Connected Strategy in the Healthcare Industry

Case studies on innovation and connectivity in chronic disease management

By Haley Fitzpatrick
Supervised by Nicolaj Siggelkow and Christian Terwiesch

WHARTON
UNIVERSITY *of* PENNSYLVANIA

William *and* Phyllis
MACK INSTITUTE
for INNOVATION MANAGEMENT

DECEMBER
2021

Connected Strategy in the Healthcare Industry

Case studies on innovation and connectivity in chronic disease management

By Haley Fitzpatrick

Supervised by Nicolaj Siggelkow and Christian Terwiesch

Contents

Introduction

In recent decades, technological advancements have dramatically changed the way in which many industries and companies deliver products/services and engage with customers. However, one exception to this rapid technological transformation is healthcare, particularly as it relates to the way in which patients receive care. For a multitude of reasons, many healthcare organizations have been slow to adopt patient-facing technologies that could disrupt and improve the way in which patients manage their health and illnesses.[1] Despite the immense benefit the healthcare industry would realize if it embraced technology and connected strategies, it remains dominated by primarily episodic, inefficient, in-person interactions between patients and providers. While patient care has been slow to transform, there has been more traction in recent years given a number of key catalysts for innovation.

As of 2019, digital health represented a global market of approximately $350 billion with companies focused on patient wellness, disease prevention, and care-delivery, representing roughly 50% of this market and these sectors are expected to grow by at least 10% annually through 2024.[2]

As the industry evolves, it is important to analyze and understand the successes and failures of companies deploying connected strategies in patient care to gather insights and learnings that can be applied to future digital health companies. To gain a better understanding of the approaches and conditions that can impact the success of connected strategies in patient wellness and care delivery, this paper analyzes notable examples of digital health companies focused on the management of chronic conditions. Chronic disease management is particularly relevant to the connected strategy framework because it has the potential for significant improvements in patient outcomes while lowering the overall cost of care through a connected delivery model that involves continuous, low friction relationships between providers and patients. To more effectively analyze this space in detail, this paper primarily focuses on one therapeutic area within chronic disease management for which there are ample examples of digital health companies trying to employ connected strategies: Type II diabetes. This paper assesses the connected strategies of multiple digital health companies that use remote monitoring tools and interactive treatment plans to help patients manage their chronic diseases, specifically focusing on Type II diabetes. Additionally, this analysis contrasts the successes of

---

1   https://www.healthaffairs.org/do/10.1377/hblog20190301.476734/full/

2   https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/healthtech-in-the-fast-lane-what-is-fueling-investor-excitement

diabetes-focused platforms with a brief assessment of the challenges faced by digital health companies dedicated to the mental health space, which is another therapeutic area poised for transformation in terms of care delivery through a connected model. For more information on the general framework underlying this analysis, the reader may refer to Connected Strategy (Siggelkow & Terwiesch, 2019, HBR Press) and related material available on **connected-strategy.com**. ■

1. Digital Health Connected Companies in Chronic Disease Management

For context, chronic diseases are defined broadly as conditions that last one year or more and require ongoing medical management, which often involves an integrated care approach including screenings, check-ups, patient monitoring, coordinating treatment, and patient education.[3,4] Chronic diseases such as diabetes and heart disease are on the rise in the US and have become the leading causes of death and disability as well as one of the primary factors contributing to the country's $3.8 trillion in annual healthcare spend.[3] Given that current methods to manage chronic diseases are failing as evidenced by their increasing costs and prevalence, many digital health companies have emerged in recent years with the goal of revolutionizing chronic disease management by employing connected strategies: fundamentally changing the relationship between patients and companies that serve as care providers through continuous, tech-enabled, and data-driven interactions.

The catalysts for the rise in digital health companies focused on chronic disease management space stem from a few key macro-level trends. First, there have been significant improvements in healthcare technologies like wearables, sensors, and connected medical devices that allow for remote patient monitoring and better insights into everyday patient behaviors that could be affecting care. Second, there is an increasing focus on improving the efficiency frontier of healthcare, more specifically increasing the gap between WTP for healthcare (quality and access) and the cost of delivering care. In terms of quality, there is a growing shift in the medical community mindset that in order to improve patient outcomes more effectively, our healthcare system needs to prioritize preventative health services and focus more on the social determinants of health (conditions that are a product of an individual's living environment that can impact health such as access to nutritious foods and safe housing).[5,6] There is recent recognition that only addressing acute medical needs in our healthcare system is not sustainable and there is a pressing need to maintain the wellness of individuals in everyday life to prevent or reverse life-threatening conditions such as diabetes. In terms of cost, it is well-known that the US spends more on healthcare than any other developed country and there is

---

3   https://www.cdc.gov/chronicdisease/about/index.htm

4   https://www.healthcare.gov/glossary/chronic-disease-management/

5   https://health.gov/healthypeople/objectives-and-data/browse-objectives/preventive-care

6   https://health.gov/healthypeople/objectives-and-data/social-determinants-health

growing political pressure to find ways to manage these growing care costs, ultimately encouraging the development of companies that can succeed in delivering value-based care (better patient outcomes at lower costs).[7] Finally, in terms of access, there is a shortage of healthcare professionals, particularly those dedicated to primary care as well as issues with "medical deserts" throughout the country.[8] Given all of these macro-level trends, there has been a recent boom in technology-enabled, chronic-disease-focused digital health companies that are trying to disrupt traditional models of care and fill current gaps.

These digital health start-ups employ connected strategies to enable more frequent and efficient touchpoints with patients that have ongoing conditions and need scalable, on-demand medical support/management on an everyday basis—essentially a solution to "the iron triangle." As noted above, one chronic disease area in particular that has seen the introduction of some successful digital health companies is Type II diabetes. Diabetes is the focus of many chronic disease digital health start-ups for a couple reasons. First, this is a very large problem with 1 in 10 Americans having diagnosed Type II diabetes, despite being a completely preventable and reversible condition. Second, this condition requires many changes in patient behavior to keep the disease under control, which can be extremely difficult for many individuals. Therefore, diabetes management could benefit from more touchpoints with providers and monitoring of patient actions/ progress each day to identify places for improvement. It follows that technology could be easily applied here in the form of wearables, sensors, and other smart devices to help fulfill this need for continuous care, monitoring, and behavior refinement. Today, there are a number of successful digital health companies in diabetes showing improvements in clinical outcomes, seeing meaningful patient engagement/retention, and gaining acceptance from key healthcare stakeholders such as insurers.

The types of connected activities that chronic disease management companies, particularly for diabetes, employ include: integration of health-focused, smart technologies into patient daily lives; continuous collection, aggregation, and analysis of patient health data by providers; on-demand access to virtual medical care teams; personalized disease management content and educational resources; and behavior coaching (by professionals and peer support networks). Companies in this space combine a number of these connected activities to create a portfolio of care services, ultimately increasing willingness-to-pay (WTP) either from the patient and/or the patient's insurer as well as

---

7 https://www.commonwealthfund.org/publications/issue-briefs/2020/jan/us-health-care-global-perspective-2019

8 https://www.aamc.org/news-insights/us-physician-shortage-growing

improving the efficiency of providing care. It is important to note that driving WTP for both patients and insurers is critical for digital health companies employing connected strategies, given that our current healthcare system has shaped the understanding of patients that care is either covered by insurance or avoided due to the additional out-of-pocket costs. As will be discussed later in the company case studies, digital health companies that focus on a direct-to-consumer revenue model can face adoption challenges and really need to demonstrate the value to consumers to justify the costs or target insurers to provide coverage and reimbursement for services.

Overall, digital health start-ups in chronic disease management have the opportunity to build a robust connected strategy that allows them to capture value by driving consumer WTP and improving the efficiency of providing care. While there have been notable successes of connected strategies in diabetes, these companies had to evolve their service offerings, revenue model, and patient targets over time to gain traction in the market. The case studies featured in this paper will demonstrate the evolution of these diabetes companies over time to reach key metrics of success and later contrast these gradual successes with some of the failures faced by companies in the mental health space. Ultimately, this analysis will show there is no one-size-fits-all connected strategy approach that guarantees success for digital health companies focused on patient care, but there are some valuable lessons. ■

2. Successes: Type II Diabetes Case Studies

This section of the analysis focuses on case studies examining the connected strategies of three diabetes-focused digital health companies that achieved key indicators of success in the market. Each company takes a slightly different approach to building its connected customer relationship and connection architecture, but all were able to achieve metrics of success in terms of demonstrated improvements in patient clinical outcomes, meaningful customer adoption, and in some instances, acceptance by health insurers through coverage.

OMADA HEALTH

Company Overview & Evolution

Omada Health was founded in San Francisco in 2011 with the original mission of chronic disease prevention, specifically by creating a digital intervention tool aimed at preventing prediabetes patients from becoming fully diabetic.[9] In 2012, the company launched its first product called Prevent, which was the first online diabetes prevention program available directly to consumers and was priced at $120 per month.[10] As the company grew and evolved, it gained more and more funding, which it used to conduct case studies and pilots with health care providers to measure the clinical effectiveness of its programs. However, in its early years, Omada struggled to gain meaningful adoption in the market with its direct-to-consumer model. Over time, the company evolved its customer channels, expanded its target patient populations, and updated its service offerings to match the needs of its new customer segments.

As of 2021, Omada Health has become a digital care company that offers clinically effective digital health programs to allow individuals to lead healthier lives across a number of chronic conditions. The online program is personalized to meet each participant's unique needs with a range of health goals. The company continues to offer its flagship diabetes prevention program, but expanded to offer programs for type 2 diabetes management and hypertension in 2018, followed by behavioral health in 2019 (in which it acquired software and content from another mental health company called Lantern), and finally

---

9 https://medcitynews.com/2020/03/is-an-omada-health-ipo-inevitable/?rf=1

10 https://vator.tv/news/2017-03-21-when-omada-health-was-young-the-early-years

musculoskeletal issues in 2020 (through acquisition of a company called Physera).[11,12,13] In addition to its patient populations evolving, Omada also changed its revenue model and customer channels over time after issues with its B2C model. After failing to gain scale with its B2C approach, Omada decided to become primarily a B2B company and focus on an enterprise revenue model. Now, Omada's revenue mainly comes from self-insured employers, health plans, and health systems that pay for Omada's programs for their patients/employees as a way to improve health outcomes of their covered populations.[14] This B2B approach allowed Omada to gain user scale much more quickly than the B2C model. Additionally, Omada also created an outcomes-based billing model, in which its enterprise customers only have to pay for participants in Omada's programs that actually see improvement in specified outcome metrics such as the percentage of body weight lost.[15] This unique outcomes-based billing model linked to specific clinical data gave Omada a lot of credibility in the market and encouraged more enterprise customers to cover Omada's program.

In terms of its products and services, Omada combines professional health coaching, connected health devices, real-time data and feedback to develop personalized programs for patients.[16] Focusing on its type II diabetes program, Omada first provides patients with a number of smart devices including a connected blood glucose meter, a connected scale, a connected blood pressure cuff, and a continuous glucose monitor sensor.[17] Patients are also paired with a professional health coach who is a Certified Diabetes Educator and attend weekly interactive lessons that focus on personalized educational materials to improve patient health such as nutrition plans.[17] Finally, patients are also able to join peer support networks through the associated mobile app.[17]

Connected Customer Experience

Evaluating the connected strategy of Omada, its diabetes program implements two of the four connected customer experiences, described in Connected Strategy (Siggelkow & Terwiesch, 2019). First, Omada integrates a number of smart devices into the daily lives of its patients and these devices are connected to its app. These connected devices allow Omada to collect personalized data on each patient and provide a Curated Offering as

---

11 https://www.mobihealthnews.com/content/omada-health-expands-digital-platform-type-2-hypertension-programs-new-features

12 https://medcitynews.com/2019/01/omada-health-launches-mental-health-programs-using-shuttered-startups-tech/

13 https://www.fiercehealthcare.com/tech/omada-health-buys-virtual-physical-therapy-provider-physera-for-rumored-30m

14 https://www.fastcompany.com/company/omada-health

15 https://www.mobihealthnews.com/news/north-america/how-digital-therapeutic-company-omada-health-has-taken-cue-life-sciences

16 https://www.omadahealth.com/frequently-asked-questions

17 https://www.omadahealth.com/programs/diabetes

well as an effective Coach Behavior connected customer experience. In terms of curated offerings, the health data collected and analyzed on each patient provides Omada with the information necessary to recommend nutrition/fitness plans and educational materials to lead a healthier life. Furthermore, in terms of coach behavior, Omada matches diabetes patients to professional health coaches to help patients stay on track with their health goals as well as provide data-driven advice in terms of medication management to keep glucose levels in check and weight loss/nutrition based on the data received from the connected devices. This feature involves coach behavior given that it helps drive patient behaviors towards healthier choices by recommending customers take particular actions. Additionally, another feature that employs coach behavior is the peer network matching, in which the app places patients in online groups with other diabetes members within the Omada ecosystem for accountability and support. This feature involves coach behavior given that it helps change patient behaviors towards healthier choices by adding another level of accountability and outlet for advice/recommendations for success. The combination of these connected activities allows Omada to provide efficient, cost-effective care compared to traditional models that would involve only a few episodic interactions between a diabetes patient and provider, in which the provider would have little insight into patient behaviors and there would be no gradual improvements through coaching over time.

Connection Architecture

Omada's diabetes program employs multiple connection architectures (Siggelkow & Terwiesch, 2019) across their various patient services. First, Omada serves as a Connected Producer because it leverages information from the smart devices associated with its program to send patients relevant educational materials, nutrition guides, and fitness plans that Omada has developed to help patients manage diabetes. Second, Omada serves as a Crowd Orchestrator because it provides a direct link between individual healthcare professionals (Certified Diabetes Educators) and patients, but Omada is not directly involved in creating the content of that service, which is personalized recommendations from the health professionals. Third, Omada serves as a Complementor Peer-to-Peer Network Creator because it matches patients to a network of peers with the same condition, free with enrollment, to supplement the coaching, support, and accountability of the Certified Diabetes Educators and curated program content.

Performance

Through its 10-year history, Omada has adapted its business model and invested heavily in clinical validation of its programs to reach key metrics of success. As noted above, from its founding, Omada invested in running case studies and pilots with health care

providers to measure the clinical value of its programs. Today, Omada has a whole package of scientific data establishing the clinical effectiveness of its programs in helping patients prevent diabetes as well as manage Type II diabetes after diagnosis. Omada has a number of well-regarded, peer-reviewed publications, clinical trials, and case studies that establish its efficacy as a digital therapeutic.[18,19] In 2016, Omada was the first digital health company to receive coverage and reimbursement from the U.S. federal government, the Center for Medicare and Medicaid Services, for its diabetes platform, which is a significant milestone for broad acceptance and credibility of its program in the medical community.[20] This also sets an important precedent for other large health insurers to provide coverage and reimbursement for Omada as well. Additionally, in 2018, the Center for Disease Control and Prevention granted Omada's diabetes management platform full recognition status, which is a critical validation from a regulatory body for its proprietary curriculum.[21] As of 2021, the company is the largest CDC-recognized provider of the National Diabetes Prevention Program. With all of this scientific evidence and regulatory recognition as key evidence of success, Omada has 350,000 enrolled participants and over 1,000 enterprise customers, making it one of the largest diabetes programs in the US.[22] Given that the company is not yet public, it is hard to determine if Omada has reached traditional, financial metrics of success in terms of profitability, but its current path suggests that it may be there or is on its way.

While Omada has reached key milestones of success for its diabetes platform, it is still yet to be determined if it will be able to reach the same level of success in its expanded offerings in hypertension, mental health, and musculoskeletal issues. Instead of expanding into new patient populations, Omada could have considered evolving its connected strategy and investing in automatic execution capabilities to deepen its connected customer experience. As will be explored in later case studies, there are a handful of diabetes platforms with connected strategies that are finding success. Omada needs to keep evolving its connected strategy to maintain its competitive edge and it is currently unclear whether or not Omada will be able to do that as more companies gain traction in this space.

18   https://www.omadahealth.com/en/omada-resources

19   https://www.mobihealthnews.com/content/omada-health-launch-largest-clinical-trial-digital-dpp

20   https://www.mobihealthnews.com/content/medicare-reimburse-diabetes-prevention-program-including-omadas-digital-version

21   https://www.mobihealthnews.com/content/digital-health-news-briefs-5312018

22   https://medcitynews.com/2020/03/is-an-omada-health-ipo-inevitable/

GLOOKO

Company Overview & Evolution

Glooko was founded in 2011 by three technologically experienced founders who had been personally touched by diabetes in a significant way. From its beginnings, Glooko's mission has been to leverage the power of mobile, cloud, and data analytics to help both patients and healthcare professionals better manage diabetes. However, the company has evolved its diabetes platform, service offerings, and revenue model significantly over time to fulfill a unique need in the diabetes space. Glooko started as an electronic glucose logbook that was focused on helping patients track important biomarkers of diabetes over time.[23] In this early version of the product, patients could download blood glucose data from only a handful of compatible blood glucose meters to their mobile phone using a Glooko MeterSync Cable to see a logbook of their levels over time and manually add notes about food intake, medication, and exercise.[23] This was a direct-to-consumer business model that charged patients for downloading its mobile app and the associated cable. With this early version of the product, Glooko had trouble gaining traction and scale with a large customer base. To better meet the needs of this market and gain commercial success, Glooko expanded its service offerings and platform capabilities and evolved its revenue to become B2B, specifically targeting employers, provider clinics, and health systems. Additionally, similar to Omada, Glooko decided to invest in running studies to establish the clinical effectiveness of its programs in helping patients manage blood glucose levels and disease symptoms.[24] As of 2021, Glooko has a portfolio of diabetes software products that target patients as well as provider clinics/health systems.

In terms of its offerings to patients, Glooko is an advanced mobile application that wirelessly syncs data from multiple diabetes devices such as a glucose meter, insulin pump, or continuous glucose monitor (now compatible with ~95% of all diabetes devices) to the mobile app.[25] Patients can also log meals and activity in the app and upload data from popular fitness trackers like Fitbit and Strava.[24] This data can then be automatically sent to a patient's diabetes care team via a provider web app or EHR system.[24] This allows the patient's care team to review actionable charts and graphs to help inform future treatment decisions. The app allows for communication via messaging and telemedicine between patients and healthcare providers. The app also provides patients with educational resources and care programs. Finally, one of Glooko's most recent

---

23 https://www.glooko.com/2015/08/glookos-evolution-from-simple-logbook-to-pump-cgm-integration/

24 https://www.glooko.com/press-release/retrospective-studies-show-glookos-mobile-health-app-helps-improve-outcomes-people-diabetes/

25 https://www.glooko.com/people-with-diabetes/#share-data

product offerings involves an FDA-approved long-acting insulin dosing system, which automatically computes how much insulin a patient should take based on parameters set by the provider as well as the blood glucose data synced to the app.[26] Revenue from this customer channel evolved from a direct-to-consumer model in which patients paid out-of-pocket for the app to a B2B model in which patients are sponsored by their provider, health plan, or employer.

In terms of its offerings to provider clinics and health systems, Glooko created a whole new suite of products to meet the needs of stakeholders who manage large populations of diabetes patients. The company now offers Glooko Enterprise, which allows for patient data integration into EHR systems, population health reports across a group of diabetes patients with risk-stratification, and automatic billing reports for remote patient monitoring. Revenue from this customer channel comes from the provider clinics and health systems as well as pharmaceutical/device manufacturers. The Glooko tools can be provided free of charge to provider clinics or health systems by device or pharmaceutical partners serving as sponsors.[27]

Connected Costumer Experience

Evaluating the connected strategy of Glooko, its diabetes platform fulfills three of the four connected customer experiences. First, Glooko provides a Respond-to-Desire experience with patients in two ways: on-demand communication with healthcare providers via app messaging, and telemedicine and its wireless collection, aggregation, and communication of patient health data to the physician. On-demand access to healthcare providers through its app significantly reduces the friction from the moment a patient needs to ask a provider a question to the moment a patient is able to receive an answer. Similarly, many diabetic patients and their providers would like to see aggregated biomarker data over time to help inform treatment decisions, but without Glooko that is a challenging process. With the Glooko app and wireless data synchronization, diabetes care teams can monitor patient health data in a fast and convenient way. Second, Glooko enables coach behavior through its app because it allows providers to remotely monitor patients and update their medication plan, encourage specific nutrition plans, or recommend workout plans based on the data collected. Finally, Glooko provides a curated offering with its FDA-approved Glooko's Mobile Insulin Dosing System, which automatically computes how much long-acting insulin a patient should take based on the parameters set by the physician in the app and the glucose level data from the patient. Typically,

---

26 https://www.glooko.com/2018/02/glookos-mobile-insulin-dosing-system-mids-fda-cleared/

27 https://support.glooko.com/hc/en-us/articles/115003858609-Glooko-Sponsored-version-of-Population-Tracker

even with input from a provider's treatment plan, insulin requires its patients to do math to determine how much to take. Glooko's dosing system creates personalized recommendations to simplify this process.

Connection Architecture

Glooko's diabetes platform employs multiple connection architectures across their various patient services. First, Glooko is a connected producer because its FDA-approved Mobile Insulin Dosing System provides patients directly with a service for calculating insulin doses over time, and its platform provides both patients and healthcare professionals with health data collection, aggregation, and analysis. Second, Glooko serves as a connected market maker because it creates a direct link between healthcare providers (supplier firms) and patients as well as diabetes devices, but is not directly involved in handling the service, which is personalized recommendations from the health professionals on how to improve their treatment plan.

Performance

As Glooko developed more advanced software and evolved its revenue model, the company was able to scale quickly. Glooko has over 2.2 million patients on its platform and its enterprise solutions are in over 9,000 clinical locations.[28] In addition to a large customer base, Glooko was also recognized with a number of awards from the medical community as well as approval from key regulatory stakeholders. Glooko has nine awards from the healthcare industry for its innovation, high-quality patient management solutions/medical devices, and diabetes applications. Additionally, Glooko's investment in running studies and pilot programs to demonstrate the impact of its diabetes platform on improving patient outcomes and saving insurers and health system care costs paid off given the uptake by customers and approval by the FDA for its core products over time. Given that the company is not yet public, it is hard to determine if Glooko has reached traditional, financial metrics of success in terms of profitability, but Glooko's traction in the market and diversified revenue streams across multiple healthcare stakeholders suggests that it is on its way there.

Similar to Omada, it is still yet to be determined if Glooko will remain successful in the long-term as other competitors strengthen their connected strategies (whether that be other digital health startups, large health systems, or large tech companies like Amazon or Google). In Glooko's current model, there is a notable absence of personalized content in terms of disease education materials, nutrition programs, etc. as well as a lack of connection to peer support communities. If Glooko wants to remain competitive and be

---

28 https://www.glooko.com/press-release/2018-success-growth/

seen as a full-service diabetes platform, the company may want to consider expanding its service offerings to deepen its connected relationships with customers.

VIRTA HEALTH

Company Overview & Evolution

Virta Health was founded in 2014 with the goal of reversing type 2 diabetes in 100 million people by 2025 using a tech-enabled platform focused on nutritional ketosis.[29] Since its early years, Virta has focused on providing diabetes patients with the care support and tools to reverse their condition and gradually stop medication treatment through a tech-enabled platform centered around individualized nutritional ketosis therapy (sustainable carbohydrate restriction).[30] In terms of its service offerings, Virta aims to create a "virtual" diabetes reversal clinic through a mobile phone application. More specifically, patients manually enter key biomarker data into mobile applications such as blood pressure, weight, blood glucose levels (patients are sent glucose meters and a connected scale) and those uploaded metrics are monitored by a supervising physician to provide consultations/recommendations for medication adjustments.[31] Patients are paired with health coaches to provide daily support to patients and answer any questions about the nutritional ketosis diet on-demand through the app.[31] Virta provides patients with access to educational resources and specialized meal plans to help them stay on this specific diet.[31] Additionally, patients are able to join a private patient community for discussion and support.[31]

In terms of revenue, from its founding, Virta has pursued two streams of revenue: direct-to-consumer model and a B2B model focused on self-insured employers and health plans (providing Virta as a covered benefit to employees/patients). The majority of its revenue comes from its B2B channels and a minority comes from patients who pay out-of-pocket (one-time $500 upfront fee and then $370 per month for the first year and $199 per month for subsequent years). Similar to Omada, Virta announced that it would have an outcomes-based billing model for its enterprise clients. In 2018, Virta changed its revenue model so that health plans and employers will pay Virta a fee only if the patient is sufficiently engaged with its program after one month and the second payment comes after a year, only if patients lower their A1C levels by certain metrics.[32]

---

29 https://www.virtahealth.com/about

30 https://www.virtahealth.com/howitworks

31 https://www.statnews.com/2018/11/14/a-startup-for-diabetes-patients-will-only-get-paid-if-the-service-works/

32 https://www.virtahealth.com/blog/rapid-growth-new-executives-customers-industry-validation

Given that it was founded a few years after many of the other major digital health players in diabetes, Virta has only had slight evolutions in terms of its service offerings and revenue models over time, seemingly learning from the lessons of its predecessors. Additionally, like Omada and Glooko, Virta also invested a lot of time and resources into establishing the clinical effectiveness of its nutritional program through rigorous, peer-reviewed research and clinical trials. Within the first year of its founding, Virta initiated a clinical trial and was able to quickly publish its first peer-reviewed manuscript, which demonstrated diabetes reversal in nearly half of its trial population in as little as 10-weeks, in which 87% of patients on insulin either reduced usage or eliminated it altogether.[30] With clinical evidence supporting its program established early-on, Virta was able to gain traction quickly - gaining a lot of publicity from the medical community as well as adoption/coverage of its platform from enterprise customers.

Connected Customer Experience

Evaluating the connected strategy of Virta, its diabetes reversal program employs three of the four connected customer experiences. First, Virta leverages a curated offering by generating tailored meal options for nutritional ketosis as well as specific medication management plans. Second, Virta provides coach behavior by matching each patient with a health coach for 1:1 consultations and daily nudges to encourage patients to stick to the ketogenic diet. Additionally, another feature that employs coach behavior is the private patient online community, which provides Virta patients with another layer of accountability and outlet for advice/recommendations for success. Finally, Virta provides a respond-to-desire experience with its on-demand access to health coaches and supervising physicians if any questions or issues arise, which is a fast and efficient way to gain access to provider services.

Connection Architecture

Virta's virtual diabetes reversal clinic employs multiple connection architectures across their various patient services. First, Virta is a connected producer because it creates educational materials and specialized meal plans for patients to succeed in achieving nutritional ketosis. Second, Virta is a connected market maker because it creates a direct link between healthcare providers (suppliers) and patients, but is not directly involved in handling the service, which is personalized recommendations from the health professionals. Third, Virta serves as a complementor peer-to-peer network creator because it provides an opt-in online patient community, free with enrollment, to supplement the guidance, support, and accountability of the health coaches and curated content.

Performance

Given the relatively young age of the company and the fact that it is not public, Virta provides limited information on its current user base and financial metrics. However, Virta's dedication to publishing many peer-reviewed studies and conducting multiple clinical trials to validate the efficacy of its diabetes reversal program has paid off. Virta's outcomes data has contributed to 300 percent growth in its employer customer base in just 2018 alone. Additionally, Virta should consider ways in which it can use smart devices and technology to deepen its connected customer relationships. Currently, it plays the same roles as Omada in the Connected Strategy Matrix (see Exhibit 1), but does so with much less technology and remains in a very specific niche of nutritional ketosis for diabetes. There is much to be seen in the future regarding the success of Virta, but it appears to have learned some valuable lessons from other well-established diabetes digital health companies, such as its initial revenue model strategy and data-driven approach, to put it on a promising path. ■

3. Challenges: Mental Health Case Studies

To contrast the success of connected strategies for the diabetes-focused platforms noted above, this paper analyzes some recent failures of digital health start-ups in the mental health space. This therapeutic area is a helpful comparison for diabetes because it is also a widespread issue with key macro-trends encouraging innovation, and the condition often requires ongoing actions by patients to overcome it. In terms of the drivers for innovation, according to recent data from the CDC, 30% of U.S. adults are experiencing symptoms of anxiety or depression, which has also been exacerbated by the COVID-19 pandemic.[33] Despite the magnitude of this issue in the US population, there is a shortage of mental health professionals, particularly in certain communities and areas of the country.[34] It follows that technology could be applied here to address this problem in the form of mobile apps that could allow for virtual support from mental health professionals/coaches, software to help patients connect with available mental health providers, or online programs with automated steps to work through challenges. Over the past 5 years, investment in mental health start-ups has been increasing and there have been a number of new companies attempting to tackle this complex issue.[35] However, many of these companies have had trouble gaining a large enough customer base and determining a lasting revenue model. Two examples of mental companies that have faced significant challenges in the past five years are described below:

LANTERN

Lantern was a digital mental health start-up founded in San Francisco in 2013 that provided support and tools to individuals experiencing anxiety, depression, and disordered eating. The service required customers to complete a self-evaluation assessment and then provided daily exercises to help customers pinpoint and restructure negative thoughts via a program on a mobile app.[36] Additionally, the company offered the services of mental health coaches or experienced behavioral change professionals, to help guide patients through the programs. However, in 2018, Lantern shuttered its operations after failing to find a viable revenue model. Interestingly, Omada Health (company profiled above)

---

33 https://www.cdc.gov/nchs/covid19/pulse/mental-health.htm?mc_cid=25b4957f35&mc_eid=0610168c1c

34 https://www.americashealthrankings.org/explore/annual/measure/MHP

35 https://news.crunchbase.com/news/access-to-mental-health-startups-tackle-sectors-complexities-as-investors-go-all-in/

36 https://medcitynews.com/2018/07/lantern-startup/

actually signed a perpetual licensing deal for the software, curriculum, and content of Lantern to expand its own offerings into mental health.

Lantern started with a direct-to-consumer revenue model, charging customers $50 per month for access to the application.[37] However, the company struggled to scale fast enough in order to get sufficient customers to survive. Ultimately, Lantern tried to pivot and focus on self-insured employers followed by traditional health insurers to get its services to be provided as a benefit to employees/patients.[37] However, employers and insurers were skeptical to cover such a service at the time without strong evidence supporting its value. While Lantern did eventually conduct a study demonstrating the cost-effectiveness of its program, it was not started early enough and the results were only released in 2018 after the company had been struggling to stay afloat and had to shutter operations.[38]

JOYABLE

Joyable was founded in 2013 with the goal of being an app-based digital therapy for mental health issues, focusing on anxiety and depression. The company created an online program that leverages key aspects of cognitive behavioral therapy to help individuals manage their mental health conditions through daily activities and exercises.[39] Additionally, Joyable matches individuals with a trained coach, available by phone, text or email.[40] However, roughly three years after its founding, Joyable was struggling to grow its customer base and see any horizon for profits. It was focused on a direct-to-consumer model in which individuals paid $99 per month for the service.[40] In January 2018, Joyable laid off half of its staff and pivoted from its DTC model to an enterprise revenue model focused solely on self-insured employers.[41] It took Joyable some time to adapt and start winning the business of employers. Ultimately, it was acquired only one year later by Ableto, a provider of virtual behavioral health services that connects patients to its network of 600 therapists for telehealth sessions.[42] Similar to Lantern, Joyable did not focus on or prioritize demonstrating the clinical value and/or cost-effectiveness of

---

37 https://medcitynews.com/2019/01/omada-health-launches-mental-health-programs-using-shuttered-startups-tech/?rf=1

38 https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0190554#ack

39 https://joyable.com

40 https://www.bizjournals.com/sanfrancisco/news/2017/10/05/digital-health-joyable-art-medical-medrio-amino.html

41 https://www.mobihealthnews.com/content/joyable-lays-20-shifts-focus-d2c-employers

42 https://www.ableto.com/news/ableto-acquires-joyable-2019/

its program until later on in the company's history; Joyable did not market its program with much data-driven evidence.[43]

Both Lantern and Joyable primarily fulfilled a respond-to-desire customer relationship and served as connected producers/connected market makers. Additionally, both companies seem to have made three critical mistakes in pursuit of their connected strategies: 1) did not invest in studies to demonstrate its value to drive consumer WTP; 2) did not consider the best revenue model approach to build upon its connected strategy; and 3) did not expand offerings/services to deepen relationships with consumers by incorporating more connected elements in the customer relationship and architecture.

While these two companies illustrate some of the challenges and failures of companies in the mental health space, there have been some recent successes, particularly due to the exacerbated mental health crisis in our country caused by the COVID-19 pandemic. For example, Ginger.io, a digital health company that provides on-demand access to mental health support coaches, just recently received acceptance by health insurer, Cigna, one of the largest insurers in the US. Ginger.io was founded in 2010, but has struggled to become a covered benefit by large, national insurers throughout the history of its company. Cigna's decision to offer Ginger.io as a benefit to all of its 14 million members this year is a significant milestone for the company; Cigna is the first national health plan to cover its services.[44] The pandemic may be the tailwind that the mental health space needed to gain increased interest in these programs/services by insurers and employers, giving hope for future successes and scale for these digital health companies. ■

---

43 https://joyable.com/what-you-get

44 https://medcitynews.com/2021/04/cigna-covers-gingers-mental-health-app-as-in-network-benefit/

4. Key Insights and Learnings

1. Gaining trust and establishing credibility across multiple stakeholders in the health-care ecosystem should be the first priority of any digital health company pursuing a connected strategy in order to succeed.

As evidenced by the case studies noted above, long-term success with any connected strategy in the patient care space requires winning the trust of patients, providers, and insurers. Patients will be hesitant to share personal, health data with a connected ecosystem and also pay for such services if they do not believe there is a guarantee of benefit. Similarly, providers and insurers will be hesitant to advocate for, support, and/or provide coverage for these services if they cannot assess the added value. To gain that trust, companies need to invest as early as possible in clinical and/or cost-effectiveness studies to demonstrate that value and drive consumer WTP. To gain the types of customers that can bring scale to any digital health company, there needs to be well-established, respected studies demonstrating the value of the services/program being published throughout the company's history. Companies should consider running pilot studies or partnering with other healthcare organizations to get that data initially and then conduct more rigorous studies later on once more funding and resources become available. Additionally, it is important to ensure that the clinical or cost measurements being studied are clear and meaningful to the stakeholders being targeted as customers. It is hard to employ connected strategies in therapeutic areas where clear measurement of clinical improvement or care cost savings cannot be easily quantified.

2. Revenue models for digital health companies focused on patient care continue to be tricky despite the fact that these companies fulfill significant gaps in care through the use of connected strategies.

It is important for digital health companies to understand the complexity of payment flows in the healthcare system. As evidenced by the case studies in this paper, direct-to-consumer revenue models can be extremely challenging because patients are used to having ongoing care services covered by insurance (minus some copays or deductibles) and are often less willing to pay for recurring care services out-of-pocket. This mindset makes gaining scale through the DTC model too slow for most digital health companies to survive. Therefore, it may be wisest for digital health companies focused on patient care to prioritize large enterprise clients in a B2B revenue model from the outset. Self-insured employers and health plans typically represent large groups of patients/employees that only use covered benefits. The B2B model allows companies to gain scale and customer adoption more quickly. However, these customers will likely

need to see more clinical or cost-effectiveness data to be convinced to offer coverage, which is why investing in studies and accumulating compelling evidence is also critical. Additionally, it is important to note the growing trend of digital health companies offering outcomes-based revenue models to enterprise clients. This tactic helps alleviate any concerns or skepticisms these customers may have about the expense of covering these digital health services for such large populations.

3. Prioritizing patient populations with specific, clinical needs first is an important first step to expanding the connected strategies of digital health companies focused on patient care into broader markets.

Given that trust and credibility are both crucial to winning over patients, providers, and payers, it is important to demonstrate the value of integrating smart technologies into everyday life and the benefits connected strategies can provide to customers. When it comes to health, people are often more hesitant to share personal information. However, if the company is focused on a patient population with significant unmet needs in clinical care that can be solved or at least alleviated by using the services of connected companies, then patients are likely to be more willing to engage (especially if there are studies demonstrating clinical or cost-effectiveness). Therefore, companies with connected strategies related to health that want to market to a broader population for services like weight-loss, wellness, and fitness tracking, should consider starting with a smaller, clinically-oriented population such as diabetes or hypertension. Omada followed this model by focusing on diabetes first and then was able to gradually expand into larger populations because the company was able to gain the clinical trust and approval of diabetes patients and providers first. This trend of connected strategies for patient care expanding into the mass market is becoming more common. For example, blood glucose monitors were historically only used by diabetes patients, but now they are being used more generally by athletes and the general public for fitness tracking purposes: Abbott launched a continuous glucose monitor for athletes without diabetes in 2020 and it appears that the Apple Watch is investigating ways to get glucose tracking functionalities. [45,46]

45 https://www.abbott.com/corpnewsroom/strategy-and-strength/abbott-launches-first-glucose-sport-biosensor-for-athletes.html

46 https://www.fiercebiotech.com/medtech/apple-watch-could-gain-glucose-tracking-rockley-photonics-deal-report

4. The long-term success of digital health companies focused on patient care is still yet to be determined even though some companies have been able to gain traction in the market in recent years through the use of connected strategies.

All of the companies assessed in this analysis were only founded in the past 10 years, have experienced evolutions in their business models, and have not yet gone public. Therefore, the long-term viability of these connected strategies is still an open question and difficult to assess based on publicly-available information. Additionally, there are a large number of digital health companies trying to revolutionize patient care with varying degrees of success. The case studies featured in this analysis are only a small sample and may be benefiting from serving a sweet spot in their respective markets as opposed to really improving the service in a fundamental way. Furthermore, while these digital health companies have shown improvements in patient outcomes and cost of care, it remains an open question as to how these connected strategies are impacting health-care providers. With more data and more touchpoints with patients, providers may start to feel overwhelmed unless these digital health companies can continually improve the user experience features of their platforms and the data analytics capabilities. However, the recent COVID-19 may be a tailwind to the success of these digital health companies going forward because it demonstrated the usefulness of connected strategies in being able to care for patients virtually and more efficiently. This may lead to broader accep-tance and usage of digital health start-ups for patient care. ■

Exhibit 1: Connected Matrix for Type II Diabetes (Omada Health, Virta Health, Glooko)

	Connected Producer	Connected Retailer	Connected Maker Market	Crowd Orchestrator	P2P Network Creator
Respond-to-Desire	glooko				
Curated Offering	glooko ○ virta ⊚ omada				
Coach Behavior			glooko ○ virta	⊚ omada	⊚ omada ○ virta
Automatic Execution					

Exhibit 2: Type II Diabetes Patient Journey

Screening/ Risk Assessment	Diagnosis	Diet & Lifestyle Changes	Pharmalogical Treatment & Medication Managment	Ongoing Physician Monitoring & Follow-up
		○ virta	○ virta	○ virta
		⊚ omada	⊚ omada	⊚ omada
				glooko

About the Authors

Haley Fitzpatrick

Haley Fitzpatrick is currently a member of the commercial team at Genentech, a biotech company based in San Francisco that is a subsidiary of Roche Pharmaceuticals. Prior to Genentech, Haley was an experienced life sciences strategy consultant working across the healthcare sector with many pharmaceutical, biotech, medical device, diagnostic, and digital health companies. Haley holds a Bachelor of Science in Biology from Stanford University and a Masters of Business Administration in Healthcare Management from The Wharton School, University of Pennsylvania.

Nicolaj Siggelkow (siggelkow@wharton.upenn.edu)

Nicolaj Siggelkow is the David M. Knott Professor of Management at the Wharton School, University of Pennsylvania. He is a Co-Director of the Mack Institute for Innovation Management and the former Department Chair of Wharton's Management Department. He is the coauthor of *Connected Strategy: Building Continuous Customer Relationships for Competitive Advantage* (Harvard Business Review Press), which was featured as one of the top business books for 2020 by *Bloomberg BusinessWeek*. Professor Siggelkow studied Economics at Stanford University and received a Ph.D. in Business Economics from Harvard University. Professor Siggelkow has been named a Fellow of the Strategic Management Society, the world's leading association of strategy researchers and has been shortlisted for the prestigious Thinkers 50 award (the "Oscars of Management"). He has been the recipient of more than 30 MBA and Undergraduate Excellence in Teaching Awards, including Wharton's and Penn's highest honors of its kind. Professor Siggelkow is the Academic Director of several executive education programs at Wharton and has been involved in many custom programs for organizations, teaching strategy and managerial decision making. He has run strategy workshops for Fortune 500 organizations and small firms alike, helping develop and analyze their strategies.

Christian Terwiesch (terwiesch@wharton.upenn.edu)

Christian Terwiesch is the department chair and a professor in Wharton's Operations, Information and Decisions department and co-director of Penn's Mack Institute for Innovation Management. He also holds a faculty appointment in Penn's Perelman School of Medicine. He has written multiple books and published extensively in many of the leading academic journals ranging from Management Science to The New England Journal of Medicine. He is an award-winning teacher with extensive experience in MBA teaching, online courses, and executive education. In addition to his teaching and his

research, Professor Terwiesch is host of "Work of Tomorrow", a national radio show on Sirius XM 132. He holds a doctoral degree from INSEAD and a Diploma from the University of Mannheim.

ABOUT THE MACK INSTITUTE FOR INNOVATION MANAGEMENT

Emerging technologies and innovations can create and transform industries, while simultaneously introducing new risks and uncertainty to established organizations.

The Mack Institute for Innovation Management is an exclusive network that connects business leaders, researchers, world-class Wharton faculty, and students. At the institute, thought leaders from across academic disciplines and industries come together to explore how companies survive, compete, and thrive through innovation management. The institute's multidisciplinary faculty and researchers develop practical approaches to managing innovation and share this knowledge through thought-provoking conferences, workshops, and publications.