also plays a critical role in patient engagement as it affects how individuals understand and utilize the information and resources provided by digital healthcare platforms. Even for patients with access to digital healthcare, there may be technological barriers that prevent them from engaging fully. For example, older patients or those with limited technology skills may struggle to navigate digital eHealth platforms. Patient engagement is critical for improving the patient experience and achieving better health outcomes. By prioritizing patient engagement, eHealth organizations can improve the quality of care they provide and build stronger relationships with their patients.

## STRATEGY - Care coaching

Instead of simply providing access to healthcare services through digital platforms, eHealth organizations can become active in engaging patients and empowering them to take a more proactive role in managing their health. To achieve this goal, eHealth organizations may need to evolve from traditional healthcare providers into "care coaches." Care coaches are healthcare professionals who work closely with patients to help them set and achieve health goals, provide personalized guidance and support, and promote healthy behaviors. There are several ways that eHealth organizations can use to address the factors that contribute to low patient engagement. They can provide educational resources and support to patients to improve their health literacy skills. This can include providing clear, simple explanations of medical terms and conditions and offering guidance on how to use digital healthcare platforms effectively. They can also communicate the benefits of engagement clearly to patients to help them understand the value of their participation and can use incentives, such as rewards programs or gamification, to motivate patients to engage with digital healthcare platforms.

This would require understanding patient and caregiver needs and preferences fully as patients and their health are unique, so decisions regarding care must be tailored to each patient's unique situation and environment, yet done in a timely manner. Gathering feedback from through surveys and focus groups can provide crucial insights as well as identify any barriers to engagement. Offering multiple channels of communication to engage will enable patients to choose the method of communication that is

most comfortable and convenient for them. Taking a multi-faceted approach to address the factors that contribute to low patient engagement can help build patient trust and engagement in digital healthcare while ensuring survival of eHealth organizations. However, to become effective care coaches, eHealth organizations will need to develop the necessary expertise, skills, and tools to engage patients, personalize care, and support behavior change. This may require a shift in organizational culture, as well as investments in training, technology, and patient engagement strategies.

## Scenario 3 - Implications for eHealth organizations

### THREAT

As the healthcare industry continues to digitalize, eHealth organizations will face increasing pressure to meet rising customer expectations. For smaller organizations, this can be a significant challenge as they often have limited financial and human resources compared to larger competitors. These limitations may make it difficult for them to invest in technology, marketing, and customer service initiatives that can help them meet rising customer expectations. One of the main challenges small eHealth organizations face is keeping up with technological advancements. As new technology emerges and becomes adopted by larger competitors, smaller organizations may struggle to keep pace due to their limited resources. This can result in a gap between what customers expect from eHealth services and what smaller organizations are able to provide. Additionally, smaller organizations may not have the same brand recognition as larger ones which can make it challenging for them to attract new customers. Another challenge faced by smaller eHealth organizations is establishing trust with their customers. In the healthcare industry, trust is crucial as customers are often sharing sensitive information about their health and well-being. Smaller organizations may struggle to establish this trust as they do not have the same level of credibility or reputation as larger competitors. They must, therefore, focus on building relationships with their customers and providing excellent customer service to gain their trust.

Another challenge eHealth organizations may face is the need to integrate with existing healthcare systems and workflows. This can be particularly challenging for smaller organizations that may not have the resources or expertise to navigate complex healthcare ecosystems.

### STRATEGY - Tailored influence

Influencing customers by offering services that meet their expectations in order to retain them and attract new ones will increasingly become the strategy of choice for eHealth organizations. Customer satisfaction will become an important metric that determines the success or failure of any organization. Abundant data can be collected and one way eHealth organizations can achieve success is by leveraging data analytics to gain insights into customer behaviour and preferences. With these insights, organizations can tailor their services to meet the specific needs of each individual client. For instance, an eHealth organization can use analytics to customize their services, such as providing tailored wellness plans or personalized health education materials based on individual client needs. This helps to create a more efficient and effective customer experience, leading to improved customer satisfaction and loyalty. It also helps to reduce costs associated with providing healthcare services. Finally, it can help to create a better understanding of customer needs, allowing for further improvements to the healthcare services offered.

## OPPORTUNITY

The lack of interoperability between different healthcare information systems has become an increasingly critical issue in the healthcare industry. This lack of interoperability can lead to patient safety risks, increased costs, and inefficient utilization of resources. Healthcare providers often rely on multiple systems to manage patient care and this issue prevents healthcare providers from having access to complete health records and sharing information seamlessly, resulting in delays in care. This issue is not only frustrating for healthcare providers, but it can also be dangerous for patients as the lack of interoperability can lead to serious consequences, such as medical errors and delays in diagnosis. In addition to hindering the efficient delivery of high-quality care, the lack of interoperability also adds unnecessary costs to the healthcare system. Providers are forced to spend time and resources manually entering data into multiple systems or relying on paper-based records - both of which are prone to errors. One of the main factors contributing to this problem is the lack of standardization in data formats and communication protocols used by different software vendors. The patient data is stored in silos, making it difficult for doctors and nurses to access critical information when they need it most. This results in duplication of tests and procedures that waste resources while jeopardizing the quality of care provided. This fragmented approach to healthcare infrastructure has led to gaps in care coordination, which can lead to medical errors and poor outcomes for patients.

## STRATEGY - Healthcare Unification

In response to this challenge, eHealth organizations have a unique opportunity to develop solutions that address the lack of interoperability and fragmentation in healthcare IT systems. One key strategy is to invest in integration and interoperability solutions that can facilitate the exchange of data between different systems. For example, they can develop middleware or integration platforms that enable the sharing of data across different healthcare IT systems. This would allow for seamless communication between different software vendors and enable healthcare providers to access critical patient data at the point of care. This will help learn about caregivers.

# Scenario 4 - Implications for eHealth organizations

## THREAT

As government funding becomes scarce, eHealth organizations will have to compete more fiercely for a smaller pool of funding, which could make it difficult for smaller organizations to survive. Many eHealth organizations rely heavily on government funding to develop and implement new technologies that can improve patient outcomes. With less financial support, these organizations may struggle to keep up with emerging trends in healthcare technology. The decline in funding could lead to a decrease in the quality of care provided by eHealth organizations. Without the resources necessary to pursue research and development projects, these organizations may fall behind their larger competitors who can afford to invest in cutting-edge technology. This could result in reduced access to healthcare for patients who need it most, especially those living in rural or underserved areas where traditional medical services are not readily available. Furthermore, without adequate funding, eHealth organizations may struggle to create and implement new technologies. This could mean that patients would not be able to take advantage of the latest medical breakthroughs, or that these breakthroughs may not be as effective as they could be if they were developed with a larger budget.

## STRATEGY - Research Accelerator

As the healthcare industry continues to evolve, eHealth organizations must stay on top of innovation and emerging trends which would require a deep understanding of the industry's needs and challenges, as well as a clear vision for how technology can help. By prioritizing research areas with high potential impact eHealth organizations can align their research agenda with the needs of the healthcare industry increasing the likelihood of securing funding and driving innovation in areas that matter the most. This can also help in collaborating with other eHealth organizations, healthcare providers, and research institutions can help pool resources, share costs, and increase the chances of securing funding.

eHealth organizations can focus on research that explores ways to provide more patient-centered care, such as leveraging telehealth technologies to improve access to care, patient engagement and shared decision-making, patient education, and patient satisfaction. They can prioritize research that improves clinical decision support systems, such as using machine learning algorithms to analyze large amounts of data and provide more accurate diagnoses, treatment recommendations, and condition management. Another important aspect is digital health literacy, such as developing educational materials and tools to help patients, caregivers, and providers navigate the complex landscape of healthcare and care management and effectively use them to improve health outcomes. Investing in research that advances health information exchange, such as developing more secure and interoperable EHRs and improving data sharing between healthcare providers, patients, and other stakeholders will also prove to be beneficial.

## OPPORTUNITY

The lack of regulation and standardization in the healthcare industry can have significant implications on eHealth organizations. These organizations often rely on patient data to provide healthcare services and make informed decisions about treatment and care management options. Without standardized regulations, eHealth organizations may face challenges in collecting and analyzing data from different sources, resulting in inaccurate or incomplete information. Furthermore, the lack of regulation can result in a lack of trust in eHealth organizations by patients and healthcare professionals. This lack of trust can make it difficult for eHealth organizations to gain the necessary market share and customer base to be successful. As a result, investments in eHealth organizations may be less likely, and even if they are successful, they may not reach their full potential. Without trust, the eHealth industry may struggle to gain traction, and the potential benefits it could bring to the healthcare industry will not be realized. Thus, trust should be a priority for eHealth organizations so they can gain the traction and investments needed to reach their maximum potential. Without trust, the eHealth industry may not be able to fulfill its promise of providing better and more efficient healthcare services.

## STRATEGY - Hypershield organizations

To leverage the opportunity in this scenario, eHealth organizations should prioritize data security and privacy, implement rigorous data collection and analysis practices, and work with regulatory bodies to develop standards and guidelines for the industry. By doing so, eHealth organizations can build trust with patients, caregivers, and healthcare professionals, and ultimately provide better care for their patients. To address these challenges, it is crucial for eHealth organizations to advocate for standardized regulations and best practices for data collection, privacy, and security. This includes collaborating with healthcare

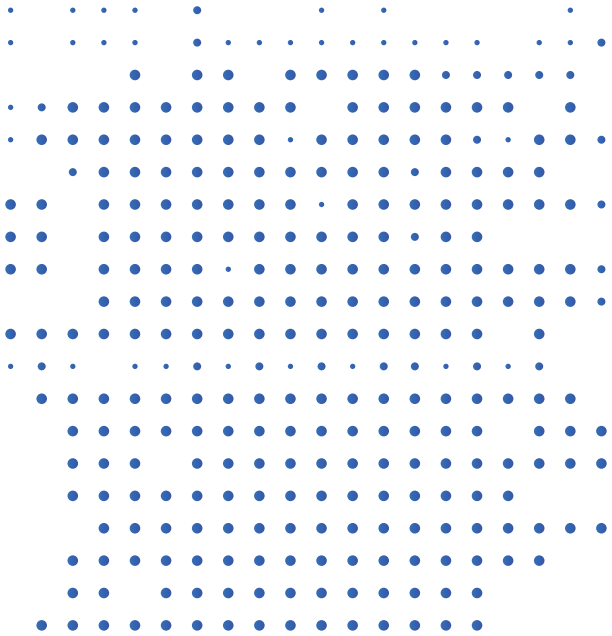
providers, policymakers, and regulatory bodies to establish clear guidelines for the collection, storage, and use of patient data. By doing so, eHealth organizations can help ensure that patient data is protected, accurate, and easily shareable, ultimately improving patient care and building trust with customers and stakeholders.

The eHealth industry has become a primary source of healthcare for many people. As such, it is crucial that organizations in the sector prioritize the security and transparency of their services. Providing clear and concise information about their services will go a long way in fostering trust between providers and users. This information should be readily available on websites or easily accessible through customer support channels. Strong security measures will also be essential to protect personal data from malicious attacks or accidental breaches. Implementing multi-factor authentication, regular software updates, and end-to-end encryption are just a few examples of ways to secure user data. Organizations will also need to invest in personnel training to ensure that staff members understand how to properly handle sensitive information and mitigate risk factors associated with cyberattacks.

# Summary

In the business world, companies are constantly seeking to gain a competitive advantage over their rivals. One way to achieve this is by developing new and innovative strategies that deviate from the norm. However, many companies make the mistake of simply tweaking existing strategies rather than exploring entirely new options. By basing strategy development on options rather than variations of existing strategies, companies can create more distant and unique approaches that truly set them apart. This allows for greater flexibility in decision-making and provides opportunities for growth and expansion into new markets or industries. Furthermore, adopting a forward-thinking approach through option-based strategy development enables businesses to anticipate future challenges and adapt accordingly. It also allows for more efficient use of resources as investments can be targeted towards long-term goals rather than short-term fixes.

However, coming up with these alternative strategies can be a challenge, especially if the strategists aren't involved in the scenario development process. With their expertise and perspectives they help identify potential alternative strategies that may not have been considered otherwise. By participating early on, strategists can also help ensure that any new ideas align with the company's overall goals and objectives. The more distant the alternative strategies are from each other, the higher their potential for providing unique solutions to evolving business problems (Gavetti and Menon, 2016). Distant alternatives help companies identify new approaches that may not have been considered before. They also enable companies to evaluate different options from multiple perspectives, which can result in an improved decision-making process. Moreover, such alternatives allow companies to explore new markets or products that could lead to business growth. We aimed at identifying a set of six to eight coherent, distant, and heterogeneous strategies that will guide our actions in the following phase.



# 7. Planing

## Introduction

Developing a set of scenarios and corresponding strategies is an effective way to break out of constraining industry mindsets that limits the ability to imagine new possibilities for any organization. By considering alternative strategies, eHealth organizations can explore new frontiers that may have seemed impossible before however, this comes with its own set of challenges. Considering multiple alternatives can be difficult for those who are used to relying on data and analysis to make decisions and can expose the team to a complex decision-making space that requires careful consideration of trade-offs and potential risks (Lehr et al., 2017). Despite the challenge, developing scenarios and alternative strategies is crucial for organizations looking to stay ahead in today's rapidly changing business landscape.

A final phase, which often concludes a scenario-building exercise, is the foresight method of 'wind-tunnelling' which is used to evaluate the 'fitness' of generated strategies within the future scenarios we have created. As long as the most relevant trends and scenarios are selected, the wind tunnel test can provide valuable insights by identifying strengths and weaknesses (Heijden, n.d.). A wind tunnel test is a fairly straightforward procedure that allows an organization to understand, test, and manage multiple organizational identities that were identified in the first phase of 'Framing' and aligning those across a range of possible futures with the ultimate goal of finding a single strategic identity that the eHealth organizations should focus on. These organizations will need to play this central, enduring, and distinctive role while pursuing a long-term, comprehensive, and robust strategic direction (Fergnani & Sweeney, 2021).

For this we will use a modified version of an approach described by Lehr et al by evaluating how well the strategies support the competencies identified in the first step of 'Framing' (efficacy evaluation) and assess the robustness of the proposed strategies under the different scenarios (robustness evaluation) (Lehr et al., 2017). The efficacy evaluation helps us identify trade-offs that need to be made. The success of one strategy may be based on boosting revenues at the expense of delivering a customer-centric product, while that of another may be based on boosting visibility at the expense of revenue and

profitability. As a result, an axis can be plotted that shows the efficacy rating aggregated. The robustness evaluation is based on an ordinal scale that includes highly robust (scenario supports strategy), robust, neutral, fragile, and highly fragile. The criteria for evaluation would be the opportunities and constraints that eHealth organizations would face in different scenarios along with how well it is able to deliver on the expectations of customers (caregivers and Pwd) and the feasibility of the strategy.

The optimal strategy or strategies are identified by plotting efficacy along the x-axis and robustness along the y-axis of the Parmenides Matrix (Figure 6). The upper right quadrant contains strategies that are both robust in different scenarios and strong in supporting the competencies. A few favorable scenarios are required for the strategies in the lower right quadrant to be effective. In the upper left quadrant, these strategies are highly effective, but they don't adequately support the competencies.

**Scoring scale used**

| Efficacy |
|---|
| Very effective - 5 |
| Effective - 4 |
| Neutral - 3 |
| Weak - 2 |
| Very Weak - 1 |

| Robustness |
|---|
| Highly robust - 5 |
| Robust - 4 |
| Neutral - 3 |
| Fragile - 2 |
| Highly Fragile - 1 |

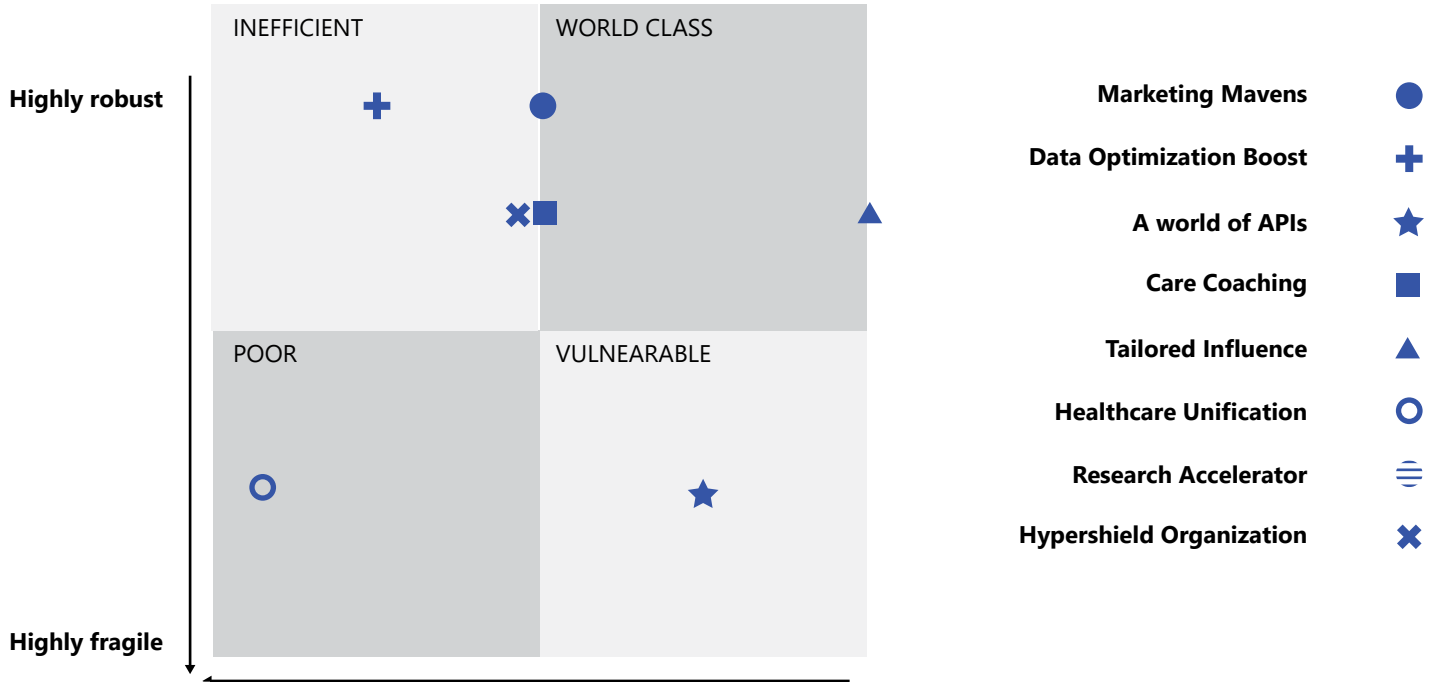



Figure 10 - Strategies plotted on Parmenides Matrix with efficacy along the x-axis and robustness along the y-axis

# Plotting Rationale

## 1. STRATEGY - Marketing Mavens

In a competitive business landscape, building strong relationships and understanding customer needs will be crucial for any organisation looking to grow and succeed therefore this strategy proves to be highly robust across all scenarios. It not only helps in the acquisition of new customers but also fosters loyalty among existing ones. By taking a customer-centric approach, companies can tailor their products or services to meet the needs of their target audience, resulting in increased sales and revenue. However, implementing this strategy requires a dedicated team that possesses both knowledge and expertise. Companies must invest in training their employees, build capabilities, and must have a robust implementation plan in place to ensure that the strategy is executed effectively across all channels – online or offline. This could be challenging for organisations with limited resources, as it may require hiring additional employees or outsourcing work.

Scores:

| Robustness | Efficacy | Total |
|---|---|---|
| **05** | **03** | **08** |

## 2. STRATEGY - Data optimization boost

Making changes to an organization's data strategy to improve the speed and effectiveness of extracting, analyzing and using the data is not an easy task. It can be a very resource-intensive exercise that may require a lot of financial investment, time, and human resources. Despite its potential benefits, it scores low on efficacy as the value it delivers in return is not too significant. Understanding patterns and trends within the collected data can prove to be valuable in making informed decisions that will benefit society in general. This knowledge provides organizations with insights into emerging market trends or customer behaviors which they could use to develop innovative solutions for their customers. It might not always address individual needs or desires directly which is considered a key competency for an eHealth organization to succeed. However as technology continues to evolve, data optimization capability will become increasingly vital. Without proper management and analysis of vast amounts of data, businesses can easily become overwhelmed and unable to make informed decisions. This strategy is therefore a good fit across all scenarios.

Scores:

| Robustness | Efficacy | Total |
|---|---|---|
| **05** | **02** | **07** |

## 3. STRATEGY - A world of APIs

As eHealth organizations are faced with increasing demands from customers who want quick and efficient healthcare services building APIs is one way to meet them as it will allow for easy integration with solutions provided by other organizations. By doing so, eHealth organizations can build partnerships with other providers in the industry and leverage their expertise to deliver better healthcare services. Building APIs also helps solve customer pain points by understanding their needs through data analysis. This enables eHealth organizations to tailor their services more effectively and efficiently, ultimately engaging customers more effectively as well. As a result of this engagement, these organizations can generate much needed revenue by expanding into new markets that have

previously been untapped but it will also require some resources. However, building APIs may not be the best strategy fit for all scenarios. Companies must ensure that their API solutions meet stringent security requirements and comply with relevant regulations to avoid significant reputational damage or financial penalties. Another factor that businesses need to consider when deciding whether to build APIs is the level of collaboration they can expect from large organisations. While some companies may be open to collaborating with third-party providers, others may prefer to build their own systems in-house so that they can maintain control over their data and intellectual property.

Scores:

| Robustness | Efficacy | Total |
|---|---|---|
| **02** | **04** | **06** |

## 4. STRATEGY - Care coaching

One of the most critical aspects in healthcare is engaging patients and empowering them to take a more proactive role in managing their health. This strategy delivers very well on the human-centered design aspects of key competencies that eHealth organizations need to have to grow. By focusing on patient engagement, healthcare providers can ensure that they are delivering care that is tailored to each individual's unique needs and preferences. However, it's important to note that this approach requires significant efforts and resources, which may be very difficult for smaller organizations. To truly engage patients in their own care and empower them to take control of their health, eHealth organizations must invest in innovative technologies. They must also dedicate personnel who are trained specifically in patient engagement strategies and tactics. It sits in the middle of the spectrum when it comes to efficacy.As a key component across all scenarios, it's robust in both self-managed and institution-managed care settings. The goal of care coaching is to help patients or their caregivers set and achieve health goals, provide personalized guidance and support, and promote healthy behaviors which is necessary to achieve in all cases. Having been identified as a potential opportunity in Scenario 2, this strategy could also be adopted by larger companies, making it a challenge for eHealth organizations to survive.

Scores:

| Robustness | Efficacy | Total |
|---|---|---|
| **04** | **03** | **07** |

## 5. STRATEGY - Tailored Influence

Capturing market share is never an easy task for any business, especially in the eHealth industry. With so many new technologies and digital platforms being introduced all the time, it's crucial that organizations stay ahead of the curve by offering services that meet their customers' expectations. This strategy supports almost all competencies and while it may require some capabilities to be built, the potential to generate income makes it a highly effective approach. In a highly competitive business landscape, understanding customers and their environment is critical which is why this strategy is also a favourable fit in all scenarios. Whether you are running a small startup or a large corporation, gaining deeper insights into your customers' needs and preferences can make all the difference in achieving success.

Scores:

| Robustness | Efficacy | Total |
|---|---|---|
| **04** | **05** | **09** |

## 6. STRATEGY - Healthcare Unification

It is a massive task to solve the interoperability challenge, which requires experiences, expertise, and collaboration partners who are motivated by this common goal. It scores the lowest on efficacy because a large team with both technical and business skills and funds would be required to be able to survive for a long time until the solution is deployed at which point the organization can generate revenue and collect valuable data from users. However, in a market flooded with numerous eHealth products each having their own system, achieving interoperability becomes challenging if not impossible and it is a strategy that may not be able to survive in Scenario 1 and 4. New products and systems could be great news for consumers who have a wide range of options to choose from, it can be a daunting task for anyone who must ensure that these products are interoperable with other existing systems.

Scores:

| Robustness | Efficacy | **Total** |
|---|---|---|
| **02** | **01** | **03** |

## 7. STRATEGY - Research Accelerator

Research is a crucial aspect of building successful partnerships and understanding users in the eHealth industry. However, it can be challenging for small organizations to devote funds and resources to research efforts alone. Conducting research requires human resources, time, and funding that may not always be readily available for smaller eHealth companies. Despite these challenges, conducting research can help companies identify gaps in the market or areas where there is room for innovation. Additionally, it can provide valuable insights into user behaviour and preferences that can inform product development and marketing strategies. Even though it can increase chances of securing funding, it is relatively a weak fit in all scenarios and doesn't really support any of the key competencies identified.

Scores:

| Robustness | Efficacy | **Total** |
|---|---|---|
| **01** | **02** | **03** |

## 8. STRATEGY - Hypershield organizations

User data protection is a crucial aspect of ensuring not just improved patient care but also building trust with customers and stakeholders. As organizations gather more information about their users, it becomes increasingly important to safeguard that information against potential breaches or misuse. This is particularly true in Scenario 3 and 4 where regulations and best practices are not actively established, making it all the more important for organizations to follow this strategy. However, taking on this role requires significant efforts not just in terms of building technical capabilities but also advocacy work that will be required. Organizations must have a clear understanding of the risks associated with compromised user data and develop strategies to mitigate those risks. Trust will be built with customers through these efforts, which may also result in growth of the business. Due to its insufficient support for the competencies, it scores relatively low on efficacy.

Scores:

| Robustness | Efficacy | **Total** |
|---|---|---|
| **04** | **03** | **07** |

From the exercise above we have the following scores for the strategies (Table 2)

| | |
|---|---|
| Tailored Influence | 9 |
| Marketing Mavens | 8 |
| Care coaching | 7 |
| Hypershield organizations | 7 |
| Data optimization boost | 7 |
| A world of APIs | 6 |
| Research Accelerator | 3 |
| Healthcare Unification | 3 |

Table 2 - Combined robustness and efficacy score of each strategy arranged from highest to lowest

# Most potent strategy

Scenarios are powerful tools for businesses to stay ahead in a rapidly changing environment. By envisioning potential futures organizations are able to create strategies that account for multiple outcomes. When it comes to decision-making, having too many options can often lead to analysis paralysis. The outputs from these exercises are usually a list of actionable ideas that can help organizations make better decisions about the future based on what has been learnt from the scenarios (Chermack, 2022). The more choices we have, the harder it becomes to weigh the pros and cons of each one, leading to confusion and indecision. This simple exercise helps us reduce our options down to a manageable few while also providing insight into which strategies will perform well in various scenarios. From the above exercise the strategy of “Tailored Influence” emerges as the winner which supports the key competencies of an eHealth organization while being robust across multiple scenarios.

One of the key benefits of scenario planning is that it helps businesses avoid putting all their eggs in one basket. By considering multiple scenarios, you can identify potential risks and opportunities and prepare accordingly (Berkhout & Hertin, 2002). For example, if one scenario assumes a recession, you can develop strategies to survive or even thrive in those conditions. If another scenario assumes rapid growth, you can plan for expansion and investments to take advantage of that growth.

The purpose of this exercise was to derive a strategy that can be used as the foundation for "Action" and the focus will now be on implementing this core strategy with precision and dedication. By doing so, we hope to achieve our overarching goals while remaining flexible enough to adjust course if necessary. It is important to note that while other strategies are not included in the initial action plan, they are still on the table for consideration. These omitted strategies may be more scenario-dependent or require further evaluation before they can be fully implemented (Chermack, 2022). Every situation is unique, and therefore an implementation plan will be designed to adapt our approach accordingly.

# 8. Action

## Introduction

Scenarios are a powerful tool for organizations to anticipate and prepare for possible futures. They allow leaders to develop a range of plausible future scenarios based on different trends, drivers, uncertainties, and assumptions. An organization can benefit greatly from scenarios as they challenge people and change the way they think about the future. However, creating scenarios is not sufficient in itself; they need to be connected to decisions and actions. Scenarios should inform strategic planning processes by providing insights into potential threats and opportunities in the external environment, as well as internal strengths and weaknesses. They should also help organizations prioritize investments or resources based on their potential impact on each scenario.

Strategic planning is a critical process for any organization that is looking to achieve its long-term goals. A strategy is a set of actions aimed at creating and maintaining competitive advantages and unique value. However, this process has suffered from being addicted to a prediction mentality, which focuses on predicting the future and separating strategy development from implementation. This has led to many organizations failing in their strategic planning efforts, as they are unable to adapt quickly enough when things don't go according to plan. It is important for organizations to embrace scenario planning as part of their organizational culture so that organizations can develop more robust strategies that are flexible enough to adapt and respond quickly when things change (Chermack, 2022). As a recap, this research aims to give practical guidance to eHealth organizations on building resilience, which requires a link between scenarios and strategies and the final step is building that organizational culture that can help them achieve that.

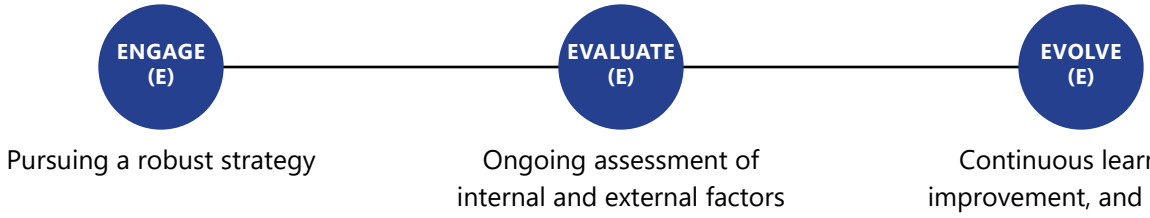
Organizational culture is a complex and evolving concept that defines the character of an organization. It represents the values, beliefs, customs, and behaviors of an organization's members. The culture of an organization is not only defined by what it believes in but also how it communicates those beliefs to employees. In a broader sense, organizational culture is critical in shaping employee behavior within the workplace. It influences how employees perceive their roles and responsibilities and guides them on how to behave while working towards organizational goals. Organizational culture can be observed through the language used by employees while communicating with each other or while addressing customers. Culture is both a set of data and a set of procedures that determine what that data can be used for (Chermack, 2022). Scenarios enables an organization to come to an agreement on the primary features of its environment in which it operates. By analyzing and understanding potential scenarios, leaders can identify key drivers and trends that will impact

their business in the future. This allows them to develop strategies and actions that can be taken to prepare for these changes, ensuring they are well-positioned for success. Through this process, the organization forms a shared mental model of its culture, enabling all members to work towards common goals. Furthermore, scenarios serve as a shared mental model that creates a cultural process within an organization. As different stakeholders come together to discuss potential scenarios and their implications, they begin to form a collective understanding of what is important for the organization's success. This shared understanding becomes part of the organizational culture and informs decision-making processes going forward. As these are interrelated, any changes in the group's shared mental model could impact its culture. Mental models are the lenses through which we view the world, and they play a critical role in shaping the perception of reality helping us make sense of the world around us.

Mintzberg argues that deliberate strategy differs from emergent strategy in that one doesn't involve learning and the other does not involve control, and that all real-world strategies must incorporate both (Chermack, 2022). A deliberate strategy is one that arises from conscious, thoughtful, and organized action on the part of a business and its leadership while emergent strategy is one that arises from unplanned actions and initiatives from within an organization.

# Implementation framework

A three step implementation framework (EEE) is designed taking the internal and external factors into consideration that can serve as guidance and help an eHealth organization shape those mental models which are crucial in influencing the organizational culture enabling them to succeed and survive.




## ENGAGE

A variety of possible futures present opportunities for positive gains when pursuing strategies that are robust across multiple scenarios. Our strategy of “Tailored Influence” works well in different scenarios and supports multiple organizational identities. In any kind of future, an eHealth organization that can establish a capability to implement this strategy has a great chance of surviving. This will help develop a clear direction for the organization and aligning all efforts towards achieving it can help in better navigating the unpredictable future. Moreover, with a strong internal capability for strategic pursuit, organizations can foster innovation within their teams. By encouraging creativity and experimentation with new ideas, they can find solutions to implementation challenges that set them apart from competitors. Providing knowledge and resources to caregivers of PwD will of course always be the primary objective of any eHealth organization working in this domain.

It is also important to note that this research focuses on the entire eHealth industry and the organizations must take into account their existing strengths and weaknesses by revisiting the 'Planning' phase. By doing so, they will be able to determine which strategy works best for them. For example a team with unique marketing skills may give a higher score to the strategy of 'Marketing Mavens' or the one with technology expertise may decide to score 'A world of APIs' higher.

An organization without a robust strategy is like a ship without a compass, drifting aimlessly with no clear sense of direction. A robust strategy means that the company has a clear direction and goals that are aligned with your mission and vision. It ensures that every aspect of the organization, from product development to customer service, is focused on achieving those objectives. A well-crafted strategy provides clarity for decision-making, enabling companies to prioritize their efforts and allocate resources effectively. It identifies the key challenges facing the organization and outlines steps to overcome them. By establishing priorities and focusing on the most critical issues first, companies can achieve greater efficiency in their operations. Prioritizing the company's strategic goals also helps them stay true to their mission and vision. This helps to ensure that the organization is unified and that everyone is working towards the same objectives. Having clearly defined goals also allows the organization to measure its progress towards those goals. Finally, it allows the organization to identify areas of improvement and make necessary changes to stay on track.

## EVALUATE

In today's fast-paced and highly competitive business environment, companies cannot afford to be complacent. To stay relevant in an ever-changing marketplace, they must continuously evaluate their strategies. Failure to do so can result in a loss of market share, declining profits, and even bankruptcy. There are a variety of internal and external factors that can impact a company's success, from changes in consumer trends to advancements in technology. By staying on top of these trends and making strategic adjustments as necessary, businesses can position themselves for long-term growth and profitability. Visionary organizations understand the importance of keeping a watchful eye on the complex interplay of trends that could potentially impact their operations. Fergnani & Sweeney, in their article titled "Identity wind tunneling: A method for discovering an organization's strategic identity using scenarios" which discusses an enhancement of wind tunneling approach, allowing an organizations to understand, test, and manage multiple organizational identities argue that when organizations use scenario planning, they must model the scenarios rigorously not only to generate substantive change, but also to apply the suite of practices and approaches that help them clarify, reorient, and possibly reimagine their identity in our increasingly volatile world (Fergnani & Sweeney, 2021).

To stay ahead of the curve, companies need to establish a process for monitoring and analysing these trends. Although it is not feasible or necessary to keep track of every trend out there, it is crucial for eHealth organizations to develop an awareness of the key forces that may influence their industry. By staying up-to-date with emerging trends and potential disruptions, organizations can proactively adapt their strategies and operations to remain competitive in an ever-changing landscape. The result is an organization's ability to both steer clear of threats to its existing business and to anticipate potential market opportunities at a time when industry trends are converging. However, effective trend monitoring is not just about collecting data; it's also about analyzing

this information in meaningful ways. Companies need to have tools and processes in place for identifying patterns, making connections between seemingly disparate pieces of information, and drawing actionable insights from complex datasets. By doing so, businesses can gain valuable insights into emerging opportunities, potential threats, and changing customer needs. These insights can help organizations make informed decisions that will drive growth, innovation, and profitability.

In addition, it is important to determine what future we are heading towards. During our 'Forecasting' phase, we identified two critical uncertainties that eHealth organizations must keep an eye on. There is a complex regulatory environment for digital healthcare, and political and economic factors may influence the pace and scope of the reforms, so it becomes really critical to monitor the role of government. Furthermore, the management of healthcare by individuals or organizations remains a question of uncertainty that can have a major impact on eHealth organizations. In order to remain competitive, healthcare providers must adapt to the changing industry. In order for a strategy to remain effective over time, it needs to be flexible enough to adapt to changes in external factors. Monitoring these trends regularly will help eHealth organizations assess which additional strategies will be effective in addressing these critical uncertainties.

Trend monitoring impacts the view of the world which has a definite influence on how people will think about organization and the decisions that are made. There is no complete, true, and accurate mental model of the world (Chermack, 2022). Every human being has their own perception of the world shaped by their experiences, beliefs, values, and culture and their mental model of the world is incomplete and limited by their individual experiences. Therefore, it becomes important to see the world from other perspectives through dialogue and exposure to other mental models. Engaging in conversations and listening to others' opinions can challenge one's assumptions and help identify gaps in one's own thinking. By incorporating scenario planning into the regular conversation that takes place within an organization they are able to achieve agility to adapt quickly and effectively. When everyone is on the same page about potential scenarios and their implications, it becomes easier to make decisions based on a common understanding of what could happen thereby helping build a shared mental model across the organization. This type of alignment also helps reduce confusion and uncertainty within teams as they work together towards shared goals. In addition to building a shared mental model, incorporating trend monitoring into ongoing conversations can lead to elements of observation that helps keep scenarios alive over time and can be used to continually review strategy (Chermack, 2022).

## EVOLVE

The third step is the flexibility of the organization itself. Companies that have rigid systems may struggle to adapt when faced with new challenges or opportunities. In today's fast-paced business world, it's more important than ever for companies to become learning organizations. A learning organization is one that values continuous improvement and growth, both for individuals within the company and for the company as a whole. By adopting this mindset, companies can stay ahead of trends and remain competitive in their industry. One key aspect of becoming a learning organization is fostering a culture of curiosity and experimentation. Leaders should encourage employees to ask questions, challenge assumptions, and try new things without fear of failure. This not only leads to innovation but also helps create an environment where everyone feels invested in the success of the company. Another crucial

element in becoming a learning organization is investing in employee development. This includes providing regular training opportunities as well as encouraging employees to pursue professional development outside of work. Transformations are never easy. They are complex, time-consuming and require a high level of commitment from an organization's workforce. Transformations involve fundamental changes in the way things are done, including processes, systems, culture and strategic direction. It is no wonder that they often fail or fall short of their expected outcomes. The challenge of executing and sustaining transformation is even greater when it comes to large organizations with tens or hundreds of thousands of employees spread across different continents, cultures and languages. Engaging such a vast workforce requires effective communication strategies that can reach everyone at every level of the organization. Leaders must also ensure that their teams understand why change needs to happen and how it will impact them personally. Effective capability-building programs play a critical role in driving successful transformations in large organizations (Bachmann et al., 2021). Such programs help develop the mindsets, behaviors and skills needed to power a transition and achieve maximum impact. In her interview Pamela (Interview Participant 12) also mentioned that at every level of the organization they need to do change management, and the ADKAR model is a way to help them with that. It entails Awareness, Desire, Knowledge, Ability, and Reinforcement, and, according to her, it's important to focus on the Desire piece so that people can understand the value and the benefit.

Another aspect of becoming a learning organization is the incorporation of feedback from customers. Interviewee #13 comments, "failures is a way to succeed as well as to get rid of the failures." Customer feedback can provide valuable insights into what works well and what needs improvement in your products or services. By actively seeking out and listening to customer feedback, organizations can identify areas for growth and make necessary changes to better meet their customers' needs. Moreover, incorporating customer feedback also helps build trust and loyalty with your audience. When customers feel heard and valued, they are more likely to remain loyal to your brand over time. This, in turn, can lead to increased customer retention and more referrals, resulting in higher profits and more success for your business. Additionally, customer feedback can also provide ideas for new products and services that can be developed to meet the needs of your customers.

# 9. Summary

A changing environment poses a challenge for businesses of all types, including eHealth organizations. These companies must stay vigilant to keep up with the latest developments and ensure they remain on course. Without proper attention and monitoring, new and unforeseen obstacles can arise that may push these organizations off track. One major reason why many eHealth organizations fail is due to their failure to adapt to changes in the market. In some cases, these businesses may have initially launched with a solid plan but failed to pivot when necessary. As a result, they were unable to keep up with their competitors or meet the evolving needs of their target audience. Another factor that contributes to the downfall of eHealth organizations is poor management. Strong leadership is critical for ensuring that employees are motivated, budgets are managed effectively, and resources are allocated efficiently. To survive, eHealth organizations must adapt and make internal changes that counteract the effects of an external environment that is rife with uncertainties.

However, implementing changes in an organization can have unintended consequences. One such consequence is the reduction of internal coherence as it can disrupt the established norms and routines that are necessary for a cohesive and efficient organization. This disruption can lead to confusion and uncertainty among employees, which may result in decreased productivity or morale. Furthermore, these changes may disturb the directional business idea that has been established by the organization's leadership. If changes cause significant deviations from this idea, it could lead to a lack of focus and direction within the organization. Building an adaptable organization requires more than just making changes – it also requires fostering a culture of creativity and innovation among its people.

The three step EEE implementation model takes into account any potential changes in future conditions that may impact the appropriateness of the decisions and defines eHealth organization in terms of its growth potential as they look for ways to create breakthrough strategies and ideas. An organization's strategy determines how it intends to achieve its goals and objectives (Chermack, 2022) therefore, it becomes important to assess both internal and external factors that may impact the business, when creating a strategy. This includes analyzing strengths and weaknesses as well as keeping an eye on industry trends, shifts in consumer behavior, and emerging technologies. In addition to gathering information about the present situation and future possibilities, having the right mindset is also key to creating a winning strategy. By using the EEE implementation model, eHealth businesses can map out a clear path to success through continuous strategic analysis. In today's fast-paced world, businesses need to be proactive in identifying and adapting to future trends and megatrends. Understanding what is coming next can give organizations a competitive edge by allowing them to prepare for the inevitable changes that will occur. Trend analysis helps companies position themselves as leaders in their respective industries by being able to anticipate shifts in consumer preferences, technological advancements, and economic conditions. By adopting the EEE implementation framework, eHealth organizations designing interventions to support informal Dementia caregivers in Ontario can adapt their strategies accordingly to ensure they remain relevant and sustainable in the face of changing circumstances.

# 10. Parting Thoughts

## Reflections and the role of eHealth solutions

The adoption of digital health is set to become the new norm and bring about enhancements in the quality of treatment and preventive medicine. Additionally, it will pave the way for new business models within the healthcare industry, empower patients to take on a more active role in their healthcare, and democratize the healthcare system. Internet interventions can offer education and support to informal caregivers who face participation barriers due to limited access to formal care services and resources. Compared to traditional in-person interventions, web-based interventions are more cost-effective and easily accessible, making them a promising option for scalability and wider outreach (Rottenberg & Williams, 2021). Utilizing innovative approaches and eHealth interventions can ensure that informal caregivers have easy, timely, and need-based access to knowledge resources, which can enhance and safeguard their care capacity. This also helps reduce stress and depression levels, delay nursing home placements, and improve mood and quality of life for caregivers.

However, the successful implementation of eHealth systems in resource-constrained areas is a crucial challenge. To improve healthcare delivery, it is essential to expand successful pilot eHealth projects and ensure sustainable use of digital health technologies. Adopting technology-driven solutions cautiously is necessary as it can create more challenges than benefits if not adequately implemented. Successful scaling up of these projects requires careful planning and collaboration among stakeholders at different levels, alongside addressing the underlying systemic issues that lead to poor health outcomes in resource-constrained areas. In today's fast-paced business world, organizations have to constantly strive to stay ahead of the curve. To do so, they must have a deep understanding of both internal and external factors that impact their operations and integrating the two functions is critical for organizations. They, however, work in silos and the lack of collaboration leads to missed opportunities and threats, impacting the bottom line of a company.

Strategic Foresight is a powerful tool that helps bridge this gap between internal and external information. With its holistic approach, it allows organizations to view all aspects of their business as interconnected components of a larger whole and develop targeted strategies. It is important to recognize that the future is shaped by the beliefs and perceptions of many individuals, rather than just one person's vision. Without the agreement of others, it is difficult for an individual's vision to be translated into reality for the wider organization. Leaders should, therefore, integrate it into their business processes as the awareness about future trends promotes organizational learning and change and use it to assess decision making which

the EEE approach facilitates. Berkhout & Hertin highlight the importance of participative futures thinking to build more self-aware and responsive organizations that can successfully navigate potential pitfalls and influence change processes. According to them it involves challenging the ideas of multiple people through a structured process and synthesizing the results to create scenario narratives and indicators. By integrating these processes into organizational routines, the quality and effectiveness of scenario exercises can improve (Berkhout & Hertin, 2002). Overall, Strategic Foresight is an invaluable tool for any organization seeking to remain competitive in today's rapidly evolving business environment.

## "The best way to predict the future is to invent it." - Alan Kay

The objective of this research is not to produce a precise prediction, but to encourage better readiness. The study does not focus on technology foresight analysis but instead concentrates more on the industry of eHealth solutions for informal Dementia caregivers in Ontario and expected market changes. Using various tools, interviewing subject matter experts, and by mapping and analyzing general drivers, the researcher has attempted to unpack and understand implications that were evaluated to highlight opportunities and threats. The chosen research approach was found useful in exploring the potential impact. The EEE framework also engages various stakeholders of the organization in conversations and promotes a joint effort that helps develop more organization-wide confidence in managing the unknowable future. Doing this together not only bonds them as a team, but it also allows them to adapt to change more quickly. The approach also helps eHealth organizations pay attention to their dynamic capabilities providing many competitive benefits.

To ensure that eHealth technologies keep up with changes in context and care standards, future implementation research should also prioritize continuous adaptation and integration of technology over time. With the rapid development of eHealth technologies, it's crucial for implementers to embrace that and stay current. In addition, the focus of policy makers and funding bodies in healthcare should shift towards promoting sustainable implementation of existing evidence-based interventions, rather than creating new ones. Supporting research that examines success factors from initial conception to daily practice can ensure resources are directed towards interventions that make a lasting impact on better health outcomes, while providing healthcare providers with the necessary support for successful implementation.

As recognized earlier in this research, providing support to informal caregivers requires a multipronged approach. The researcher believes that it is not something that the government should be expected to solve alone as it involves complex challenges involving collaboration of various stakeholders, including the developers of innovative technology solutions, healthcare providers, and community organizations. As a responsible Strategic Designer, the intent of this work is to equip eHealth service providers with the right kind of insights and approaches that they need to ensure their solutions remain viable over time. This MRP is a hope to start a conversation and to build awareness about the future that will help eHealth organizations develop resiliency while creating meaningful solutions for informal Dementia caregivers.

# Limitations and next steps

When it comes to research, predicting the future through foresight is a daunting task because there is a considerable amount of data that one would wish to have, but unfortunately, a significant portion of it just does not exist. The nature of this report's findings is a combination of exploration and conceptualization. Due to the limited time available for this research it was critical to find a balance between searching for valuable information while using time effectively. However, it is also worth the effort to find certain information if it is deemed valuable. Therefore, this project stands to benefit from more intensive and nuanced investigation. Scenario development, in particular, is a very collaborative process and requires further exploration. It can benefit from several rounds of workshops and iterations with various industry stakeholders. A further more robust and broader review of current eHealth interventions is essential to identify gaps in implementation strategies which can help develop targeted strategies to address the gaps and improve implementation outcomes.

The analysis in 'Framing' gives an overview of factors that affect the implementation of web-based technology solutions for PwD and their caregivers. However, it doesn't distinguish between different types of technologies (example mobile app or browser based solution) in terms of successful implementation. To improve the implementation of specific kinds of technologies that can help support PwD and their caregivers at home, further research is necessary. Such research could help identify specific factors that facilitate successful implementation of these technologies, leading to better outcomes.

The importance of gathering data from diverse sources cannot be overstated, as it provides a more comprehensive view of the issue in question. There is a possibility of selection bias, as the responses gathered for evaluation were from my own Dementia and eHealth networks. This could have resulted in a biased sample that may not be representative of the broader population. While exploring the topic, the researcher has been fortunate enough to connect with organizations working in this field and in light of this limitation, alternate recruitment strategies will be considered for future evaluations that would allow for a more diverse range of participants. The limited number of studies included in this review suggests that the connections between variables and information needs should be viewed as hypotheses. The search strategy only included English-language studies, so relevant articles in other languages may have been missed. Despite my best efforts to track recent literature, some papers may have been omitted due to the technicalities involved in accessing them and time required to finalise the research report.

The findings of this research focus on the industry of eHealth organizations in the context of informal Dementia caregivers and therefore are not necessarily generalizable to other implementation contexts or to one organization. In order to create a strategy that is much more resilient and customized for a specific organization, a comprehensive understanding of both the internal and external environment of the company is necessary along with its openness to accepting ambiguity. Additional stakeholders must also be identified so that their input can be taken into account when making strategic decisions related to the solutions and its implementation.

The most important next step that will facilitate the adoption of the EEE framework is development of 'Signals' that are used to identify the early signs of emerging trends, issues or changes in the external environment. 'Signals' are events required for a given scenario to appear in reality and are critical in keeping scenarios alive, has serious benefits as it creates a feedback loop with the external environment as time passes, allowing for the tracking of short-term developments necessary for the scenario to become reality (Chermack, 2022). By monitoring these 'Signals', eHealth organizations will be able to anticipate possible future developments and prepare accordingly by adopting other strategies that have been identified in this report.

"In the Buddhist lineage, knowledge is not handed down like an antique. One teacher experiences the truth of the teachings and hands it down as inspiration to his students. That inspiration wakens the student who passes it on further. The teachings are seen as always up to date, they are not thought of as ancient wisdom" (Hope et al., 1995). The teachings of Buddhism can be challenging and transformative and many people have found great inspiration and guidance in this tradition, similarly, through this research and the design of the EEE framework the researcher hopes to inspire and enlighten not just eHealth organizations but stakeholders from other groups including government, large healthcare organizations, and funders of these solutions. The strategy and implementation framework is an initial step aimed at enhancing support for eHealth organizations which will eventually benefit family and informals caregivers of people living with Dementia. In the future, the researcher also wishes to extend the research to other digital health solutions of many more serious illnesses.

# 11. Bibliography


5G will enable super-fast, real-time delivery of telemedicine in India's remote areas: Oracle. ABP Live News. (2022, October 20). Retrieved December 19, 2022, from https://news.abplive.com/technology/5g-will-enable-super-fast-real-time-delivery-of-telemedicine-in-india-s-remote-areas-oracle-1559082

Abou-Atme, Z., Alterman, R., Khanna, G., & Levine, E. (2022, December 16). Investing in the new era of value-based care. McKinsey & Company. Retrieved December 29, 2022, from https://www.mckinsey.com/industries/healthcare/our-insights/investing-in-the-new-era-of-value-based-care

Allen, F. V. (2014, February 17). Datacoup: Make money selling your personal data yourself. techland.time.com. Retrieved April 19, 2022, from https://techland.time.com/2014/02/17/datacoup-make-money-selling-your-personal-data-yourself/

AlMulla, A. (2020, October 23). organizations need to care about caregiving. Retrieved from https://www.weforum.org/agenda/2020/10/why-organizations-need-to-care-about-caregiving/

Brodaty, H., & Donkin, M. (2009, June). Family caregivers of people with Dementia. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3181916/

Bachmann, H., Skerritt, D., & McNally, E. Y. (2021, March 30). How capability building can power transformation. McKinsey & Company. Retrieved March 29, 2022, from https://www.mckinsey.com/capabilities/transformation/our-insights/how-capability-building-can-power-transformation

Bashan, A., & Kordova, S. (2021, February 11). Globalization, quality and systems thinking: Integrating global quality management and a systems view. ScienceDirect. Retrieved February 26, 2022, from https://www.sciencedirect.com/science/article/pii/S2405844021002668

Bastoni, S., Wrede, C., Silva, M. C. da, Sanderman, R., Gaggioli, A., Braakman-Jansen, A., & Gemert-Pijnen, L. van. (2021, October 8). Factors influencing implementation of eHealth technologies to support Informal Dementia Care: Umbrella Review. JMIR Aging. Retrieved March 13, 2022, from https://aging.jmir.org/2021/4/e30841

Bauer, M. S., & Kirchner, J. A. (2019, April 23). Implementation science: What is it and why should I care? Psychiatry research. Retrieved April 2, 2023, from https://pubmed.ncbi.nlm.nih.gov/31036287/

Benjamin, J. (2023, February 16). Dr Tiktok? why younger audiences are turning to influencers for healthcare information - the media leader. The Media Leader. Retrieved March 19, 2023, from https://the-media-leader.com/dr-tiktok-why-younger-audiences-are-turning-to-influencers-for-healthcare-information/

Benoit, H. (2020, January 21). Tricorders & Telemedicine: 9 emerging trends for Healthcare in 2040. M3 Design. Retrieved February 19, 2022, from https://www.m3design.com/future-healthcare-transformation-digital-impact/

Berkhout, F., & Hertin, J. (2002, March). Foresight futures scenarios: Developing and applying a participative ...Retrieved September 15, 2022, from https://www.researchgate.net/publication/282069810_Foresight_futures_scenarios_Developing_and_applying_a_participative_strategic_planning_tool

Big Tech in Healthcare: Amazon, Apple, Google & Microsoft. Insider Intelligence. (2023, January 24). Retrieved February 19, 2023, from https://www.insiderintelligence.com/insights/big-tech-in-healthcare-report/

Bird, M., McGillion, M., Chambers, E. M., Dix, J., Fajardo, C. J., Gilmour, M., Levesque, K., Lim, A., Mierdel, S., Ouellette, C., Polanski, A. N., Reaume, S. V., Whitmore, C., & Carter, N. (2021, March 1). A generative co-design framework for Healthcare Innovation: Development and application of an end-user engagement framework - research involvement and engagement. BioMed Central. Retrieved April 23, 2023, from https://researchinvolvement.biomedcentral.com/articles/10.1186/s40900-021-00252-7

Calahan, K., & Chai, C. (2013, August 14). Canada facing shortage of geriatricians as population ages. Global News. Retrieved February 26, 2022, from https://globalnews.ca/news/778073/canada-facing-shortage-of-geriatricians-as-population-ages/

Canada, V. A. (2017, November 22). 5.0 key findings by objective. Key Findings by Objective - Dementia Care Evaluation - Veterans Affairs Canada. Retrieved January 8, 2023, from https://www.veterans.gc.ca/eng/about-vac/publications-reports/reports/departmental-audit-evaluation/2009-06-dementia-care-evaluation/5-0

Canadian Academy of Health Sciences. (n.d.). Improving the quality of life and care of persons living with dementia and their caregivers.

Canadian Centre for Caregiving Excellence. (2022, November). Giving care an approach to a better caregiving landscape in Canada. Retrieved January 26, 2022, from https://canadiancaregiving.org/wp-content/uploads/2022/11/Giving-Care_Executive-Summary.pdf

Carnicero, J., & Serra, P. (2020, September). Governance for Digital Health The art of health systems transformation.Inter-American Development Bank. Retrieved April 13, 2022, from https://publications.iadb.org/publications/english/viewer/Governance-for-Digital-Health-The-Art-of-Health-Systems-Transformation.pdf

CB Insights. (2023, January 24). State of Digital Health 2022 report. CB Insights Research. Retrieved February 9, 2023, from https://www.cbinsights.com/research/report/digital-health-trends-2022/

CHC model of care. Parkdale Queen West Community Health Centre. (2022, October 28). Retrieved April 19, 2022, from https://pqwchc.org/about-us/who-we-are/chc-model-of-care/

Chen, M., & Decary, M. (2019, September 24). Artificial intelligence in healthcare: An essential guide for health leaders. Retrieved April 2, 2022, from https://journals.sagepub.com/doi/full/10.1177/0840470419873123

Chermack, T. J. (2022). Using scenarios: Scenario planning for improving organizations. Berrett-Koehler Publishers, Inc.

Christie, H. L., Boots, L. M. M., Hermans, I., Govers, M., Tange, H. J., Verhey, F. R. J., & Vugt, M. de. (2021, June 3). Business models of eHealth interventions to support informal caregivers of people with dementia in the netherlands: Analysis of case studies. JMIR Aging. Retrieved March 13, 2022, from https://aging.jmir.org/2021/2/e24724/

Christie, H. L., Bartels, S. L., Boots, L. M., Tange, H. J., Verhey, F. R., & Vugt, M. E. (2018, July 07). A systematic review on the implementation of eHealth interventions for informal caregivers of people with Dementia. Retrieved from https://www.sciencedirect.com/science/article/pii/S2214782918300228

Christie, H. L., Boots, L. M. M., Tange, H. J., Verhey, F. R. J., & Vugt, M. E. de. (2021, February 5). Implementations of Evidence-Based eHealth Interventions for Caregivers of People With Dementia in Municipality Contexts (Myinlife and Partner in Balance): Evaluation Study. JMIR Aging. Retrieved March 13, 2022, from https://aging.jmir.org/2021/1/e21629/

Christie, H. L., Martin, J. L., Connor, J., Tange, H. J., Verhey, F. R. J., Vugt, M. E. de, & Orrell , M. (2019, July 24). EHealth interventions to support caregivers of people with dementia may be proven effective, but are they implementation-ready? Internet Interventions. Retrieved March 19, 2022, from https://www.sciencedirect.com/science/article/pii/S2214782919300090

Clampett, J. (2023, February 27). Prepare your business for futures with insight & foresight. insight & foresight. Retrieved March 2, 2023, from https://www.insightandforesight.com.au/blog-foresights/prepare-your-business-for-futures-with-insight-foresight

CodeBlue. (2022, May 16). UOA launches co-living wellness hub in Cheras for seniors. CodeBlue. Retrieved January 19, 2023, from https://codeblue.galencentre.org/2022/05/16/uoa-launches-co-living-wellness-hub-in-cheras-for-seniors/

Davey, K., & Nicholson, P. (2021, October 26). Market forces alone will not deliver fast 5G internet to rural areas. Policy Options. Retrieved March 19, 2022, from https://policyoptions.irpp.org/magazines/october-2021/market-forces-alone-will-not-deliver-fast-5g-internet-to-rural-areas/

Deloitte Centre for Health Solutions. (2015, April). How digital technology is transforming health and social care. Deloitte. Retrieved February 17, 2022, from https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/life-sciences-health-care/deloitte-uk-connected-health.pdf

Digital Health Literacy: How New Skills Can Help Improve Health, equity and Sustainability. EuroHealthNet. (2019, September 9). Retrieved February 26, 2023, from https://eurohealthnet.eu/publication/digital-health-literacy-how-new-skills-can-help-improve-health-equity-and-sustainability/

Dignan, L. (2021, December 22). Top cloud providers: AWS, Microsoft Azure, and Google Cloud, hybrid, SAAS players. ZDNET. Retrieved April 19, 2022, from https://www.zdnet.com/article/the-top-cloud-providers-of-2021-aws-microsoft-azure-google-cloud-hybrid-saas/

Edwards, J., Chu, P., & Thomson, J. (2000, September 1). The use of clinical case management for early stage Alzheimer' patients and their families - Paul Chu, Joy Edwards, Ron Levin, Jim Thomson, 2000. Retrieved from https://journals.sagepub.com/doi/10.1177/153331750001500506

Eldercare-assistive robots market. Future Market Insights. (2022, September). Retrieved February 26, 2023, from https://www.futuremarketinsights.com/reports/eldercare-assistive-robots-Market

Estes, C. (2022, November 11). To ensure access for all, healthcare payment models need innovation. Bio.News. Retrieved December 19, 2022, from https://bio.news/state-policy/to-ensure-access-for-all-healthcare-payment-models-need-innovation/

Fanta, G. B., Pretorius, L., & Erasmus, L. D. (2015, June). An evaluation of ehealth systems implementation frameworks for sustainability in resource constrained environments: a literature review. ResearchGate. Retrieved February 2, 2022, from https://www.researchgate.net/profile/Louwrence-Erasmus/publication/278438398_AN_EVALUATION_OF_EHEALTH_SYSTEMS_IMPLEMENTATION_FRAMEWORKS_FOR_SUSTAINABILITY_IN_RESOURCE_CONSTRAINED_ENVIRONMENTS_A_LITERATURE_REVIEW/links/55811e4108ae47061e5f474e/AN-EVALUATION-OF-EHEALTH-SYSTEMS-IMPLEMENTATION-FRAMEWORKS-FOR-SUSTAINABILITY-IN-RESOURCE-CONSTRAINED-ENVIRONMENTS-A-LITERATURE-REVIEW.pdf

Feldstein, S. (2019, September 17). The Global Expansion of AI Surveillance. Carnegie Endowment For International Peace. Retrieved February 25, 2022, from https://carnegieendowment.org/2019/09/17/global-expansion-of-ai-surveillance-pub-79847

Fergnani, A., & Sweeney, J. A. (2021, June 11). Identity Wind Tunneling: A method for discovering an organization's strategic identity using scenarios. Retrieved April 21, 2022, from https://onlinelibrary.wiley.com/doi/abs/10.1002/ffo2.96

Fielding, S. (2022, November 15). Zemplee uses 5G and AI to monitor elderly people's well-being from the comfort of their home, without the need for in-person caregivers. Business Insider. Retrieved January 7, 2023, from https://www.businessinsider.com/zemplee-monitors-elderly-people-well-being-from-their-home-5g-2022-11

Fooks, C. (n.d.). The importance of co-design in realizing the potential of Integrated Care. Health System News The Importance of Co-Design in Realizing the Potential of Integrated Care. Retrieved April 9, 2022, from https://www.oha.com/discovery/past-issues/2019/integrated-care/in-this-issue/the-importance-of-co-design-in-realizing-the-potential-of-integrated-care

Future Health Index 2021. (2021, April 14). Healthcare leaders look beyond the Crisis - 2021 global report. Philips. Retrieved March 22, 2022, from https://www.philips.com/a-w/about/news/future-health-index/reports/2021/healthcare-leaders-look-beyond-the-crisis.html

The Future of Digital Health 2022 Health Care Innovation Predictions. BCG Digital Ventures. (2022, February 1). Retrieved March 27, 2022.

Georges, B. (2023, January 9). Listening for illness: Your voice may soon help detect health problems. Worldcrunch. Retrieved April 19, 2023, from https://worldcrunch.com/tech-science/voice-ai-healthcare

Gitlin, L. N., Marx, K., Stanley, I. H., & Hodgson, N. (2015, February 17). Translating evidence-based dementia caregiving interventions into practice: State-of-the-science and next steps. The Gerontologist. Retrieved April 3, 2022, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4542834/

Gooding, P., & Kariotis, T. (2022, November 15). Mental health apps are not keeping your data safe. Scientific American. Retrieved December 19, 2022, from https://www.scientificamerican.com/article/mental-health-apps-are-not-keeping-your-data-safe

Goodyear-Smith, F. (2021, June 1). Use of codesign in primary care research: Real-life examples. Family Medicine and Community Health. Retrieved April 7, 2022, from https://fmch.bmj.com/content/9/Suppl_1/e001181

Government of Canada, S. C. (2022, January 14). Differences in the characteristics of caregivers and caregiving arrangements of Canadians, 2018. The Daily. Retrieved March 27, 2023, from https://www150.statcan.gc.ca/n1/daily-quotidien/220114/dq220114c-eng.htm

Government of Canada. (2022, July 28). Government of Canada announces additional funding for digital literacy skills training to help more Canadians get online. Canada.ca. Retrieved February 19, 2023, from https://www.canada.ca/en/innovation-science-economic-development/news/2022/07/government-of-canada-announces-additional-funding-for-digital-literacy-skills-training-to-help-more-canadians-get-online.html

Greenwood, K., & Anas, J. (2021, October 4). It's a new era for mental health at work. Harvard Business Review. Retrieved April 7, 2022, from https://hbr.org/2021/10/its-a-new-era-for-mental-health-at-work

Guay, C., Auger, C., Demers, L., Mortenson, W. B., Miller, W. C., Gélinas-Bronsard, D., & Ahmed, S. (2017, September 19). Components and outcomes of internet-based interventions for caregivers of older adults: Systematic review. Journal of Medical Internet Research. Retrieved March 13, 2022, from https://www.jmir.org/2017/9/e313/

Guisado-Fernández, E., Giunti, G., Mackey, L. M., Blake, C., & Caulfield, B. M. (2019, April). Factors Influencing the Adoption of Smart Health Technologies for People With Dementia and Their Informal Caregivers: Scoping Review and Design Framework. Retrieved from https://aging.jmir.org/2019/1/e12192/

Hackett, M. (2021, June 9). Remote diagnostic letsgetchecked lands $150M in series D funding. MobiHealthNews. Retrieved April 19, 2022, from https://www.mobihealthnews.com/news/remote-diagnostic-letsgetchecked-lands-150m-series-d-funding

Hampson, M. (2022, November 8). App identifies parkinson's, COVID-19 based on user's voice. IEEE Spectrum. Retrieved January 19, 2023, from https://spectrum.ieee.org/parkinsons-disease-diagnosis

Harrington, S., L. George, K. L., Zalewski, Z., Kyei-Baffour, B., & Neal, J. C. (2021, October 5). Prescription Digital Therapeutics bring new treatments to healthcare. Avalere Health. Retrieved April 2, 2022, from https://avalere.com/insights/prescription-digital-therapeutics-bring-new-treatments-to-healthcare

Healthcare Cloud and Computing Market. (2022, April). Healthcare Cloud Computing Market Trends, growth, Drivers & Opportunities. MarketsandMarkets. Retrieved April 19, 2023, from https://www.marketsandmarkets.com/Market-Reports/cloud-computing-healthcare-market-347.html

Heijden, K. van der. (n.d.). Scenarios, Strategy, and the Strategy Process. Global Business Network.

Hines, A., Bishop, P. J., & Slaughter, R. A. (2015). Thinking about the future: Guidelines for strategic foresight. Hinesight.

Hope, J., Loon, B. V., & Appignanesi, R. (1995). Buddha for Beginners. Icon Books.

Hopwood, J., Walker, N., McDonagh, L., Rait, G., Walters, K., Iliffe, S., Davies, N. (2018, June 12). Internet-Based Interventions Aimed at Supporting Family Caregivers of People With Dementia: Systematic Review. Retrieved from https://www.jmir.org/2018/6/e216/

How healthcare ecosystems evolve? ForeCytDX. (2022, February 14). Retrieved April 19, 2022, from https://forecytdx.in/2022/02/14/how-healthcare-ecosystems-evolve/

Huesch, M. D., & Mosher, T. J. (2017, May 4). Using it or losing it? the case for Data Scientists Inside Health Care. Open Health News. Retrieved March 19, 2022, from https://www.openhealthnews.com/news-clipping/2017-05-04/using-it-or-losing-it-case-data-scientists-inside-health-care

Ihilchik, R. (2019, February 11). New app for Dementia caregivers launches, with CABHI support. Retrieved from https://www.cabhi.com/blog/new-app-for-Dementia-caregivers-launches-with-cabhi-support/

Insights, L. (2020, March 5). Canadian hospital collaborates with IBM for Health Consent blockchain. Ledger Insights. Retrieved April 19, 2022, from https://www.ledgerinsights.com/health-consent-blockchain-university-health-network-uhn/

Järvenpää, A.-M., Kunttu, I., & Mäntyneva, M. (2020, July). Using foresight to shape future expectations in circular economy smes. Technology Innovation Management Review. Retrieved April 15, 2022, from https://timreview.ca/article/1374

Jennings, K. (2021, March 22). Digital Health Startup Ro raised $500 million at $5 billion valuation. Forbes. Retrieved June 19, 2022, from https://www.forbes.com/sites/katiejennings/2021/03/22/digital-health-startup-ro-raised-500-million-at-5-billion-valuation/?sh=7d26dbc462f5

Johnson & Johnson. (n.d.). The Growing Importance of More Sustainable Products in the Global Health Care Industry. Johnson & Johnson. Retrieved December 20, 2022, from https://www.jnj.com/_document?id=00000159-6a81-dba3-afdb-7aeba25f0000

Katz, B. (2019, October 28). Council post: Wellness co-living: The Three trends driving the rise of our industry. Forbes. Retrieved February 19, 2022, from https://www.forbes.com/sites/forbesrealestatecouncil/2019/10/28/wellness-co-living-the-three-trends-driving-the-rise-of-our-industry/?sh=44cd738946bd

Keer, K. (2022, April 30). Why misinformation thrives on social media. missINFORMED. Retrieved December 19, 2022, from https://www.missinformed.ca/post/why-misinformation-thrives-on-social-media

Kimpen, J., & Osnabrugge, R. (2020, June 30). Moving towards value-based care: Will covid-19 accelerate or slow down transformation? Philips. Retrieved April 19, 2022, from https://www.philips.com/a-w/about/news/archive/blogs/innovation-matters/2020/20200630-moving-towards-value-based-care-will-covid-19-accelerate-or-slow-down-transformation.html

Kuehn, B. M. (2019, January 29). Hospitals Turn to Community Partnerships to Improve Health Equity. Retrieved January 1, 2023, from https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.118.038905

Leslie, M., Gray, R. P., Eales, J., Fast, J., Magnaye, A., & Khayatzadeh-Mahani, A. (2020, February 27). The care capacity goals of family carers and the role of technology in achieving them. Retrieved from https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-020-1455-x

Lindberg, O. (2020, December 31). Why UX design in healthcare is too often overlooked. Shaping Design Blog. Retrieved March 13, 2022, from https://www.editorx.com/shaping-design/article/healthcare-ux-design

Lee, D. (2021, September 14). The Next Big Tech Battle: Amazon's bet on healthcare begins to take shape. Financial Times. Retrieved January 22, 2022, from https://www.ft.com/content/fa7ff4c3-4694-4409-9ca6-bfadf3a53a62

Lehr, T., Lorenz, U., Willert, M., & Rohrbeck, R. (2017, July 14). Scenario-based strategizing: Advancing the applicability in strategists' teams. Technological Forecasting and Social Change. Retrieved May 15, 2022, from https://www.sciencedirect.com/science/article/pii/S004016251730848X

Levinson, A. J., Ayers, S., Butler, L., Papaioannou, A., Marr, S., & Sztramko, R. (2020, October 2). Barriers and facilitators to implementing web-based Dementia Caregiver Education from the clinician's perspective: Qualitative Study. JMIR Aging. Retrieved March 19, 2022, from https://aging.jmir.org/2020/2/e21264/

Licholai, G. P., & Feuerstein, S. (2021, August 13). The expanding role of Digital Therapeutics in Mental Health. Psychiatric Times. Retrieved February 7, 2022, from https://www.psychiatrictimes.com/view/the-expanding-role-of-digital-therapeutics-in-mental-health

Lindeman, D. A., Kim, K. K., Gladstone, C., & Apesoa-Varano, E. C. (2020, February 14). Technology and Caregiving: Emerging Interventions and Directions for Research. Retrieved from https://academic.oup.com/gerontologist/article/60/Supplement_1/S41/5735605

Maloy, A. F., & Vynck, G. D. (2021, November 22). How wellness influencers are fueling the anti-vaccine movement. The Washington Post. Retrieved February 7, 2023, from https://www.washingtonpost.com/technology/2021/09/12/wellness-influencers-vaccine-misinformation/

Mastrolonardo, R. (2016, September 28). How doctors are prescribing VR to help patients cope with real life. ZDNET. Retrieved February 7, 2022, from https://www.zdnet.com/article/how-doctors-are-prescribing-vr-to-help-patients-cope-with-real-life/

Mayo Clinic Staff. (2022, June 18). Managing your health in the age of wi-fi. Mayo Clinic. Retrieved March 27, 2023, from https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878

McCord, M. (2021, March 1). People were asked about communal living – this is what they say is the biggest benefit. WeForum. Retrieved April 7, 2022, from https://www.weforum.org/agenda/2021/03/co-living-communal-mental-health/

McKinlay, S. N. (2020, June 25). Data democratization: The unsung hero of health equity. Health Leads. Retrieved April 19, 2022, from https://healthleadsusa.org/communications-center/blog/data-democratization-the-unsung-hero-of-health-equity/

Merck Manuals. (2022, November 7). Doctors and patients must tackle medical misinformation online. Merck Manuals Consumer Version. Retrieved December 12, 2022, from https://www.merckmanuals.com/en-ca/home/news/editorial/2022/11/07/04/04/medical-misinformation

Miliard, M. (2018, December 11). As blockchain proves its worth for healthcare, regulatory questions remain. Healthcare IT News. Retrieved February 3, 2022, from https://www.healthcareitnews.com/news/blockchain-proves-its-worth-healthcare-regulatory-questions-remain

Mohide, E. A., Pringle, D. M., Streiner, D. L., Gilbert, J. R., Muir, G., & Tew, M. (2015, April 27). A Randomized Trial of Family Caregiver Support in the Home Management of Dementia. Retrieved from https://agsjournals.onlinelibrary.wiley.com/doi/abs/10.1111/j.1532-5415.1990.tb03544.x

Morey, J. (2021, October 5). Council post: The future of blockchain in Healthcare. Forbes. Retrieved February 7, 2022, from https://www.forbes.com/sites/forbestechcouncil/2021/10/25/the-future-of-blockchain-in-healthcare/?sh=1e608f82541f

Moukheiber, Z. (2019, May 22). Mental Health Awareness is on the rise, but access to professionals remains dismal. Forbes. Retrieved April 19, 2022, from https://www.forbes.com/sites/zinamoukheiber/2019/05/22/mental-health-awareness-is-on-the-rise-but-access-to-professionals-remains-dismal/?sh=457661e67ba5

News Wire. (2021, April 27). National survey shows Canadians overwhelmingly want to age at home; just one-quarter of seniors expect to do so. Cision Canada. Retrieved April 22, 2022, from https://www.newswire.ca/news-releases/national-survey-shows-canadians-overwhelmingly-want-to-age-at-home-just-one-quarter-of-seniors-expect-to-do-so-842023628.html

Ohlheiser, A. (2020, April 26). Doctors are now social-media influencers. They aren't all ready for it. MIT Technology Review. Retrieved April 19, 2022, from https://www.technologyreview.com/2020/04/26/1000602/covid-coronavirus-doctors-tiktok-youtube-misinformation-pandemic/

Olesch, A. (2018, December 17). Technology is destiny. about Digital Health. Retrieved December 19, 2022, from https://aboutdigitalhealth.com/2018/08/13/technology-is-destiny/

Olesch, A. (2021, May 24). 9 trends for 2021. about Digital Health. Retrieved March 22, 2022, from https://aboutdigitalhealth.com/2021/01/06/9-trends-for-2021/

Olsen, R. (2021, January 14). At the height of Digital Wellness, are we missing the human touch? MedCity News. Retrieved April 22, 2022, from https://medcitynews.com/2021/01/at-the-height-of-digital-wellness-are-we-missing-the-human-touch/

Ontario Expanding Mental Health Services for Children and Youth in Every Corner of the Province. Ontario newsroom. (2023, January 25). Retrieved February 19, 2023, from https://news.ontario.ca/en/release/1002662/ontario-expanding-mental-health-services-for-children-and-youth-in-every-corner-of-the-province

Ontario Investing $1 Billion More to Expand Home Care. Ontario newsroom. (2022, April 25). Retrieved January 28, 2023, from https://news.ontario.ca/en/release/1002107/ontario-investing-1-billion-more-to-expand-home-care

Ontario Investing An Additional $100 Million This Year in Home and Community Care. Ontario newsroom. (206AD, July 19). Retrieved April 2, 2022, from https://news.ontario.ca/en/release/41145/ontario-investing-an-additional-100-million-this-year-in-home-and-community-care

Open data. Public Health Ontario. (n.d.). Retrieved April 19, 2022, from https://www.publichealthontario.ca/en/data-and-analysis/using-data/open-data

Ozcan, P., & Dinckol, D. (2022, August 8). How big tech is breaking into the healthcare sector. Saïd Business School. Retrieved December 19, 2022, from https://www.sbs.ox.ac.uk/oxford-answers/how-big-tech-breaking-healthcare-sector

Padmanabhan, P. (2019, November 21). How human-centered design is driving Digital Health. CIO. Retrieved April 22, 2022, from https://www.cio.com/article/215769/how-human-centered-design-is-driving-digital-health.html

Palmer, D. (2016, March 3). Blockchain startup to secure 1 million e-health records in Estonia. CoinDesk. Retrieved January 3, 2023, from https://www.coindesk.com/markets/2016/03/03/blockchain-startup-to-secure-1-million-e-health-records-in-estonia/

Parra-Arnau, J. (2017, October 6). Optimized, direct sale of privacy in personal data marketplaces. Information Sciences. Retrieved April 9, 2023, from https://www.sciencedirect.com/science/article/abs/pii/S0020025517310022

Pennic, F. (2021, February 16). 30 executives share top healthcare predictions & trends to watch in 2021. Healthcare IT News. Retrieved March 27, 2022, from https://hitconsultant.net/2020/12/30/executives-healthcare-predictions-trends-2021/

Pennic, J. (2020, August 31). New Voice-based app enables Behavioral Health Measurement Anytime, anywhere. Healthcare IT News. Retrieved March 5, 2022, from https://hitconsultant.net/2020/08/31/new-voice-based-app-enables-behavioral-health-measurement/

Persson, M., Redmalm, D., & Iversen, C. (2021, January 29). Caregivers' use of robots and their effect on work environment – a scoping review. Taylor & Francis. Retrieved April 2, 2023, from https://www.tandfonline.com/doi/full/10.1080/15228835.2021.2000554

Philips, R. (2021, August 16). Philips spotlights smart diagnostic and treatment solutions driving clinical confidence and workflow efficiency at ESC 2021. Philips. Retrieved April 19, 2023, from https://www.philips.com/a-w/about/news/archive/standard/news/press/2021/20210826-philips-spotlights-smart-diagnostic-and-treatment-solutions-driving-clinical-confidence-and-workflow-efficiency-at-esc-2021.html

Philips, R. (2022, March 11). Philips collaboration live integrated tele-ultrasound expands FDA 510(k) clearance for remote diagnostic use to additional mobile platforms. GlobeNewswire News Room. Retrieved April 19, 2022, from https://www.globenewswire.com/en/news-release/2022/03/11/2401583/0/en/Philips-Collaboration-Live-integrated-tele-ultrasound-expands-FDA-510-k-clearance-for-remote-diagnostic-use-to-additional-mobile-platforms.html

Philips. (2021, August 6). Three reasons why healthcare providers are moving to the cloud. Philips. Retrieved April 2, 2022, from https://www.philips.com/a-w/about/news/archive/blogs/innovation-matters/2021/20210803-three-reasons-why-healthcare-providers-are-moving-to-the-cloud.html

Philips. (2022, January 9). 10 Healthcare Technology Trends for 2022. Philips. Retrieved March 27, 2022, from https://www.philips.com/a-w/about/news/archive/features/2022/20220120-10-healthcare-technology-trends-for-2022.html

Ploeg Professor, J., & Markle-Reid, M. (2019, December 12). Stressed and exhausted caregivers need better support. Retrieved from https://theconversation.com/stressed-and-exhausted-caregivers-need-better-support-92340

Program to improve Canadians' Digital Health Experience. Canadian Healthcare Technology. (2020, October 20). Retrieved April 19, 2022, from https://www.canhealth.com/2021/10/20/program-to-improve-canadians-digital-health-experience/

Public Health Agency Of Canada. (2020, June). A Dementia Strategy For Canada. Alzheimer Society. Retrieved February 2, 2022, from https://alzheimer.ca/sites/default/files/documents/PHAC-A-dementia-strategy-for-Canada-2020-annual-report.pdf

Public health work with community partners. Lambton Public Health. (2022, November 18). Retrieved February 19, 2023, from https://lambtonpublichealth.ca/about/community-partners/

Rachini , M. (2022, October 13). How the working for workers act could empower employees in Ontario | CBC Radio. CBCnews. Retrieved February 25, 2023, from https://www.cbc.ca/radio/thecurrent/how-the-working-for-workers-act-could-empower-employees-in-ontario-1.6614498

Rahman, A., Hossain, M. S., Muhammad, G., Kundu, D., Debnath, T., Rahman, M., Khan, M. S. I., Tiwari, P., & Band, S. S. (2022, August 17). Federated learning-based AI approaches in Smart Healthcare: Concepts, taxonomies, challenges and open issues. Cluster computing. Retrieved March 27, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9385101/

Rhydderch, A. (2017, June). Scenario building: The 2x2 matrix technique - researchgate. Retrieved September 6, 2022, from https://www.researchgate.net/profile/Alun-Rhydderch/publication/331564544_Scenario_Building_The_2x2_Matrix_Technique/links/5c80fc83458515831f8b5508/Scenario-Building-The-2x2-Matrix-Technique.pdf

Rhydderch, A. (n.d.). Scenario Building: The 2x2 Matrix Technique. The Prospective and Strategic Foresight Toolbox.

Rijmenam, M. van. (2019, July 5). How blockchain will give consumers ownership of their data. Medium. Retrieved April 14, 2022, from https://markvanrijmenam.medium.com/how-blockchain-will-give-consumers-ownership-of-their-data-3e90020107e6

Ross, C. (2022, October 6). Call it data liberation day: Patients can now access all their health records digitally. Retrieved April 19, 2022, from https://www.statnews.com/2022/10/06/health-data-information-blocking-records/

Rottenberg, S., & Williams, A. (2021, June 15). Web-based delivery of the caregiving essentials course for informal caregivers of older adults in ontario: Mixed methods evaluation study. JMIR Aging. Retrieved April 14, 2022, from https://aging.jmir.org/2021/2/e25671/

Royal Philips. (2018, June 27). Philips and Jackson Health System Sign Groundbreaking 11-year agreement for Enterprise Monitoring as a Service. PR Newswire. Retrieved March 11, 2022, from https://www.prnewswire.com/news-releases/philips-and-jackson-health-system-sign-groundbreaking-11-year-agreement-for-enterprise-monitoring-as-a-service-300672852.html

Rutherford, J., & McNamara, H. (2022, March 17). The impact of 5G on advancements in health sciences. Blogs.oracle.com. Retrieved April 19, 2022, from https://blogs.oracle.com/oracle-communications/post/the-impact-of-5g-on-advancements-in-health-sciences

Smith, R. (2021, July 28). Richard Smith: The role of digital health in keeping health systems financially, socially, and environmentally sustainable. The BMJ. Retrieved April 19, 2022, from https://blogs.bmj.com/bmj/2021/07/28/richard-smith-the-role-of-digital-health-in-keeping-health-systems-financially-socially-and-environmentally-sustainable/

Sohail, S. H. (2023, January 1). Digital Health funding reaches $15.3B in 2022 across 572 deals, Rock Health Reports. HIT Consultant. Retrieved February 19, 2023, from https://hitconsultant.net/2023/01/10/digital-health-funding-reaches-15-3b-in-2022/

Soong, A., Au, S. T., Kyaw, B. M., Theng, Y. L., & Car, L. T. (2020, February 14). Information needs and information seeking behaviour of people with dementia and their non-professional caregivers: A scoping review - BMC Geriatrics. BioMed Central. Retrieved March 26, 2022, from https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-020-1454-y

Sriram, V., Jenkinson, C., & Peters, M. (2019, June 14). Informal carers' experience of assistive technology use in dementia care at home: A systematic review - BMC Geriatrics. BioMed Central. Retrieved March 13, 2022, from https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-019-1169-0

Stone, M. (2021, September 17). How Estonia created trust in its digital-forward government. Security Intelligence. Retrieved April 19, 2022, from https://securityintelligence.com/articles/estonia-trust-digital-government/

Straits Research. (2022, August 16). Big Data in healthcare market size is projected to reach USD 105.73 billion by 2030, growing at a CAGR of 13.85%: Straits research. GlobeNewswire News Room. Retrieved December 19, 2022, from https://www.globenewswire.com/en/news-release/2022/08/16/2499473/0/en/Big-Data-in-Healthcare-Market-Size-is-projected-to-reach-USD-105-73-Billion-by-2030-growing-at-a-CAGR-of-13-85-Straits-Research.html

Strand, M., Eng, L. S., & Gammon, D. (2020, May 29). Combining online and offline peer support groups in Community Mental Health Care Settings: A qualitative study of service users' experiences - international journal of mental health systems. BioMed Central. Retrieved March 27, 2023, from https://ijmhs.biomedcentral.com/articles/10.1186/s13033-020-00370-x

Stuart, H. (2016, May 10). Reducing the stigma of mental illness. Global mental health (Cambridge, England). Retrieved April 7, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5314742/

Sun, Y., Zhang, J., Xiong, Y., & Zhu, G. (2014, July 16). Data Security and privacy in cloud computing. Retrieved April 19, 2022, from https://journals.sagepub.com/doi/full/10.1155/2014/190903

Sztramko, R., Levinson, A. J., Wurster, A. E., Jezrawi, R., Sivapathasundaram, B., Papaioannou, A., Cowan, D., Onge, J. S., Marr, S., Patterson, C., Woo, T., Mosca, L., & Lokker, C. (2022, March 16). Online educational tools for caregivers of people with dementia: A scoping literature review. Canadian Geriatrics Journal. Retrieved April 18, 2022, from https://cgjonline.ca/index.php/cgj/article/view/506

Teichmann, K., Scholl-Grissemann, U., & Stokburger-Sauer, N. E. (2022, February 15). The power of Codesign to bond customers to products and ... - sage journals. https://journals.sagepub.com/doi/abs/10.1016/j.intmar.2016.03.006?journalCode=jnma. Retrieved April 9, 2023, from https://journals.sagepub.com/doi/abs/10.1016/j.intmar.2016.03.006

The Ministry of Health and Long-Term Care, Ontario. (2016, September). Developing Ontario's Dementia Strategy: A Discussion Paper. Retrieved from https://files.ontario.ca/developing_ontarios_Dementia_strategy_-_a_discussion_paper_2016-09-21.pdf

Thompson, M. (2021, August 10). The environmental impacts of digital health. Retrieved April 18, 2022, from https://journals.sagepub.com/doi/full/10.1177/20552076211033421

Torous, J., & Rodriguez-Villa, E. (2021, August 30). Should your company provide mental health apps to employees?Harvard Business Review. Retrieved April 19, 2022, from https://hbr.org/2021/07/should-your-company-provide-mental-health-apps-to-employees

Webb, A. (2021, January 20). How to do strategic planning like a futurist. Harvard Business Review. Retrieved February 1, 2023, from https://hbr.org/2019/07/how-to-do-strategic-planning-like-a-futurist

Westerlund, M., Isabelle, D. A., & Leminen, S. (2021, March). The acceptance of digital surveillance in an age of big data. Technology Innovation Management Review. Retrieved April 19, 2022, from https://timreview.ca/article/1427

What is co-design? Design for Europe. (2011). Retrieved April 23, 2023, from https://designforeurope.eu/what-co-design/

White, C. L., Overbaugh, K. J., Pickering, C. E., Piernik-Yoder, B., James, D., Patel, D. I., Cleveland, J. (2018, January 22). Advancing Care for Family Caregivers of persons with Dementia through caregiver and community partnerships. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5776762/

Wilkinson, L. (1995, November 1). How to build scenarios. Wired. Retrieved March 2, 2022, from https://www.wired.com/1995/11/how-to-build-scenarios/

World Health Organization. (2022, September 1). Infodemics and misinformation negatively affect people's health behaviours, new who review finds. World Health Organization. Retrieved December 22, 2022, from https://www.who.int/europe/news/item/01-09-2022-infodemics-and-misinformation-negatively-affect-people-s-health-behaviours--new-who-review-finds

Woudenberg, M., & Unis, C. J. (2023, January 29). Systems thinking. Polymathic Being. Retrieved April 23, 2023, from https://polymathicbeing.substack.com/p/systems-thinking

Wright, T. (2023, February 10). Ottawa wants health data reform. how will this help Solve Canada's health crisis? Global News. Retrieved February 22, 2023, from https://globalnews.ca/news/9475485/canada-health-care-data-reform/

Young, W. (2016, June 20). The voice search explosion and how it will change local search. Search Engine Land. Retrieved April 10, 2022, from https://searchengineland.com/voice-search-explosion-will-change-local-search-251776

# 12. Appendix A - Interview Guide

This study has been reviewed and received ethics clearance through the Research Ethics Board at OCAD University, the file number of this study is [2022-08]. Participation in this study was voluntary and participants were not provided any compensation for participating in this study.

## Interview Discussion Guide

Exploring future models of eHealth interventions to support informal dementia caregivers in Ontario (guide for healthcare experts)

### DISCOVERY QUESTIONS

**4-5 minutes**

- What is your name and in what capacity do you currently work?
- What is your understanding of the overall experience of online resource navigation by informal dementia caregivers?
- Can you tell us about some eHealth solutions for informal dementia caregivers that you've worked with in the past?

### UNDERSTANDING LANDSCAPE & EXTERNAL FACTORS

**10 minutes**

- Can you give an overview of resources and processes involved in developing an eHealth solution? (expertise, people, technology, compliance, logistics).
- What impact do government policies, compliance, and actions have on organizations providing and building these services? (positive, negative, enablers, regulatory, etc)
- What sort of economic and logistical concerns

must solution providers prepare for and how can they do so? (interoperability, internet use, communication, implementation, monetary)

- In your opinion, what are some of the biggest concerns for users of these solutions? (data privacy, accessibility, geographic location, diversity in digital literacy, languages, hardware, internet requirements, any other ethical concerns)

- Could you tell me about any government initiatives that you know of which are underway to improve support for family/friends caregivers?

## UNDERSTANDING ORGANIZATIONAL CAPACITY AND STRUCTURES

**7-8 minutes**

- Which organizational capabilities are critical in development of effective and meaningful eHealth interventions? (team structures, learning and iterations process, implementation models, marketing)

- What are some operational challenges these organizations face and what kind of support do they seek? (health experts, developers, healthcare providers, funding, research, user testing, technology, etc)

- How and what kind of support programs and services aid the development of these solutions (government and private)

- To ensure success, how can these organizations be more strategic in their approach (outreach, user testing, partnerships, success measurement, research, stakeholder management)

## EXPLORING FUTURES & OPPORTUNITIES

**7-8 minutes**

- What key influences/trends might impact factors affecting organizations in this sector? (trusted/secure technology, regulatory frameworks, logistical concerns | user concerns/attitudes/behaviours)

- What might an ideal solution/program look like and what challenges do you foresee in implementing that?

- How can support for service providers be enhanced to improve caregivers' experience? (people, policies, technology, regulatory processes, scaling, implementation, funding)

- What sort of implementation models do you think can be successful and in what setting? (Public, private or partnership | in a hospital, at home, clinic, community space, virtual via internet, combination of any)

## CLOSING

**2-3 minutes**

- Is there anything else you would like to add? (suggestions/advice for service providers, systemic/ procedural improvements)

- Any questions you would to ask me about the project

# Interview Discussion Guide

Exploring future models of eHealth interventions to support informal dementia caregivers in Ontario (guide for informal caregivers)

## DISCOVERY QUESTIONS

**4-5 minutes**

- What is your name?
- Can you please describe your role in caring for a person with dementia? (Who are you caring for? What is your routine like? Any additional family members who help?)
- What kind of resources do you seek to support your care needs?
- How do you currently find that information online? (names and types of app/website/software OR do you rely on a person in the healthcare or social system for this)

## UNDERSTANDING NEEDS & PAIN POINTS

**5-7 minutes**

- How well do you know how to find knowledge resources online and what services are available to you?
- What are some challenges you face when trying to find information online and how do you overcome those?
- What do you feel about the knowledge resources that are available online?
- How would you describe your overall experience of navigating resources online to be like? (satisfied, confusing, time taking, tough, easy, helpful)

## EVENT RECALLING

**4 minutes**

- Can you walk me through a time/situation where you had to look for caregiving support resources and how did you go about doing that?

## CONCERNS

**5-7 minutes**

- What are some of your biggest concerns with using eHealth solutions requiring the use of the internet?
- In the knowledge that these solutions will satisfy your needs, what will stop you from using them?
- How willing and concerned would you be in sharing your personal data if it would help you make better recommendations?

## EXPLORING OPPORTUNITIES

**7-8 minutes**

- What could have improved your experience of online navigation of services and programs?
- Can you think of any challenges in implementing an eHealth solution that can support caregivers in finding knowledge resources?

- How would you feel about using a web service that is customized to your specific needs but requires the collection of your personal information to do so? Have you come across similar solutions anywhere else?

- Would you like to suggest services or improvements that could make it easier for caregivers to navigate services and programs?

- In what setting receiving this support would be more helpful for you? (in a hospital, at home, clinic, community space, virtual via internet, combination of any)

## CLOSING

**2-3 minutes**

- Do you have any additional suggestions or anything you would like to add which I may not have asked? (processes/systems that can be improved making it easier to meet the needs of informal dementia caregivers)

- Any questions you would like to ask me about the project?

# Interview Discussion Guide

Exploring future models of eHealth interventions to support informal dementia caregivers in Ontario (guide for eHealth solution providers)

## DISCOVERY QUESTIONS

**4-5 minutes**

- What is your name and what is the solution you are currently working on?

- What inspired you to work in this area and how did this idea come about?

- Can you describe the challenges faced by informal dementia caregivers in navigating online resources and how you learned about them? (caregiver journey and needs)

## UNDERSTANDING LANDSCAPE & EXTERNAL FACTORS

**10 minutes**

- Can you give an overview of resources and processes involved in developing your solution? (expertise, people, technology, compliance, logistics)

- When complying with government policies and requirements, how would you describe your experience? (challenging, easy to navigate, well laid out, time consuming)

- What sort of economic and logistical concerns did you face and what support did you seek? (interoperability between healthcare systems, internet use, communication, implementation, monetary)

- What are some of the biggest user concerns and how did you address them? (data privacy, accessibility, geographic location, diversity in digital literacy, languages, hardware, internet requirements, any other ethical concerns)

- Are you aware of any other private or government initiatives that are underway to improve support for family/ friends caregivers? What is missing in those services? (may be your competitors)

## UNDERSTANDING ORGANIZATIONAL CAPACITY AND STRUCTURES

**7-8 minutes**

- Which internal capabilities are critical in development of effective and meaningful eHealth interventions? (team structures, learning and iterations process, implementation models, marketing)

- What will you say are some operational challenges you faced and how did you manage those? (no evidence, no implementation—no implementation, no evidence" paradox, health experts, user testing, developers, funding, research, technology, etc)

- Can you identify some support programs and services that aided the development of your solutions (government and private)

- To ensure success, how would you say you have been strategic in your approach to design and deliver your solution (outreach, partnerships, success measurement, research, stakeholder management)

## EXPLORING OPPORTUNITIES

**7-8 minutes**

- What key influences/trends might impact factors that affect the working of your organization? (trusted/ secure technology, regulatory frameworks, logistical concerns | user concerns/attitudes/behaviours)

- Enhancing what type of support will enable you to build better solutions that will improve caregivers' experience? (people, policies, research, technology, regulatory processes, scaling, implementation, funding, technology)

- Are there any challenges in your sector that you foresee and how would you be prepared for them?

- What implementation models have worked for you and what is the most ideal setting according to you? (private or partnership | in a hospital, at home, clinic, community space, virtual via internet, combination of any)

## CLOSING

- Is there anything else you would like to add? (suggestions/advice for systemic/procedural improvements or support for service providers)

- Any questions you would to ask me about the project?

# End of Report