

Healthcare gone digital



Creating shared value
through e-health



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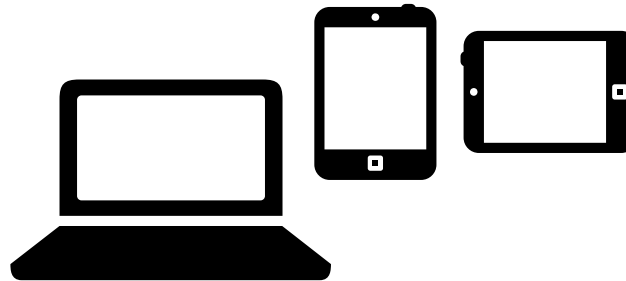
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Glossary

E-health:

The growing array of combinations of ICT and healthcare have come to be known as 'telemedicine', 'telehealth', 'e-health' and 'm-health', amongst others¹. Whereas the prefix "tele" explicitly refers to "at a distance", and "m-health" is used to refer to mobile devices for healthcare purposes, in this report we will further use the term e-health as the term that most comprehensively captures the entire range of advances at the intersection of ICT and healthcare.

Impact investing:

We define impact investing as the entire spectrum of investments that deliberately aim to create shared value. This new, integral approach to investing is distinguished from an ESG-approach² to investing. Impact investing as 'creating shared value' is about the creation and fair distribution of prosperity. It combines solid financial returns with social, environmental and community wealth and takes the business rationale as its point of departure.

1 WHO GOe report 2009

2 Such an investment approach pays extra attention to environmental, social and (corporate) governance criteria in its quest for (long-term) value creation.

Self-management:

Self-management (support) is the systematic provision of education and supportive interventions by healthcare staff to increase patients' skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support. Self-management is defined as the tasks that

individuals must undertake to live well with one or more (chronic) conditions. These tasks include having the confidence to deal with medical management, role management, and emotional management of their conditions.³

Shared value:

The concept of shared value can be defined as policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates. Creating shared value focuses on identifying and expanding the connections between societal and economic progress.⁴

³ Adams et al. (2003)

⁴ Porter and Kramer (2011)



Executive summary

This report evaluates a case study of impact investing in healthcare and brings together three parties (Ch. 1):

- PROOF Impact at Maastricht University aims to demonstrate evidence of the (non-financial) relevance of impact investing by illustrating how financial and non-financial value can be turned into shared value.
- As an impact investor, the Dutch Noaber Foundation aims to support game-changing technologies in the healthcare domain. The foundation has the desire to create a virtuous cycle in which its investments have a positive financial return while improving the lives of individuals.
- VitalHealth Software as the focal investee of this report seeks a combined and balanced societal and financial return for its investors. The company's mission reads: improving the healthcare of millions of people through e-health solutions.

The ability to create shared value in healthcare can best be understood by taking into account current developments in (e-)healthcare (Ch. 2):

- In line with innovations in other sectors of the economy, like banking or travel, the decentralization trend – from provider to consumer, or from healthcare provider to patient – also manifests itself in healthcare. This trend departs from the traditional model of care marked by a sharp hierarchy between the expert provider and the passively complying patient.

- Despite general technical advancements in healthcare treatments, we witness a rise in chronic diseases that has caused *total* patient numbers to actually increase. This shows a paradox of better health, and more patients.
- Rising healthcare costs and budget cuts have placed pressure on care providers to explore ways to work more efficiently. E-health, as the combination of ICT and healthcare, capitalizes on the ability of patients to become managers of their own health and the ability of providers to deliver healthcare more efficiently and more effectively. In addition, e-health facilitates the way healthcare professionals interact with patients as well as among each other and has helped to create so-called collaborative or integrated care settings.
- VitalHealth's product portfolio and platform technology facilitate the shift from doctor-centered care to patient-centered care and capitalize on the benefits of collaborative care settings.

Evaluating the market adoption of the VitalHealth product portfolio reveals the creation of shared value at three levels (Ch. 3):

- At the macro level we see that the combination of task delegation supported by the VitalHealth Collaborative Health Management (CHM) solution resulted in lower costs to society as a result of positive effects for both patients (fewer cardiovascular events) and society (lower costs associated with cardiovascular treatments). In addition, VitalHealth assists traditionally dispersed healthcare systems – for example those in China – to transform into more integrated ones by supporting teleconsultations and effective tele-medicine functionality. Also, VitalHealth teamed up with Argentina based healthcare provider and insurance company OSDE and tackles two problems that often occur among the chronically ill: isolation and mounting costs. This joining of forces helps to prevent the administration of acute care, by shifting healthcare delivery from a doctor and facility centric approach to a patient-centered approach.

- At the organizational level, VitalHealth makes information more readily available to care team members and reduces the time physicians need per non-direct patient encounter, as is the case with the Generic Disease Management System (GDMS) tool. Consequently, by having the right information available VitalHealth improves the delivery of preventive care services. Also, by facilitating a patient-centered approach and relying on self-management, the close monitoring of chronic diseases helps to prevent the administration of acute care to increase efficiency and effectiveness at the meso level.
- At the micro level, next to clinical outcomes such as the prevention of (acute) care, VitalHealth's product portfolio also impacts the type of healthcare for end users, most notably patients and doctors. VitalHealth's digitization of care may help to reduce temporal, physical and even psychological barriers at the individual level (convenience, greater mobility, feeling of autonomy). For instance, patient-clients do not need to be physically present and some prefer the safety of their own home environment over the visit to a more distant healthcare facility. At the same time, aforementioned developments bring about a different type of healthcare experience and shape the way individuals interact with one another. Additional research will be needed to gain a good understanding of what such a transition effectively means for the (quality of the) healthcare process. This is particularly important for end users, who – as the providers and receptors of this very form of renewed care – remain its ultimate beneficiaries.
- In order to realize VitalHealth's sustained impact at the aforementioned three levels, the organization monitoring the developments at regular intervals appears to be a relevant requirement – also to assess the (reputation) risks that investors particularly want to minimize or avoid all together. Unintended or unanticipated consequences of new technologies may be revealed over time as a result of the continuous monitoring of the developments at the macro, meso and micro-level.

Acknowledgments

The authors wish to thank the Noaber Foundation and VitalHealth Software for facilitating this study. As such, the various cases in chapter three – except the study carried out by PROOF – have been prepared and provided by VitalHealth.



1 | Introduction

The cover page of this report shows the staff of Asclepius, a symbol of medicine and healing dating back to ancient classical times. This staff is placed behind the symbol for wireless connectivity, a quintessential innovation of modern times. The question that underpins this image asks: how can the timeless concept of healthcare best be delivered through ever more technologically advanced instruments and infrastructures?

In this report, PROOF Impact at Maastricht University, takes an investigative look at how VitalHealth Software, a provider of e-health solutions headquartered in the Netherlands, impacts the healthcare industry.

PROOF Impact, an acronym for presenting results outside of financial impact, aims to expose the business case for impact investments. In other words, PROOF impact looks at how financially sound investments can also actively and purposely result in societal success. Examples can be found in various industries, such as microfinance, clean energy, or agriculture. In this report we consider the impact of information and communication (ICT) technologies on the healthcare sector; in particular, we assess the extent to which cloud-based technologies as devised by VitalHealth Software create ‘shared value’⁵ in the healthcare industry.

5 See glossary

- 6 This new, integral approach to investing is distinguished from an ESG-approach to investing. Impact investing as 'creating shared value' is about the creation and fair distribution of prosperity. It combines solid financial returns with social, environmental and community wealth and takes the business rationale as its point of departure.
- 7 The term 'market-rate' refers to a risk-adjusted return that is equal to or exceeds the relevant benchmark of a particular investor. Institutional investors usually start with the assumption that – based on their fiduciary responsibility toward their beneficiaries – their investments need to be in line with or exceed relevant benchmarks.
- 8 Porter and Kramer (2011)
- 9 IRIS, which stands for impact reporting and investing standards, is a catalog of generally-accepted performance metrics that leading impact investors use to measure the social,

1.1 | The act and evaluation of impact investing

Impact investing, which we define as the entire spectrum of investments deliberately aiming to create shared value, can be seen as an integrative approach to wealth creation⁶. The investments aim at making a financial return either at or below the market rate⁷. In addition, they look at labor, environmental, cultural, religious, and other non-financial criteria relevant for the communities in which the investments are made. This simultaneous realization of financial and non-financial objectives is what Michael Porter and Mark Kramer have called 'shared value creation'.⁸ This focus on shared value is an attractive feature for investees – being the recipients of the new type of investment.

An integral element of impact investing is the subsequent evaluation of these proclaimed benefits to society. Unlike financial ratios, value to society or increases in various forms of wellbeing are often hard to quantify. Moreover, comparing any such softer outcomes across organizations or industries opens a Pandora's box of methodological challenges and practical constraints. This runs the risk that impact creation remains in the eye of the beholder. Fortunately, various efforts have been launched to advance our understanding of impact and its measurement. Noteworthy examples include calculations of *social* returns on investment (SROI) to come up with a social equivalent to monetary value. Another effort is the global impact investing network's (GIIN) standardization of performance outcomes, which is narrowed down by sector or industry type.⁹ At PROOF Impact we employ the case study method and approach the VitalHealth investment as such, which allows for "an empirical enquiry of a contemporary phenomenon in-depth and within its real-life context"¹⁰. Case study design welcomes multiple sources of evidence, for the data to converge in a 'triangulating' fashion. As such, we will make use of primary data, including questionnaires and interviews, complemented with a variety of secondary data provided by investor and investee such as memos, communication and product records

and (progress) reports. The purpose of this case study is to assess the shared value that impact investor and impact investee create in the healthcare industry.

The contents of this report are divided into four chapters. We start with an introductory chapter that covers in more detail the key stakeholders of this study, namely PROOF Impact, the Noaber Foundation and VitalHealth Software. The second chapter describes our focal company in more detail, including a concise analysis of the e-health industry and the target markets in which it operates. The chapter also explicitly gathers information on VitalHealth's objective of being a social enterprise and the various efforts the company has championed in this regard. The third chapter then moves on to discuss how various products of the VitalHealth product portfolio behave in the market. The extent to which VitalHealth's products are adopted by the market, and to what extent they are evaluated as social innovations, provides the impact investor with an indication of how his impact mission is effectuating. Since the term 'impact' is a kaleidoscopic term that can be interpreted in a variety of ways, we differentiate between the individual micro-level (patient-doctor encounter), the meso-level (organized healthcare providers) and the macro-level (industry wide or country wide effects). Chapter four concludes this study by describing how the VitalHealth product portfolio impacts the healthcare industry in a variety of ways.

1.2 | Key stakeholders

PROOF Impact

If impact investing wants to be attractive for institutional investors, it has to address the needs of the institutional environment. Due to their fiduciary responsibility, institutional investors have a primary obligation to focus on risk-adjusted (market rate) returns.

environmental, and financial performance of their investments. For more information: <https://iris.thegiin.org>

10 Yin (2009)

- 11 Impact investing goes beyond Socially Responsible Investing (SRI) in the sense that it aims at realizing predetermined social or environmental objectives and is able to measure the outputs, outcomes and – hopefully – impact of the investment. Very often Impact Investing also uses different investment strategies, such as venture capital and private equity, although this is not a necessity (cf. Godeke, S., and D. Bauer, *Mission-related Investing*, Rockefeller Philanthropy Advisors, New York, 2008; Hummels, H., *Een Aandeel in Maatschappelijke Ontwikkeling*, Van Gorcum, Assen, 2009)

Recently, however, investors have taken a clear interest in the non-financial consequences of their investments and how these will be achieved, measured and communicated. In other words, investors will always ask the question: ‘Show us the proof that impact investing makes sense – both financially and non-financially?’ And that is where it becomes difficult for the current generation of impact investors. Providing compelling evidence for the business case of impact investing is not easy. At face value there appears to be a justification for impact investments insofar as they contribute to risk diversification while resulting in a financial return that is comparable to other investments in the same asset class. Investors – both private and professional – are in need, however, of information on financial and non-financial returns and on the process in which these returns are being achieved. In short, the financial community knows how to create financial value. A challenge is to turn financial value into shared value. Our aim is helping investors with patient capital to demonstrate evidence of the (non-financial) relevance of impact investing¹¹.

The focal investor: The Noaber Foundation

The Noaber Foundation is a family foundation in the Netherlands with the aim of supporting game-changing technologies in the healthcare domain. The foundation has the desire to create a virtuous cycle in which investments have a positive financial return while improving the lives of individuals. The foundation supports a variety of initiatives in the Netherlands and abroad, which, when placed on a spectrum, can be positioned between impact only and finance only investments. The figure below describes just that spectrum and visualizes how impact investments aim to combine both extremes. As such, the foundation aims to bridge the commercialization gap that presents itself when dealing with impact investments. In doing so, unlocking traditional capital ultimately creates a community of likeminded investors. See [figure 1](#).

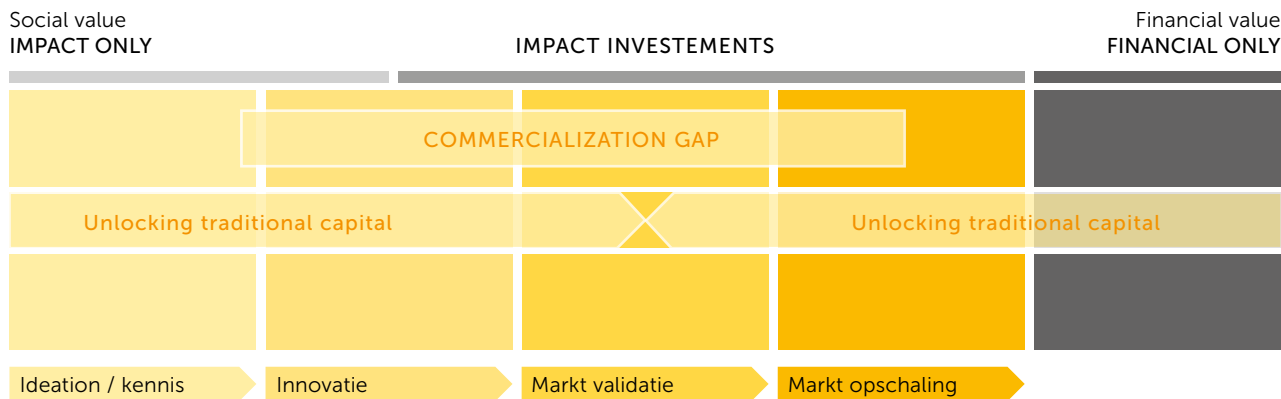


Figure 1. Noaber Foundation investment spectrum

In 2005 the Noaber Foundation joined forces with the Mayo Clinic, the large care provider in the US, to found VitalHealth Software. As a not for profit foundation the Mayo Clinic is a world leader in medical care, research and education for a diverse clientele of over 1.1 million patients each year.¹² For Noaber Foundation this partnership was an ideal entry point into the healthcare industry. Mayo welcomed the founding of VitalHealth Software to explore the possibilities of computerized solutions for disease management. The conviction at the time was that there was large potential in applying next generation software to the relatively traditional healthcare market. Indeed, the company was founded “on the premises to become a world leader in software for disease management”.¹³

12 See also: <http://www.mayoclinic.org/about/facts.html>

13 Company news/ Press release dated 8 December 2005

From the start Noaber Foundation aspired to foster an impact-oriented company culture, in which founder and chairman Paul Baan aimed to stimulate as much as possible the application of new perspectives and fresh approaches to the healthcare domain.

The focal investee: VitalHealth Software

VitalHealth describes itself as a social venture that seeks a combined and balanced societal and financial return for its investors. Overall, the founders of VitalHealth have come to shape the vision of 'personalized health management' where individuals can assume a more proactive role towards their health condition using ICT. VitalHealth is founded with a goal of helping people live longer, healthier lives independently and enable providers to better coordinate the care of patients with complex chronic conditions. In short, VitalHealth's mission is: improving the healthcare of millions of people through e-health solutions. The company's product portfolio serves three domains of the health sector: (networks of) primary care, mental care and hospital care. At the same time, with the use of its signature platform technology, the company is able to chase emerging market opportunities in niche domains. For instance, in the US VitalHealth was able to put its platform technology to use and enter the optometry market. The flexibility of the VitalHealth platform has resulted in a variety of products and entry points in markets across the globe. With branches in India, Germany and the US, and recent partnerships in China and Argentina, VitalHealth has in the past decade grown into a solid player with a diversified product portfolio in the e-health domain. **Figure 2** points out key developments in VitalHealth's first decade of existence.

A decade of VitalHealth Software

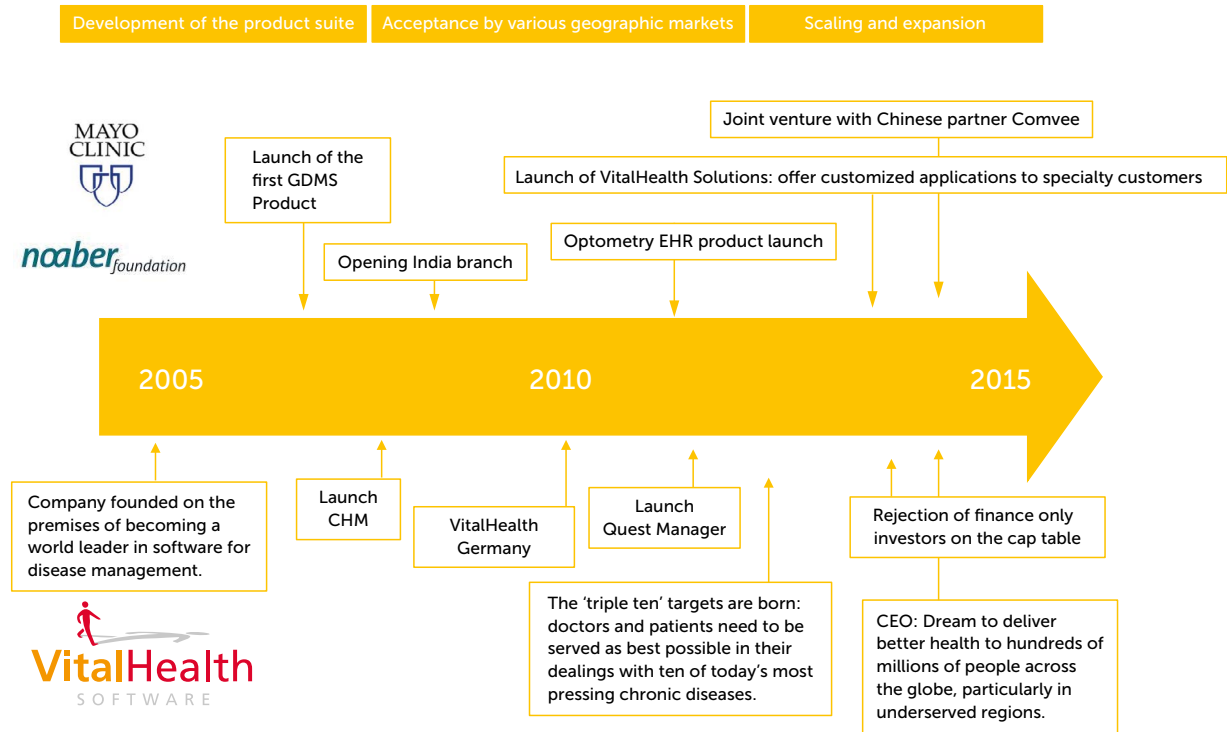
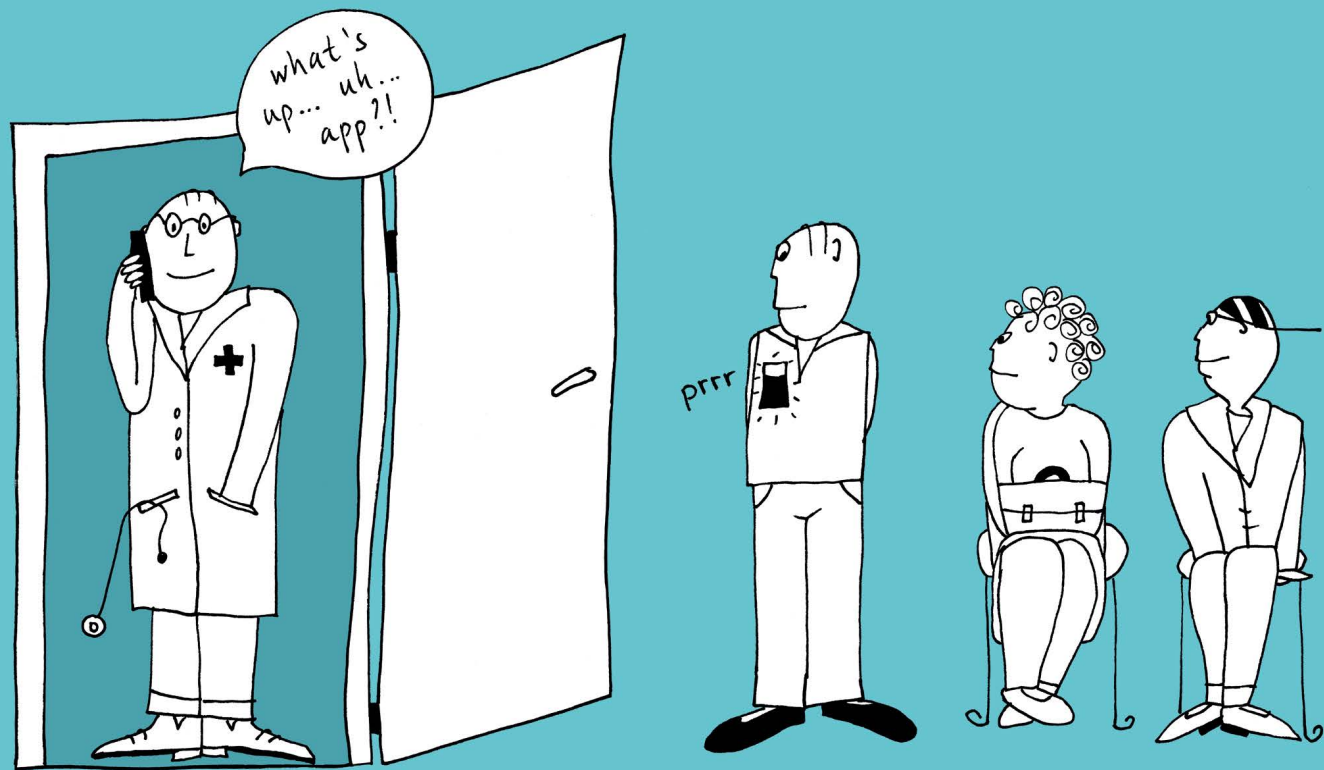


Figure 2. Milestones founding decade



2 | Creating shared value through e-health

As is described by the graphic on our cover page, technological innovations condition the ways in which healthcare is being delivered. Medical consults increasingly occur at a distance, or people use mobile devices to communicate their vital statistics. This section discusses some key developments in the healthcare domain, with a focus on e-health, to understand how VitalHealth's solutions are able to improve twenty-first century healthcare delivery.

2.1 | Healthcare trends

In the Netherlands, akin to much of the rest of Europe, the relative number of seniors over 65 years of age compared to the number of 20-64 years of age, has increased steadily over the past years. See the development of this 'old-age dependency ratio' for the Netherlands in [figure 3](#).

Paradox: better health, more patients

Because of technical advancements, generally, healthcare treatments have become more effective, such that, in recent years mortality rates have gone down and people on average live longer. Paradoxically, because of the phenomenon of chronic care, more people have become patients, such that *total* patient numbers have actually increased. Chronic

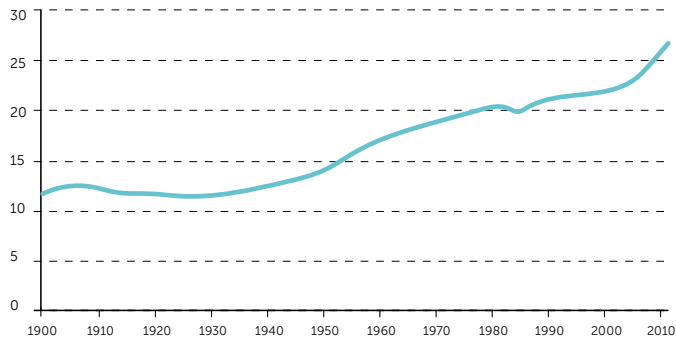


Figure 3. Old-age dependency ratio, or “grijze druk” (“Nationaal Kompas”, 2012)¹⁴

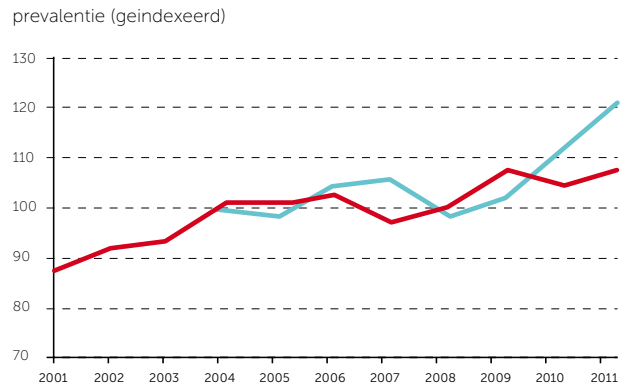


Figure 4. Multiple diseases in the Netherlands (RIVM, 2013)

diseases, and especially more of them at the same time, lead to a reduced quality of life and demand a significant share of a nation’s healthcare capacities (see [figure 4](#)).

As a result of ageing populations and the rise in chronic patient care, countries worldwide prepare for increasing healthcare costs. In the case of the Netherlands, over recent years healthcare costs have risen much quicker than national income and substantial (increases in) collective health expenses pose a threat to the sustainability of governmental budgets and the provision of healthcare services¹⁵. International organizations like the World Health Organization mention the benefits of ICT as a potential means to organize healthcare more efficiently, particular for those living with chronic conditions. E-health solutions are being mentioned in a variety of ways to control the rising costs of healthcare and other adverse effects of more patients requiring more treatments.¹⁶

14 http://www.nationaalkompas.nl/bevolking/vergrijzing/verleden/#reference_5138

15 Conform findings by the SCP (2012)

16 Megatrends in Global Healthcare (2013), HBR.

When VitalHealth was founded it initially focused on the US and Dutch markets. These markets share some similarities in the fact that 'networked' care has increasingly emerged as the preferred healthcare infrastructure. In the US, the biggest healthcare reform in decades is the patient protection and affordable care act (ACA) that was signed into law by US President Barack Obama in 2010. The idea of the ACA is to decrease the number of uninsured Americans and to improve healthcare, whilst also reducing overall costs.¹⁷ The idea behind such a coordinated care model is to instill a new power balance between caregiver and recipient, one which characterizes provider and patient as partners in the care process. As such, the patient becomes an *active and informed consumer of care* by participating through *self-management*.¹⁸ The Dutch ministry of health points at the plethora of opportunities for e-health solutions in this regard.¹⁹ ICT is an important element in keeping healthcare up to date and affordable. The ministry also stresses the importance of the healthcare provider and the healthcare recipient; solutions must be designed *with* them rather than *for* them.²⁰

E-health and disease management: from patient to client

Against this backdrop, the use of ICT can contribute to the quality and efficiency of healthcare, the accessibility of care and the growing possibility of 'self-management'.²¹ Particularly in developing countries, greater accessibility to healthcare can be achieved through tele-health initiatives. We see a parallel with initiatives in the banking sector in countries where access to financial services is limited. Renowned is the Kenyan mobile-money system "M-PESA" that lets people transfer cash using their mobile phones. A system that is now used by over 17 million people, or about two thirds of the adult population²². In healthcare, ICT may contribute to a similar shift from a professional-centered approach to a consumer-centered approach – although it must be acknowledged that providing healthcare by medical professionals is a different service than transferring money. Health

17 Myers, et al. (2013)

18 Ibid. p. 441. It must be noted, however, that the quality of healthcare for those who are not – or to a limited extent – in a position to participate in self-management, must be guaranteed. Particularly some old or (partially) disabled patients are vulnerable in this respect.

19 Kamerbrief e-health. Kenmerk: MEVA/ICT-3118565, 7 juni 2012. Letter to the Parliament by the ministry of health, wellbeing and sports (2012) <http://www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2012/06/07/kamerbrief-over-e-health.html>

20 Ibid.

21 KNMG (2012)

22 The Economist, 2013, Why does Kenya lead the world in mobile money?

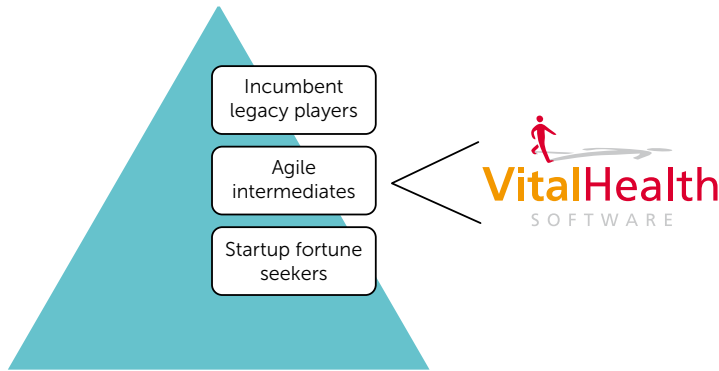


Figure 5. E-health: a fragmented market

reforms in both developed and underdeveloped²³ countries increasingly explore e-health solutions to improve (accessible) healthcare and to bring down costs²⁴. E-health, as the combination of ICT and healthcare, capitalizes on the patient's ability to manage his or her own health process, and the ability of a provider to deliver certain types of healthcare at a distance. Such trends in the development of the health care system are not without challenges, some of which may be quite serious. The increased focus on e-access to healthcare may pose a threat to the protection of the privacy of patient-centered

information. In addition, these developments may transform the relationship between patients and medical professionals – including but not limited to specialists, general practitioners, their assistants, nurses and other (proto-)medical staff. Also, the role of the practitioners may change, leading to a different conception of what it means to be a doctor.

A pyramid of e-health players

Because of the decentralization trend and regulations varying across jurisdictions many players have started to operate in different sub-domains, and the e-health market has become highly fragmented, which the pyramid [figure 5](#) further describes.

In this pyramid large 'legacy' players populate the top.

²³ WHO (2012)

²⁴ Schoen et al. (2012)

The roughly one hundred traditional hospitals in the Netherlands use electronic health records or hospital information systems of these larger software providers, which include national and international players, with the Dutch *Chipsoft* capturing a 43% market share, *CSC-iSOFT* and *McKesson* about 16 %, and *Epic* 4%.²⁵

In contrast, a plethora of small startup companies is struggling at the bottom of the pyramid. The generally favorable prospects, such as low barriers to entry, have prompted an exponential growth of digital applications offered by a variety of developers.²⁶ In general, the weakness of these companies is the large variability in quality of these applications, and the (in)direct implications for the quality of healthcare. Therefore, this category may best be described as ‘startup fortune seekers’.

The remaining selection of companies that operate in between we refer to as ‘agile intermediaries’. This category contains elements of both the other categories and we have placed VitalHealth in this middle section. Indeed, the VitalHealth platform technology is aimed at answering *niche needs* of major customers with hundreds of different clinical systems that need to be interfaced with electronic medical records, but also by being able to devise more *generic solutions* which can be adopted by different types of clients. Somewhat ironically, VitalHealth has many competitors at the product level, but is one of its kind when compared at the company level. CEO van der Tang reflects on the unique product proposition of VitalHealth: “We think that our customers need a solid player with a related but diversified product portfolio”.

2.2 | VitalHealth and creating shared value

Currently, the company’s ambitions towards creating shared value are embodied by the ‘triple-ten targets’ ([figure 6](#)), with which the company aims to devise solutions for ten different diseases, to allow ten thousand healthcare providers to work with these solutions, and subsequently improve the quality of healthcare for ten million patients around the globe.

25 M&I Partners consultancy,
Zorgvisie, 2013 <http://www.zorgvisie.nl/>

26 Kaplan et al. (2004)

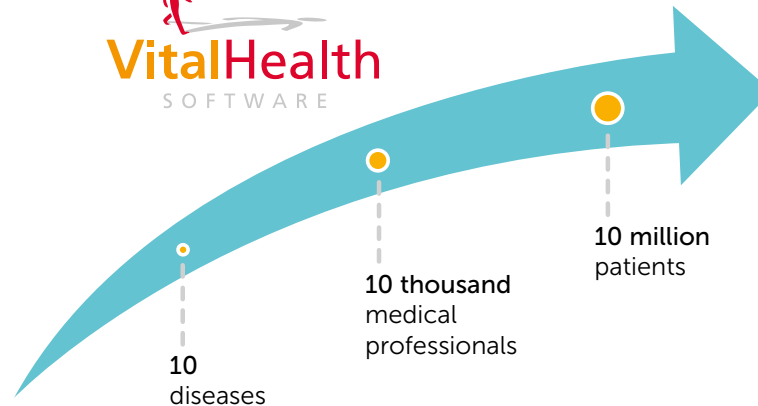


Figure 6: Triple ten targets VitalHealth

After reviewing the characteristics of the product portfolio,²⁷ three main propositions on creating shared value can be distilled.

Firstly, increasing access to healthcare means that VitalHealth looks at ways to leverage its platform technology to improve care at 'bottom of the pyramid' markets in developing countries. Via new infrastructures, validated software systems can be delivered much faster than before. ICT reduces physical but also temporal barriers to the delivery of care. In a recent interview²⁸ CEO van der Tang reveals that his dream is to improve the health of hundreds of millions of people, especially people with chronic conditions in countries where good care is currently missing. Indeed, the technology has the potential to thrive

27 See appendix X: VH product suite infographics

28 <http://www.zorgvoorinnoveren.nl/nieuws/936/voorpublicatie-internationaliseringsgids>

in geographically dispersed markets such as India and China, where many individuals lack access to mainstream healthcare. VitalHealth capitalizes on the efficiency gains ICT can realize: through digitizing healthcare, it intends to organize healthcare more efficiently and increase access to healthcare for (tens of) millions of deprived or underserved patients. In itself increasing access to specific types of healthcare is a major achievement and significantly contributes to creating shared value.



Figure 7: VitalHealth's global span

Secondly, after the patients have been more easily connected to the healthcare system, the second proposition deals with a potential increase in the quality of care delivered. VitalHealth helps doctors to deliver care more efficiently and effectively by enabling doctors to better cooperate among each other and cross-disciplinary. Ideally, cloud-based technologies would enhance the decision-making process of doctors and feed live information during the encounter with the patient. The idea of any such e-health solutions is to ensure that doctors are able to spend their time on those tasks that add the most value. Software can thus specifically help to allow doctors to focus as much as possible on the patient and less on tasks that software could do better. Another issue that VitalHealth hopes to tackle is the problem of 'isolation'. Hospitals, general practitioners, or providers of healthcare tend to behave as isolated entities, all the while caring for the very same patient. The providers want to act as a team but the communication between team members is frequently frustrated by lack of common systems. Therefore, one of the ideas behind VitalHealth is that the information about the patient should follow the same trajectory as the patient itself. The rationale is that when more caregivers have access to relevant information such as blood tests or scans, there is much to gain in terms of the effectiveness of individual patient care by having better communication of goals between the patient and all of their care providers, for example setting a diagnosis within a shorter period of time.

Thirdly, transforming patients into empowered clients deals with the conviction that there is a large untapped potential within patients themselves. By activating and engaging patients, VitalHealth hopes to achieve better health outcomes. This includes a better understanding of the patient's own condition and the customization of the treatment process to the needs of the patient. To test these propositions in practice, VitalHealth is exploring appropriate targets to channel its shared value proposition, and calculates

monetary equivalents of its payoffs to society via the SROI approach. Also, VitalHealth has started working with a software tool called “Sinzer”, which tracks a selection of designated impact parameters over time. **Figure 8** shows an impression of how Sinzer facilitates the measurement of social returns on investments.

The next chapter includes five cases that describe the market adoption and subsequent evaluation of the VitalHealth product portfolio in more detail.

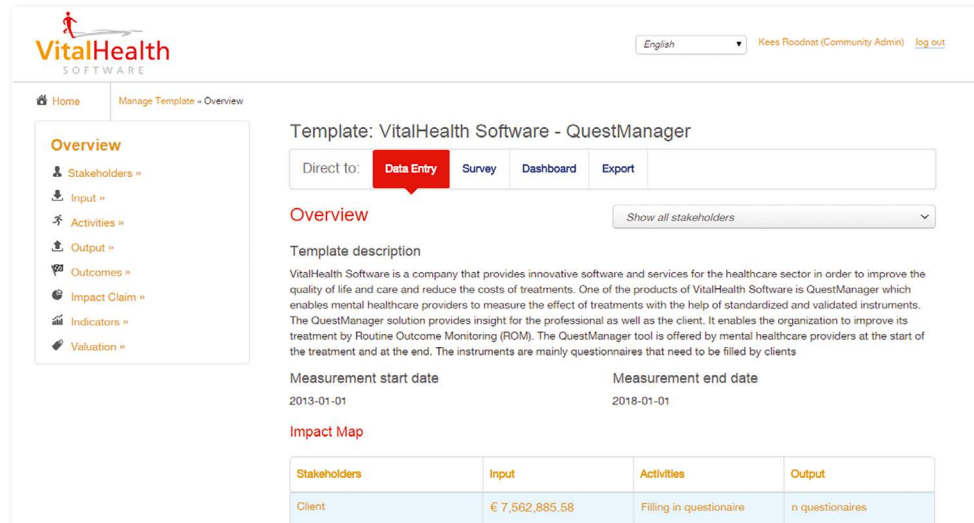


Figure 8. Software for SROI analysis



3 | Adoption and evaluation of the VitalHealth product portfolio

3.1 | VitalHealth CHM for Collaborative Health Management

Introduction

As described in chapter two, the advances in medical knowledge, the rising healthcare costs, related to the treatment of chronic conditions, and the societal costs associated with the treatment of patients with these conditions, is further amplified by a globally aging population. In the case of diabetes, the challenge is to use existing resources as effectively as possible, while simultaneously maintaining excellent quality of care. This forces payers and providers to think about disease management differently. Diabetes is a chronic disease that requires involvement of multiple care providers using standardized treatment protocols and communicating with one another to ensure the best patient outcomes possible. To more effectively and efficiently deliver care requires 'task delegation', which in this context means that the general practitioner is able to delegate some of these tasks. As such, medical staff with less knowledge than the GP, can perform these tasks guided by an automated protocol in the CHM system. Such task delegation between multiple providers is most efficiently

accomplished through so-called computer based 'decision support programs' that are based on a standardized Diabetes protocol.

CHM in Almelo the Netherlands

The first region where the VitalHealth CHM solution has been implemented is Almelo, a province town which is located in the eastern part of the Netherlands. The VitalHealth CHM solution was developed to give the physicians better control over the entire care process and a better overview of and insight into the patient population. Research into the effects of the CHM module showed that delegation of routine diabetes care to a practice nurse combined with computerized decision support and feedback reduced cardiovascular risk in type 2 diabetes patients in spite of the fact that they were unable to document lower hemoglobin A1C levels²⁹. Thus the combination of task delegation supported by the VitalHealth CHM solution resulted in a positive effect for both patients (fewer cardiovascular events for patients) and society (lower costs associated with cardiovascular risk).

29 Cleveringa, F.G.W. MD, et al.,
Diabetes Care, volume 13,
number 12, December 2008

30 The research concluded the
increase of quality of care
because the percentage
of patients that reached all
treatment goals has increased
in the group treated with CHM
from 10.3% to 18.9%, whereas
this percentage increased in
the control group from 10.9%
to 13.4%.

VitalHealth has also investigated the SROI (Social Return on Investment) of the VitalHealth CHM Diabetes module in the Almelo region. This analysis has been done in close cooperation with the customer. This study showed that the main advantages for the patients include:

- Reduced risk of cardiovascular diseases
- Reduced incidence of visual complications related to diabetic retinopathy
- Increased quality of care³⁰

- 31 More information on this calculation can be found in the SROI Vital4Diabetes analysis. On the previous page its main findings have been mentioned. For the full analysis please contact VitalHealth Software. Maastricht University has not been able to fully assess, verify and discuss (the relevance of) the SROI/Sinzer methodology. Due to the fact that the assessment contains confidential information VitalHealth has decided not to disclose information on the Sinzer evaluation. Therefore, Maastricht University cannot support Sinzer's conclusion on the creation of value.
- 32 For (impact) investors – and particularly institutional investors – this calculation is relevant, but the main question is how this outcome translates into IRRs. If there is no positive causal relation between the increase of societal value and the increase of the IRR for the investor the (institutional) investor is likely to see this

The main advantages for the healthcare professionals are:

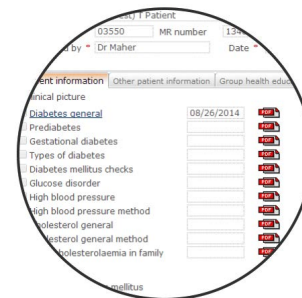
- More effective time with each patient related to improved communication between healthcare providers and ease of access to patient related information
- More time available for other patients

Figure 9 depicts the results of this SROI analysis.

The SROI ratio of 1.95 means that every investment of €1 results in a positive effect that is valued €1.95.³¹ These outcomes document the positive return of the VitalHealth CHM module for one specific implementation. VitalHealth is planning to do similar SROI analyses in order to validate the SROI in other settings³².

CHM in Saudi Arabia

The VitalHealth CHM Diabetes implementations in the Netherlands generated international attention. As a result the Saudi Arabian Security Forces Hospital contacted VitalHealth for a diabetes solution. Pre-diabetes and diabetes are frequently occurring diseases in Saudi Arabia, with approximately one third of the population being affected.³³ Reasons for this high percentage have been theorized to include the country's climatic conditions, the lack of physical exercise, changing dietary habits and obesity. The rapid increase in incidence of diabetes mellitus has challenged the Saudi healthcare system to adequately deal with diabetes and its consequences. The Security Forces Hospital partnered with VitalHealth Software using its Collaborative Health Management (CHM) system to provide support for diabetes care.



Template: CHM: Vital voor Diabetes

Direct to:

Data Entry

Survey

Dashboard

Export

Overview

Select Stakeholders

Select Comparable Template

Description

De communicatie tussen zorgaanbieders, het werken volgens de richtlijnen, het goed ik in kaart brengen van het risicoprofiel van de patient en de mogelijkheden voor taakdelegatie werden voorheen onvoldoende gefaciliteerd. Hierdoor kregen de diabetespatienten niet de meest optimale zorg. Door een ICT systeem (KIS) te leveren die de communicatie tussen zorgaanbieders, het werken volgens de richtlijnen, het goed ik in kaart brengen van het risicoprofiel van de patient en de mogelijkheden voor taakdelegatie faciliteert. Als casus voor onderhavige SROI berekening is de implementatie in Almelo e.o. gebruikt. Binnen de FEA in Almelo draait sinds 2006 Vital voor Diabetes. Dit Ketenzorg Informatie Systeem (KIS) is aanvankelijk door D4H opgezet en binnen FEA geïmplementeerd en sinds een aantal jaar door VitalHealth overgenomen.

Discount Rate

3.50

Edit Discount Rate

SROI ratio :

€ 1.95

Total Input: € 966,539.05

Total Value Created: € 1,884,116.21

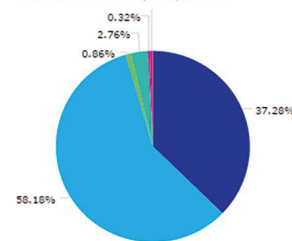
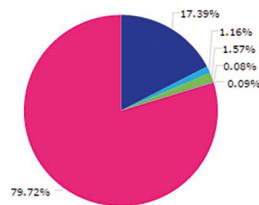


Figure 9. Impression of impact analyses carried out by VH

information as 'nice to have' but certainly not 'need to have'. That conclusion is even reinforced if the cost of the SROI is substantial.

33 Prevalence of diabetes was 20.2% in 2013 (excluding pre-diabetes) <http://healthintelligence.drupalgardens.com/content/prevalence-diabetes-world-2013>

The Security Forces Hospital has been using the Diabetes module of the VitalHealth CHM since 2010. At present 5500 patients with pre-diabetes or diabetes – and 100 medical service professionals – use the system to manage and monitor their health on a daily basis. The providers each have a separate portal via which they upload necessary information into the system. These portals are in English, but do not represent a barrier to communication as most healthcare providers in the kingdom speak English. The patient population on the other hand speaks Arabic or an Arabic dialect. All information relating to the treatment of diabetes is therefore translated into Arabic and sent to the patient in the form of a web based “booklet”. In this way the patients can learn about their disease and have the necessary information available to them when the clinic closes during the holiday season.



CHM in China

The Chinese healthcare sector is organized differently than in most Western countries. Partly this is due to the often substantial distance between the patient’s place of residence and the location of the hospital based healthcare provider. China has neither a model for proactive healthcare for the chronically ill nor a requirement for which care has to be provided to these patients at a reduced cost, as most patients have to pay for healthcare services themselves. To address the unique needs of the Chinese patients and providers, VitalHealth worked with local



partner “Comvee”³⁴ and used the CHM solution configured according to the wishes and requirements of the healthcare providers and patients in China.

The guiding principle for Comvee in this project is to improve healthcare for chronically ill patients in China and to make healthcare affordable for them. In order for this to occur, telemedicine functionality needs to be effective so healthcare can be coordinated and teleconsultations can be supported from a central location. This solution to the Chinese problem is based upon the ubiquitous nature of ‘cellular technology’ within China. If a medical visit is required, the patient can use a smartphone application to access a database to select a suitable doctor for his condition. Each healthcare provider works with shared electronic patient records. These records are used to create risk profiles and provide a way to give care recommendations based on the patient’s personal data. Patients have full access to their personal records, which they can also access from their smartphone. More than 200.000 people currently use the application. It allows patients to do home monitoring and not have to go to the hospital unless there is something specifically out of control, which requires greater medical input. The use of a call center is also part of the model in China with the goal of providing information or help to the patient in a more convenient way. Elderly adults may also prefer to have one of their children participate in the use of the application. In this way family relatives play an important role in providing care and thereby transforming the composition of the care team. The VitalHealth CHM solution supports this transition and the implications for more self-management and focus on personal (or family)



³⁴ <http://www.vitalhealthsoftware.nl/customer-testimonial/comvee>

responsibility for a person's individual health. The VitalHealth solution implemented with Comvee allows medical knowledge to empower individuals whenever they want the information, wherever they are and when they want it. Potentially scaling to tens of millions of people using 'mass customization' is enabled by VitalHealth's cloud based technology. This potential is already an important indication of the promise of shared value that VitalHealth's web-based technology can deliver.

3.2 | VitalHealth GDMS at Mayo Clinic

The United States Preventive Services Task Force (USPSTF) recommends that primary care providers address preventive services for the patient³⁵ during every visit, regardless of the reason for the visit. However, time constraints limit the physician's ability to deliver these services. It has been estimated that a typical physician would have to work 18 hours a day to address all preventive and chronic care services to all patients. Consequently, physicians are in practice able to deliver only half of the required preventive services. Clinical decision support (CDS) technology has the potential to save time and to ensure that patients receive necessary services³⁶.

Mayo Clinic together with VitalHealth designed and developed a patient-centric software application called GDMS (Generic Disease Management System). The application supports the needs of primary care physicians, allied health staff and patients. Patient and provider input was gathered and the software was designed to provide recommendations in a format for providers and in a patient-friendly version based upon the same data and guidelines.

The GDMS (Generic Disease Management System) system supports the physician provider care team by providing the right information for the right patient at the right

35 For example: AAA screening, check for vaccinations, etc. (see also further in the paragraph)

36 Chaudhry, et al., Innovations in the delivery of primary care services using a software solution: the Mayo Clinic's Generic Disease Management System, The International Journal of Person Centered Medicine Vol 2 Issue 3 pp 361-367

time to enhance care delivery and completion of preventive services in support of the USPSTF recommendations. Based on the feedback and time studies the system saves the physicians an average of five minutes per patient encounter, since the information is readily available to the care team members. The typical patient encounter in Primary Care is 15 to 20 minutes. Having the right information available, delivered through the GDMS solution, has improved the delivery of preventive care services. Since GDMS was implemented at Mayo Clinic there has been significant improvement in the percentage of appropriate adult immunizations administered and AAA³⁷ as shown in [Table 1](#) below³⁸.

Vaccine & AAA Screening	Before GDMS	Before GDMS	Before GDMS
Zorster Vaccine	111 (doses/month)	529 (doses/month)	376%
Pneumococcal Vaccine	331 (doses/month)	665 (doses/month)	101%
Tdap Vaccine	575 (doses/month)	925 (doses/month)	61%
AAA Screening	41%	45%	10%

³⁷ Abdominal aortic aneurysm (AAA) screening is a way of detecting a dangerous swelling (aneurysm) of the aorta, the main blood vessel that runs from the heart, down through the abdomen to the rest of the body.

³⁸ DeJesus, R. et al. (2012)

Table 1. Clinical impact of the GDMS tool

GDMS has been able to improve the appropriate utilization of the above vaccines and in doing so has improved the quality of care. Similar reminders, which are “pushed” by the GDMS tool, can help providers remember to screen individuals susceptible to conditions such as abdominal aortic aneurysm (AAA). Not all individuals need to be screened for this condition, but GDMS can suggest AAA screening to busy primary care providers when a set of conditions are identifiable in the electronic medical record (EMR). In addition to these clinical measures of improvement, a satisfaction survey of patients showed strong positive results³⁹. The software solution was accepted by primary care physicians and the allied staff and facilitated adherence to guidelines and quality measures.

3.3 | VitalHealth QuestManager

Within the mental healthcare sector, there is a growing need to understand the quality and effectiveness of care delivery. Routine Outcome Measurement (ROM)⁴⁰ techniques can be used to qualify and justify care delivery, both for internal as well as external purposes. With VitalHealth QuestManager the progress, quality and effectiveness of care can be measured for each individual patient using standardized questionnaires. The use of ROMs brings the patient’s voice not only to the virtual dialogue, which can inform her or his individual care, but also to the evaluation and identification of best practices and care plans.

VitalHealth QuestManager provides insight into the quality and effectiveness of care delivery. This solution allows patients to complete a questionnaire from a computer at home at the time of their initial evaluation. The information provided in this way allows the subsequent intake interview to focus on the major issues identified through the intake survey process. As such the time devoted to the intake interview can be more effectively used to meet the patient’s needs. At any given moment, the progress, quality and effectiveness of the patient’s care can also be measured utilizing QuestManager

39 Chaudhry et al (2012)

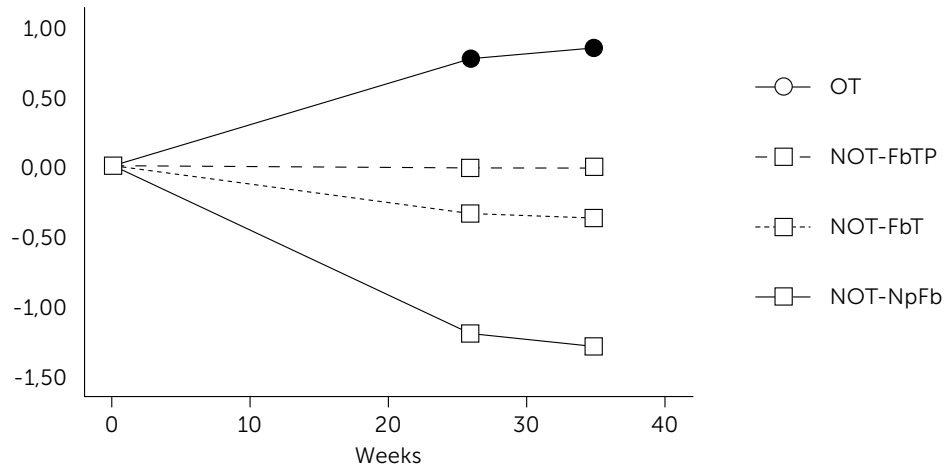
40 ROM refers to the process of regularly monitoring individual’s treatments, by requesting feedback from both patients and healthcare providers through validated measurement tools, with the aim of evaluating and – if needed – potentially adjusting the treatment. ROM has grown popular in mental healthcare and is increasingly used as a benchmarking tool to compare the performance of individual healthcare providers with that of their peers.

functionality, including using input from mobile devices such as smart phones and tablets. In response to such follow-up surveys treatment can be adjusted early, which helps avoid over-treatment and reduces the treatment's overall duration.

Research showed that measuring treatment progress with ROM is particularly helpful to identify patients who are not responding to their treatment as anticipated. The figure below shows that giving feedback to both the therapist and the patient can avoid negative effects during short-term therapies⁴¹.

41 Jong, K. de, A chance for change Building an outcome monitoring feedback system for outpatient mental health care, Dissertation Leiden University

42 This graph shows that patients who are not "on track" and have feedback (through ROM) have a better outcome than when they do not receive feedback. Those patients who are not "on track" and who in addition to getting feedback through ROMs also have their providers have the same feedback of the ROM, have an even better response. The key is that patient who are not "on track" and who do not get feedback and their providers do not get feedback using ROM, have the worst outcomes.



OT = on track, NOT-FbTP = not on track, feedback to therapist and patient, NOT-FbT = not on track, feedback to therapist, NOT-NFFb = not on track, no feedback⁴²

The QuestManager application, which is called QuestLink in the US, is also used for measuring Patient Reported Outcomes (PROs). PROs are calculated scores based on standardized and validated survey tools, using data collected via patient questionnaires. PROs are giving a voice to patients in their care and treatment process and these measures facilitate that best practices can be identified and disseminated globally, for example through organizations such as the International Consortium for Health Outcomes Measurement (ICHOM).⁴³ ICHOM's mission is "To unlock the potential of value-based health care by defining global Standard Sets of outcome measures that really matter to patients for the most relevant medical conditions and by driving adoption and reporting of these measures worldwide." Major stakeholders in the care delivery process, including most importantly the patient, have agreed upon the outcomes for the ICHOM Standard Sets. Collection of the outcome data for the ICHOM Standard Sets is facilitated by the use of electronic tools such as QuestManager. The efficient collection of this data using standard formats will allow for the comparison of outcomes across multiple practice sites across the world. Dissemination of the best practices will be a natural step once outcomes can be easily compared between sites. PROs data can also be used to monitor an individual patient through the course of their treatment and beyond. The PROs based numeric scores can be graphed to give care providers a quick overview of a patient's current condition and comparison with previous results. PROs data can be compared to normative values to monitor exceptions or alarming deviations from expected results. QuestManager automates the review process for PROs and can trigger interventions for patients who have significantly deviated from the expected care pathway. As a result hospital readmissions can potentially be avoided. Care providers can also use the outcomes to monitor and change the patient's treatment plan or aggregate the data at a population level to research care plan effectiveness and identify new best practices. This can lead to improved quality of care for many patients with similar conditions.

⁴³ www.ichom.org

VitalHealth is a certified vendor for ICHOM. ICHOM uses groups, including patients with a given condition, providers who treat that condition and other stakeholders to develop “standard sets” for outcome measurement. As a certified vendor ICHOM has recognized the impact that VitalHealth solutions have on enabling outcomes measurement for healthcare organizations, professional societies and governments around the world are recognizing the value of such measurements. Without tools, such as QuestManager, it will not be possible for society to effectively identify best practices and improve the care for populations. VitalHealth was founded on principles of collaborative health management for social or shared value. The facilitation of electronic patient reported outcomes is essential to the enablement of aforementioned patient-centered care.

QuestManager: impact at the micro level

Literature Review

The acceptance or rejection of an innovative e-health technology is arguably dependent upon multiple factors. Based upon a literature review⁴⁴ carried out by PROOF Impact, we argue that any such factors occur at three different levels, namely the macro level, the meso level, and the micro level. Besides broad economic gains (macro) or organizational benefits (meso), end user perceptions (micro) also make up part of the shared value and potential impact picture. This is in line with findings by Li et al (2013)⁴⁵ who conclude that: “Health care providers (e.g. medical doctors) are the key driving force in pushing e-health initiatives. Without their acceptance and actual use, those e-health benefits would be unlikely to be reaped.” The literature search’ objective for this paper was to gather a comprehensive overview of the anticipated benefits and concerns for both patient and provider. The unit of analysis in this QM study therefore was the individual, who is situated in the micro layer. Within the micro layer, we then chose to particularly focus on socio-behavioral outcomes (e.g. perceived benefits, concerns, attitudes, quality of life). See **Figure 11**.

44 See appendix II: research log

45 Li et al (2013) Health Care
Provider Adoption of eHealth:
Systematic Literature Review
[http://www.ncbi.nlm.nih.gov/
pmc/articles/PMC3628149/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3628149/)

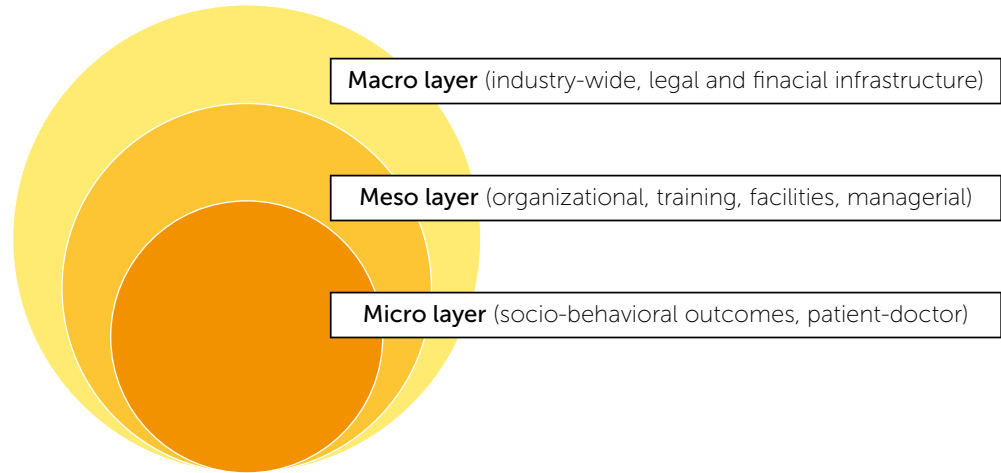


Figure 11: Conditions for e-health acceptance

What can be concluded from our literature search is that in the domain of chronic disease management and mental healthcare a finite set of factors seem to underlie the possible acceptance and success of e-health technologies. These factors are summarized in the **Table 2** on the next page.

Provider		Patient	
Benefits	Concerns	Benefits	Concerns
Improved workflow	Loss of professional autonomy	Increased usability	Decreased usability
Efficiency (accessibility, logistics)	Privacy uncertainty	Efficiency (accessibility, logistics, continuity of care)	Privacy uncertainty
Organizational incentives (managerial and technical support)	(Over-reliance on) decision support, decreased utility	Educational (informational component)	Reduction of face-to-face contact
External incentives (financial and legal issues)	Interruption of rapport with patient	Empowerment (individual disease management), improvements in personal rapport	Interruption of rapport with provider

Table 2. Provider and patient benefits and concerns in the e-health domain

Survey study

Despite the heterogeneous group of studies that make up the literature review, the findings show that the adoption of particular e-health technologies is a delicate process, influenced by many forces at play at different levels, and in which the end users also have a stake. The results in above table therefore served as the basis for the development of a survey to QuestManager end users.⁴⁶ The questions in this survey were designed to

⁴⁶ The host institution for this study was GGZ Delfland, a large provider of mental healthcare in the greater Delft region in the Netherlands.

measure perceived gains of e-health techniques and levels of patient satisfaction related to six socio-behavioral themes: safety and trust, empathy and patient-centeredness, efficiency and effectiveness, self management, accessibility and loyalty. Although QuestManager as a tool was not designed to specifically address self management and the tool only contributes partially to a patients perception of the other socio-behavioral domains, these domains are none the less ones which have been identified from the literature review as being important for the adoption of e-health solutions and were therefore deemed appropriate for this survey research.

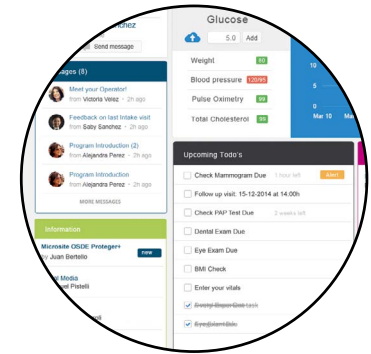
Overall, our analysis⁴⁷ of the survey paints the following picture: end users have a clear desire for a 'mixed method' approach. In other words, end users particularly favor when digital methods *complement* rather than *supplant* patient-doctor communication. Also patients value the fact that digitized care can reduce physical and temporal barriers. One woman mentioned: "...Digitally I work faster, and I can complete the list at a time and pace of my liking." At the same time, digitized care can also reduce psychological barriers. As one end user shares: "...Behind the computer I dare to speak up", and "...Nobody likes to visit a mental care facility in person." On the other hand, patients also put any such benefits into perspective, and may be subject to a standardization of their individual conditions. As one patient mentioned: "...Questionnaires are snap-shot images, in which many additional factors play a role that remain underemphasized." Our findings also show that our sample did not view privacy concerns to be as big a barrier as is often predicted in the literature. Finally, and concurrent with findings from the literature, we see that younger patients consistently rate digital communication methods more desirable than their older counterparts. We conclude that technological innovations, such as digital questionnaires delivered via QM, impact the doctor-patient relationship in a number of ways. Via researching and understanding these delicate balances, VitalHealth is consistently looking to optimize its micro level impact on end users.

⁴⁷ See appendix II: research log

3.4 | VitalHealth EHR at OSDE in Argentina

The Argentina based healthcare provider and insurance company OSDE defined two problems that often occur among the chronically ill: isolation and mounting costs. In addition, the 10% annual growth rate of chronically ill patients in Argentina is much higher than the country's 5% annual population increase. OSDE decided that a solution had to be found to address the rising burden of chronic disease care in Argentina. OSDE's goal was to reduce the number of emergency department visits/admissions, while simultaneously increasing customer appreciation/ satisfaction. The result of their efforts is a solution that does not focus on medical treatment of the patient or on eliminating doctor office visits. What OSDE offers is an extra service to maintain contact with the patient via a call center to ensure that patients continue to follow their care plan. In addition, the patient has access to a personal web portal. The call center contacts the patient for things such as follow-ups and reminders relating to preventive services. For example, the patient is reminded to schedule a periodic check-up or receives a follow-up call after a treatment. In this way the VitalHealth solution helps OSDE to ensure that patients receive optimal therapy based upon information they provide to the call center between their face-to-face provider visits.

What is unique about OSDE is the patient-oriented focus. Many patients are at high risk for hospitalization and higher use of healthcare resources. Therefore the use of tools to monitor the patient's daily condition helps to ensure there is intervention at an earlier stage and reduce the likelihood of hospitalization. Patients using the portal get information



pushed to them based upon their condition. In addition, they can define near term goals for themselves and the system monitors their progress relative to reaching those goals. Research has shown that when patients participate in goal setting the likelihood of achieving those goals increases. The direct, personal contact with the patient makes it possible for both the healthcare provider and the patient to closely monitor the chronic disease, thereby helping to prevent the administration of acute care. The various call center staff members have different backgrounds including a doctor, a pharmacist and a biologist or psychiatrist. They are therefore capable of helping the patients medically as well as in social areas. The call center operators (CCOs) monitor the patient's condition for medical deterioration and offer support if needed, in addition to advising the patient on how to live a healthy lifestyle. The patient is assigned to a CCO upon registration and can call or use the web portal to maintain contact. The portal was developed in collaboration with VitalHealth and is directly linked to a patient's electronic record.



The patient web portal is also used to send specific documents and reminders to the patient. Care for each patient is individualized as patients can use the portal to define their own personal objectives such as healthy living goals. These goals can then be tracked over time by both the patient and their care team including the CCO. Currently, the call center primarily offers support for individuals with diabetes, COPD, CVRM and hypertension. But OSDE maintains a holistic approach and also supports diseases that are not included in their standard package.

VitalHealth concludes that this approach is enabling a more effective delivery of services to patients. As an insurance provider, OSDE recognizes the financial value of working with VitalHealth solutions. They also need to ensure that their customers have a positive experience with the solution. The combination of high tech and high touch implemented in this case show a direction for migration from a doctor/facility centric approach to the delivery of healthcare to a patient-centered approach.



4 | Conclusions

This document provides an indication of whether the VitalHealth investment is moving into the right direction and acts as a signal to the impact investor of how its investment thesis is unfolding in practice. We have tried to explain how VitalHealth's efforts to simultaneously generate societal and financial gains through e-health solutions embody the idea of creating shared value in healthcare. The examples demonstrate that VitalHealth's software has an immense potential to provide adequate healthcare services to previously deprived or underserved populations. As such the potential impact of the company's product portfolio can add value to society and to impact investors. Creating shared value from an impact investor's point of view actively advances the societal gains of a particular investment as it specifically defines and pursues non-financial objectives. VitalHealth is a case in point as it specifically targets improved self-management and control by patients of their disease. It therefore supersedes existing responsible investment approaches, characterized by the screening of negative investment options.

48 Explained by Harvard Prof. Clayton Christensen in his book *The innovator's prescription: a disruptive solution for healthcare*, which describes recent innovations in healthcare using the decentralization metaphor.

We witness a recent and clear trend in healthcare towards on the one hand patient-centered care rather than physician-centered care, and on the other hand towards integrated care and away from isolated care. The decentralization trend⁴⁸ from provider to consumer coincides with innovations in other sectors of the economy, like banking or travel, and allows patients to approach their general physicians per mobile device, engage in tele-consults and increasingly become managers of their own health. At the

same time, ICT conditions the way healthcare professionals interact among themselves and how they share data with pharmacies, laboratories and hospitals.⁴⁹ VitalHealth's product portfolio and platform technology allows the provision of adequate patient- (and sometimes client-) centered care in an efficient way and on a significant scale. Nevertheless, as the technology further develops and is implemented on a global scale, a focus on impact requires continuous monitoring and assessment of unintended and unanticipated consequences – for instance with regard to a fair distribution of access and services. Particularly from an impact investors' perspective, the search and monitoring of unforeseen consequences (in terms of outputs and outcomes) is seen as a *conditio sine qua non* for investment to adequately manage reputation risk. Investors – and in particular institutional investors – do not like to be surprised by negative publicity, potentially leading to reputation damage.

49 Nictiz e-health monitor (2014)

50 Obviously, but this is not the topic of this study, mainstream impact investors such as pension funds, insurance companies or asset managers, require the investment to yield market-rate returns. Foundations, High Net Worth Individuals or governments might be more inclined to accept returns that are below the market-rate. A recent benchmark study by Cambridge Associates and the GIIN (2015) demonstrates that private equity investments in companies with a clear focus on creating shared value and positive impact, do not underperform their peers that do not focus on impact and shared value.

4.1 | Impacting healthcare: a multilayered perspective

In the previous chapters we have described how VitalHealth's varied product portfolio impacts the healthcare process in a number of ways. To dissect the multifaceted concept of impact, we chose to distinguish between three main levels of impact, i.e. impact at the societal or macro level; at the organizational or meso level; and at the end user or micro level. We posit that all three levels must be taken into account to be able to make a sensible assumption about the extent to which shared value is created and to which potential impact investors will be interested in allocating capital to the company⁵⁰.

At the macro level we have seen that the combination of task delegation supported by the VitalHealth CHM solution resulted in lower costs to society as a result of positive effects for both patients (fewer cardiovascular events) and society (lower costs associated with cardiovascular treatments). Internationally, VitalHealth can assist traditionally dispersed

healthcare systems – for example those in China – to transform into more integrated ones by supporting teleconsultations and effective telemedicine functionality. More than 200,000 people currently use the application for the Chinese market in which patients use cellular technology and mobile devices to access databases and select suitable doctors. Scaling to millions of people using ‘mass customization’ is enabled by VitalHealth’s cloud based technology. In South America, VitalHealth teamed up with Argentina based healthcare provider and insurance company OSDE to tackle two problems that often occur among the chronically ill: isolation and mounting costs. OSDE’s call center approach in which patients more closely monitor their chronic disease, helps to prevent the administration of acute care, and show a direction for migration from a doctor and facility centric approach to the delivery of healthcare to a patient-centered approach. The different approaches in the different countries demonstrate that there is no ‘one size fits all’ solution. VitalHealth’s product portfolio allows the company to be flexible in serving the needs of the healthcare system, the healthcare providers and the patients (or sometimes clients) in a multifaceted way.

At the organizational or meso level, we described how VitalHealth’s GDMS tool makes information more readily available to care team members and reduces the time physicians need per non-direct patient encounter. Consequently, having the right information available has improved the delivery of preventive care services. In the OSDE case, the patient has access to a personal web portal and a call center for things such as follow-ups and reminders relating to preventive services. For example, the patient is reminded to schedule a periodic check-up or receives a follow-up call after a treatment. In this way the VitalHealth solution helps OSDE to ensure that patients receive optimal therapy based upon information they provide to the call center in between their face-to-face provider visits. Such close monitoring of chronic diseases helps to prevent the administration of acute care and increases efficiency and effectiveness at the organizational level.

Any such improvements in clinical terms also impact patients at the individual level. OSDE and VitalHealth offer an extra service to maintain contact with the patient via a call center to ensure that patients continue to follow their care plans, reducing hospitalizations, and increasing customers' participation. The direct, personal contact with the patient increases the possibility for both the healthcare insurer and the patient to closely monitor the chronic disease, and the prevention of acute care.

VitalHealth's QuestManager product measures the progress, quality and effectiveness of care for individual patients using standardized questionnaires and can avoid over-treatment and an unnecessary increase of the treatment's overall duration. As such, the digitization of care helps to reduce temporal, physical and even psychological barriers at the individual level. Patient-clients do not need to be physically present and some prefer the safety of their own home environment over the visit to a more distant healthcare facility. On the contrary, any unintended consequences of e-health can include a standardization of patients and a mechanization of care. Our survey study shows that end users favor when digital methods *complement* rather than *supplant* patient-doctor communication. The active management of any such unintended consequences at the micro level can be important from an investor's point of view to mitigate risk⁵¹, also taking into account perceptions of the general public. As such, it becomes clear that impact on the healthcare process is a holistic phenomenon in which macro, meso and micro effects all influence each other and make up parts of the bigger whole of healthcare quality. By introducing the solutions of VitalHealth, explaining shifts in the e-health domain, and describing how e-health solutions touch upon the quality of care, this document adds to our understanding of impact investing and impact measurement in the healthcare sector. Future research should continue to study impact in all its facets and aim to translate findings into a standardized measurement language. The Global Impact Investing Network

51 Jed Emerson, leading thinker on impact investing, stresses the importance of 'impact risk' as the possibility that what at first may be viewed as a good thing, may actually end up being not so good (Emerson, 2011: p. 3).

(GIIN) aims to realize such a standardized language through IRIS, which collects a growing taxonomy of impact indicators per industry. In appendix III we have added some metrics that according to us would qualify for incorporation in the IRIS catalog's (electronic) healthcare domain. Additional (empiric) research stimulates reporting on relevant impact indicators. Taken together, these efforts can further objectify the measurement of impact and demonstrate how private capital sets in motion a series of mechanisms that are of measurable benefit to stakeholders and society.

4.2 | Limitations

We chose to break down the concept of impact into three levels and argued that following the investor's impact thesis, the impact of individual investments can be analyzed on a macro, meso and micro level to enhance the creation of shared value. A better understanding of how impact unfolds in each of these domains helps investors to assess how their investments have the potential to simultaneously achieve solid financial as well as clear social objectives. Although we have provided a number of snapshot images of how the VitalHealth investment case is unfolding in practice, difficulties with external validity and the lack of a standardized measurement tool, make the act of impact measurement a notoriously complex and likely imperfect one. In chapter three we have tried to tackle the problem of external validity by discussing different cases, including the GDMS solution that demonstrably improves health outcomes that touch upon the lives of end users, benefits clinical organizations and serves society as a whole.

4.3 | Last words

This study shows that VitalHealth is an innovative company creating products and services that potentially have an enormous impact on the access to quality healthcare services in previously underserved or deprived communities – particularly in emerging economies.

In addition, the product portfolio entails a promise to contribute to improving the efficient delivery of healthcare services in more developed countries such as the USA and the Netherlands.

With this perspective in mind VitalHealth's impact investors – including Noaber Foundation – have initiated a development that can become bigger than the company itself. Nevertheless, one of the key drivers for Noaber Foundation is to start ventures that have the potential of becoming mainstream and attracting capital from institutional investors, such as pension funds. The objective is to enhance long-term capital investing in health related social development – more in particular healthy aging.

VitalHealth has taken some important steps to measure the outputs and potential outcomes of its interventions, particularly at the level of its Triple Ten Targets. This is very laudable. However, the PROOF of the entire impact pudding lies in the eating of some additional bits and pieces. In line with Emerson we suggest VitalHealth to continue with its Social Return on Investment approach, but to complement it with a risk-based approach. This requires a forward-looking, future-oriented approach – in addition to the backward looking measurement of outputs, outcomes and potential impact. Instruments like QuestManager and the survey we conducted in this study are helpful to shed light on potential downsides of the VitalHealth product pallet – now and in the future.

Appendices



Appendix 1 | A phased approach to impact investing

52 Awareness or enlightenment refers to what extent the innovation punctures old myths and offers new perspectives and – as such – is reflected in the current state of mind of the popular and scientific thinking (cf. Weiss, 1999)

53 Adoption can be described as to what extent and by who these ideas have been embraced as concrete solutions. Adoption relates to the extent to which VitalHealth has found partners, clients for and co-developers of its technology. See also Tornatzky and Klein (1982) and conform the idea of emerging patterns and dominant designs by Tushman and Anderson (1990).

Throughout this report we have come to conclude that impact manifests itself roughly across three levels. At the same time, it is to the contention of PROOF that the impact of VitalHealth's innovations proceed sequentially, i.e. starting with a phase of awareness (or enlightenment)⁵², followed by a phase of adoption⁵³, to ultimately arrive at the stage of achievement (or goal attainment)⁵⁴. We have combined these terms that belong both to summative and formative evaluation traditions to improve our understanding of how the impact of a particular innovation affects the present and settles for success in the future. Moreover, we believe that the extent to which these terms reinforce each other, serves as an indication to the investor of how its investment is proceeding in practice. **Figure 12** depicts both these multilevel and sequential aspects.

At the awareness stage, the key challenges for VitalHealth have been to identify unmet end user needs and to subsequently promote their e-health solutions in the market. Because of both the background of the impact investor as well as founding partner the Mayo Clinic, network effects include the knowledge to build a product portfolio around it with the potential to be introduced in nationally and international markets alike. In the adoption stage the end users take the role of "gatekeepers". Patient-clients and doctors, as the end users of the e-health technologies, can both stifle and push the adoption of e-health solutions. At the meso level, organizational outcomes such as an improved workflow and increased interoperability of systems encourages new product development

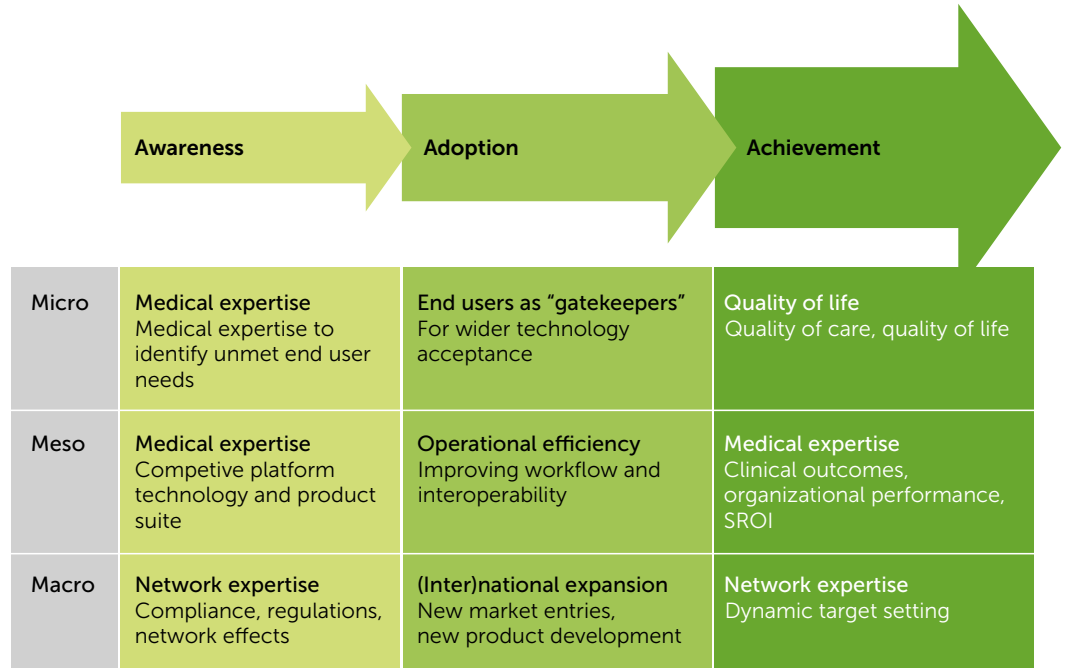


Figure 12. A phased and multilayered approach to impact investing

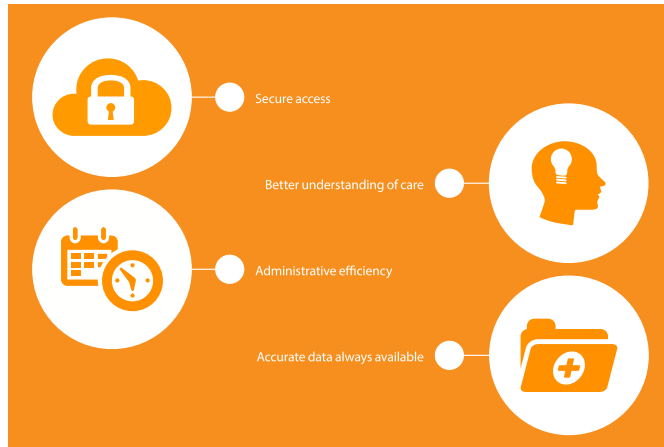
and an eventual expansion into international markets. Collaborations with aforementioned partnering organizations have allowed VitalHealth's solutions to be adopted internationally, including in regions such as Asia and South America. Subsequently, in the achievement stage, the impact investor and investee connect back to the predefined impact targets. At the micro-level these targets may include a better quality of care for patient-clients. At the meso level, outcomes across organizations can be accumulated and help to identify best practices. As such, with an increasing number of participating organizations, operational efficiency throughout the sector can be improved to account for monetary gains to society and relieving the burden of rising healthcare costs. Ultimately, by increasing the scope and reach of the product portfolio, VitalHealth keeps close track of its triple ten targets while fulfilling its corporate mission of improving the health of millions of people through e-health.

54 Goal attainment, finally, refers to what extent the goals as set out in the investment thesis have been achieved by comparing *a priori* declared investment goals with *a posteriori* operative achievements. See also Hansen (2005).

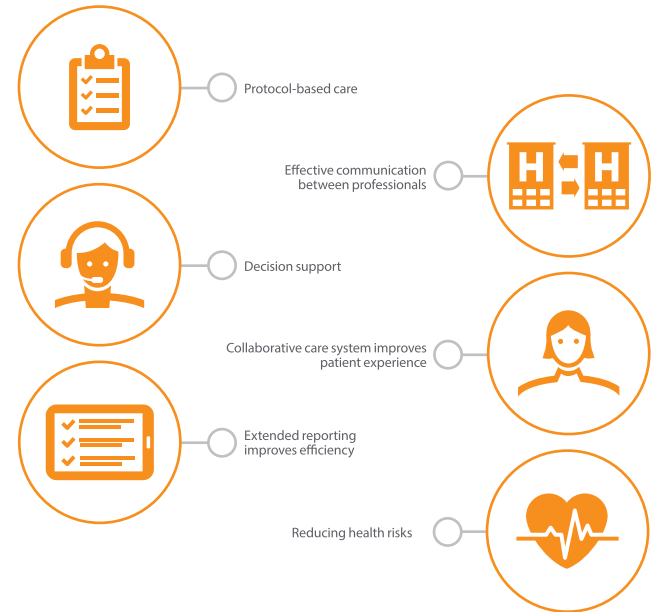
Appendix 2 | Infographics VitalHealth product portfolio

A | Collaborative Health Management

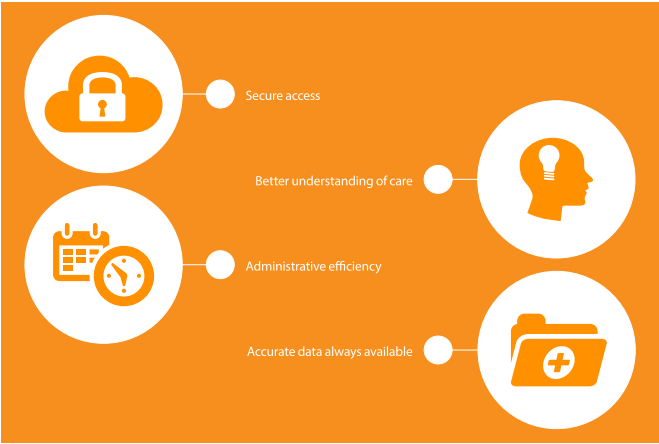
General Indicators



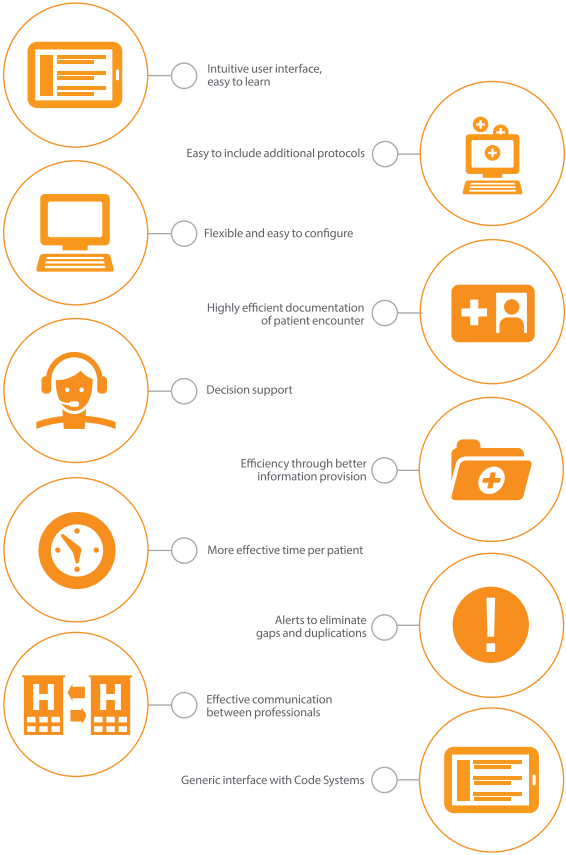
Product Specific Indicators



General Indicators

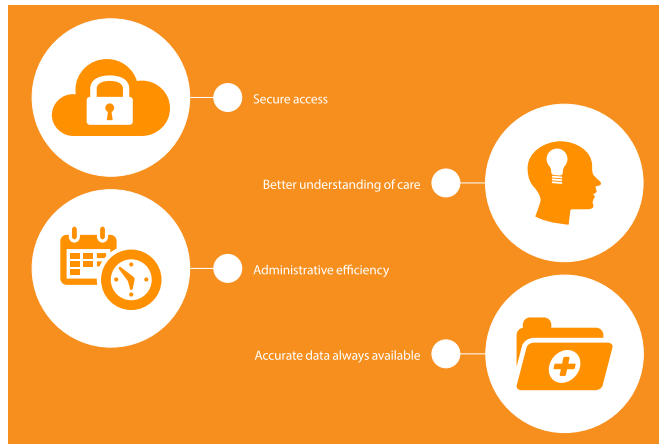


Product Specific Indicators

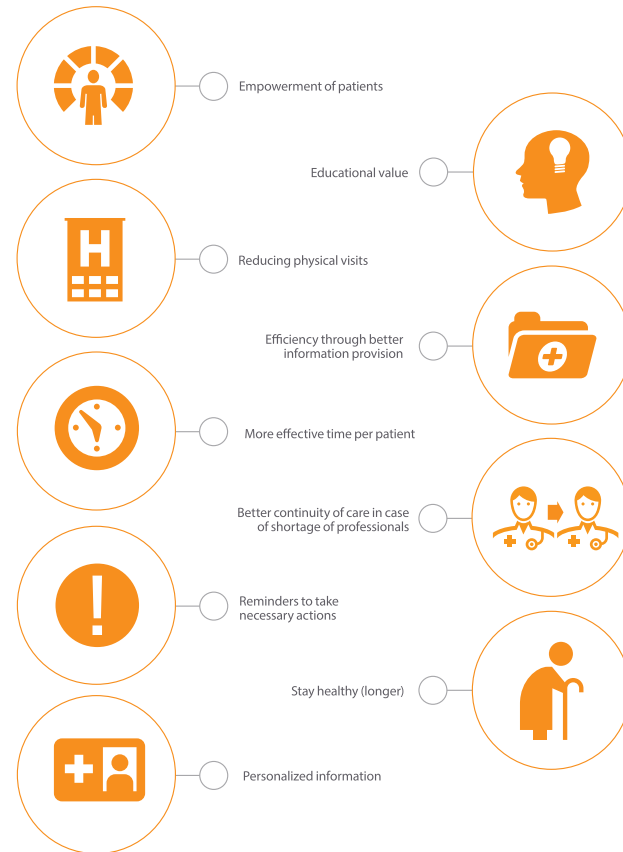


C | e-Vita Platform for selfmanagement

General Indicators



Product Specific Indicators



General Indicators



Product Specific Indicators



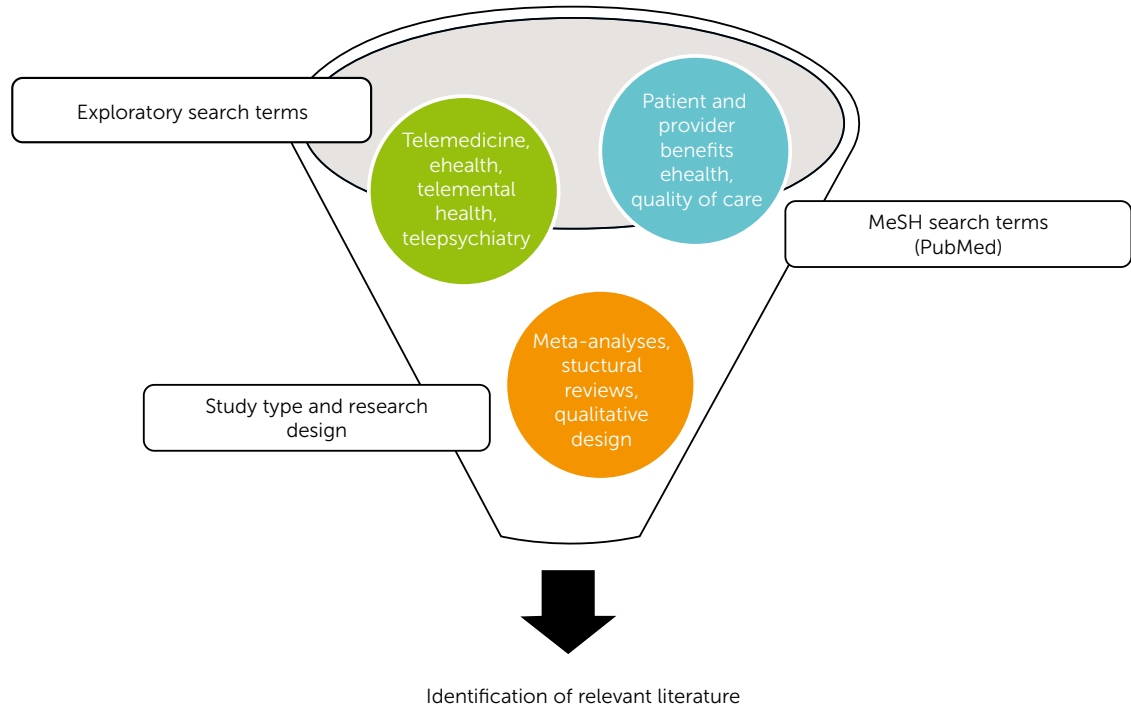
Appendix 3 | **Research log literature review and survey design**

Search strategy

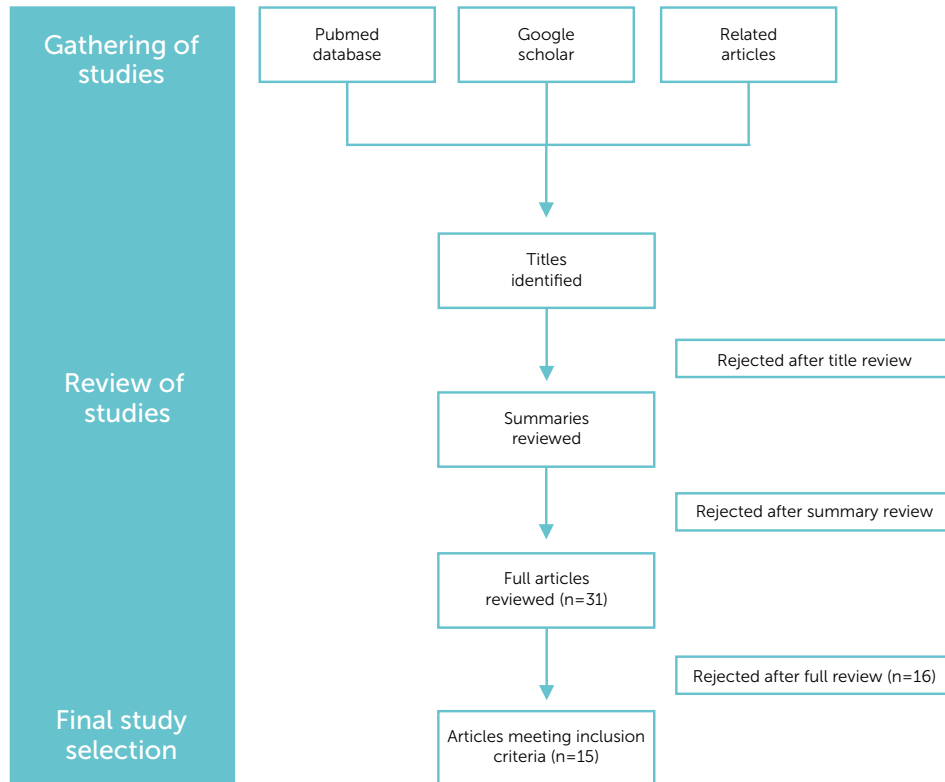
We performed three searches to organize the number of academic literature covering the area of e-health. Our objective was to gather a comprehensive overview of the anticipated benefits and concerns for both patient and provider. See [Figure 13](#): Search terms e-health literature

Selection criteria

Study designs we were particularly interested in included systematic reviews, meta-analyses and so-called reviews of reviews. Articles in academic journals and book chapters were included taking into account the year of publication; contributions could still be relevant despite being outdated in terms of the then available technical solutions. With the micro-level as the unit of analysis, the qualitative research approach was deemed particularly effective to explore relevant dimensions for the doctor and the patient. In total, 673 titles were identified, of which ultimately 15 met the inclusion criteria. See [Figure 14](#): Literature search and selection process.



See Figure 13. Search terms e-health literature



See Figure 13. Literature search and selection process.

Data synthesis

We systematically collected data on the key benefits and concerns of e-health solutions, in terms of the interaction between healthcare provider and healthcare recipient. We looked for data relating to factors at the healthcare *professional-patient relationship* in terms of perceived quality of care and quality of life more broadly.⁵⁵

Survey design

The study questionnaire included 19 items related to patient perceptions and was expected to take between two to five minutes to complete.⁵⁶ To maximize the response rate, we emphasized that respondents would remain anonymous and data would be presented in aggregate form. Wording and phrasing was carefully considered to account with the target population and make the questionnaire as accessible and clear as possible. It was clearly stressed that we evaluate the *method* of using digital questionnaires as part of the individual's complete therapeutic program, i.e. not the particular quality of the validated questionnaires themselves. Besides the closed questions, there was one question in which individuals were encouraged to describe in more detail whether or not they would recommend working with digital questionnaires.⁵⁷

134 questionnaires were returned. Thirty-four surveys proved to be either incomplete or otherwise not of use, for example if completion time was unrealistically short or if for all answers one and the same answer was given. Ultimately a sample of 100 patients responded adequately to the survey. Results were both analyzed quantitatively and qualitatively. For the closed questions IBM SPSS 22 software was used and for the open questions QSR NVivo 10. Survey questions included:

- 55 The full list of references and identified themes from the literature are available upon request
- 56 Question content was based on the literature review; question wording was chosen via literature consultation of Yin (2009) and Groves et al. (2009), checked by VH's account manager and two GGZ Delfland representatives.
- 57 Using descriptive statistics to analyze the Likert scores, and independent samples T-tests and Kruskal-Wallis tests to subsequently distinguish among groups.
- 58 Also featured in VitalHealth's triple ten targets: caregivers employed (healthcare professionals), clients (patients), and diseases (diabetes, cardiovascular diseases, etc.)

1	Ik kan mij veel beter voorbereiden op een afspraak als ik van tevoren een digitale vragenlijst heb ingevuld.	I can prepare much better for a meeting with my doctor if I filled in a preparatory digital questionnaire beforehand.
2	Er moet altijd iemand aanwezig zijn ter ondersteuning als ik een digitale vragenlijst invul.	I need someone available for assistance at all times when I fill in a digital questionnaire.
3	Als ik gebruik maak van digitale vragenlijsten heb ik het gevoel dat mijn privacy extra risico loopt.	When I use digital questionnaires, I feel my privacy runs additional risks.
4	Ik ben veel meer betrokken geraakt bij mijn behandeling door te werken met een digitale vragenlijst.	Because of working with digital questionnaires, I am much more engaged with my treatment.
5	Ik ben veel meer te weten gekomen over mijn behandeling door te werken met een digitale vragenlijst.	Because of working with digital questionnaires, I am much better informed about my treatment.
6	Ik vind het heel handig om de vragenlijst op afstand, bijvoorbeeld vanuit huis, in te vullen.	I highly appreciate the fact that I can fill in such questionnaires online, for example whilst I'm at home.
7	Digitale vragenlijsten dragen bij aan een effectievere behandeling.	Digital questionnaires contribute to a more effective treatment.
8	Het invullen van digitale vragenlijsten gaat ten koste van het persoonlijk contact met mijn behandelaar.	Working with digital questionnaires comes at the expense of the personal rapport with my doctor.
9	Digitale vragenlijsten geven mij het gevoel dat mijn behandelaar minder tijd voor me heeft.	Working with digital questionnaires implies that my doctor has less time available for my particular treatment.
10	Door gebruik te maken van digitale vragenlijsten kan mijn behandelaar mij beter ondersteunen.	Using digital questionnaires, my doctor is able to add to the quality of the overall treatment

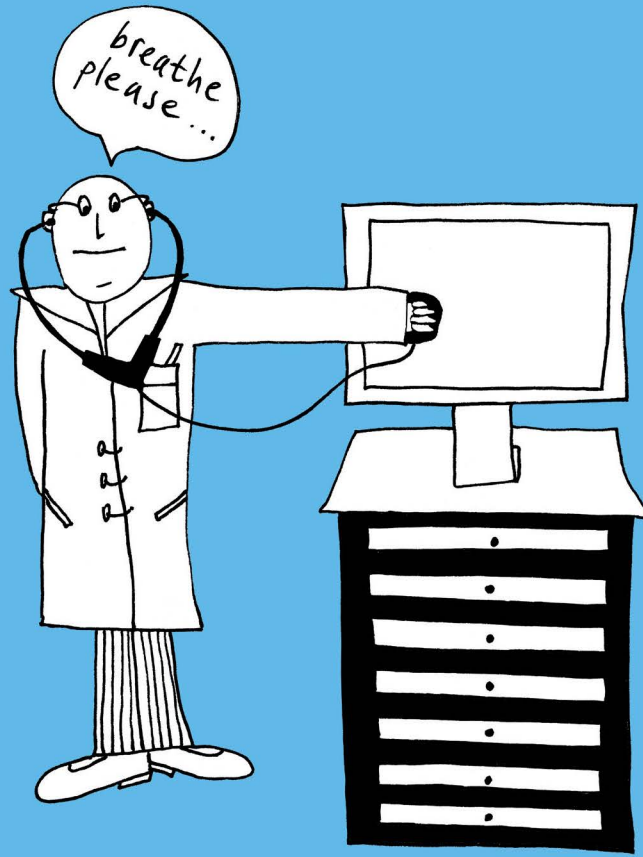
11	Algemeen genomen, hoe groot is de kans dat u het werken met digitale vragenlijsten zou aanbevelen aan mede-patiënten? Wat is hiervoor de belangrijkste reden?	In general, how likely is it for you to recommend working with digital questionnaires to fellow-patients? What is the main reason?
12	Tijdens een digitale behandeling heb ik er vertrouwen in dat mijn persoonsgegevens goed worden beschermd.	During a digital treatment session, I trust that my personal data is being dealt with confidentially.
13	Contact met mijn behandelaar één op één vind ik prettiger dan contact met mijn behandelaar via een computerscherm.	I prefer one on one contact over connecting via a digital device.
14	In het algemeen geeft het mij een heel veilig gevoel als ik via de computer met mijn behandeling bezig ben.	In general, I feel completely safe when working on my treatment via the computer.
	Wat is uw geslacht? (M=1,V=0)	Gender?
	Wat is uw leeftijd?	Age?
	Wat is de hoogste opleiding die u heeft voltooid?	Educational level?
	Heeft u vragen of opmerkingen?	Additional questions/ remarks?

Appendix 4 | **Health metrics in IRIS**

The Impact Reporting and Investment Standards (IRIS) framework by the Global Impact Investing Network (GIIN) is the catalog of generally-accepted performance metrics that leading impact investors use to measure social, environmental, and financial success, evaluate deals, and grow the credibility of the impact investing industry. As we have shown in this report, the impact investor (Noaber Foundation) wishes to support game changing innovations in healthcare, and the impact investee (VitalHealth Software) aims to impact the lives of millions of individuals through e-health solutions. For the investor, IRIS can be useful to analyze VitalHealth's development marking its first decade of existence, and for the investee IRIS can be useful to track advancements and achievements over time. Keeping track of these indicators is not only relevant in retrospect to determine what has been achieved so far; it is of relevance for both impact investor and investee to monitor achievements in the years to come and therefore can be used prospectively. Besides relevant metrics that the IRIS catalog already features (denoted by an individual ID code), we propose the inclusion of a set of additional metrics based on our findings in this report with the aim of increasing the relevancy of the framework for both the investor and investee.

IRIS ID	Impact type	Metric name	Measure	Definition
(OI5796)	Social	Caregivers Employed: Total	Number of people	Number of caregivers, with current licenses, certifications, or trainings based on local requirements, employed by the organization as of the end of the reporting period.
(PI2822)	Social	Client Individuals: Provided New Access to healthcare ⁵⁸	Number of people	Number of client individuals who were served by the organization and provided access, during the reporting period, to products/services they were unable to access prior to the reporting period.
(PI5184)	Social	Client transactions	Number of sales transactions	Number of sales or client transactions during the reporting period
(PD3569)	Social	Poverty Assessment	Yes/No	Indicate whether the organization assesses the poverty levels of its intended beneficiaries. Organizations should footnote the details around the frequency and ways in which poverty levels are assessed and the type of beneficiary (clients, suppliers, distributors, etc.) assessed.
(PD5752)	Social	Target Beneficiary Demographic	Selection	Demographic groups of beneficiaries targeted by the organization. Select all that apply: Children (younger than 10 years old), Adolescents (10 year of age or older but younger than 19), Adults, Elderly/older adults, Persons with disabilities, Minority/previously excluded populations, Women, other target populations.
(PD2541)	Social	Target Beneficiary Socioeconomics	Selection	Socioeconomic groups of beneficiaries targeted by the organization. Select all that apply: very poor, poor, low income, other.

IRIS ID	Impact type	Metric name	Measure	Definition
(PI2845)	Social	Client Households: Provided New Access	Number of households	Number of unique households that were clients of the organization and provided access, during the reporting period, to products/services they were unable to access prior to the reporting period.
*	Social	Levels of productivity [healthcare professional]	Number of patients	Number of clients under treatment per healthcare professional.
*	Social/ clinical	Prevention of (acute) care administration	Number of treatments	Reduction in number of treatments after preventive screening through e-health solutions.
*	Social	Reduction of physical barriers	Number of patients	Connecting remote households to conventional healthcare infrastructure.
*	Social/ clinical	Reduction of temporal barriers	Minutes	Average time savings per patient encounter as a result of increased efficiency .
*	Social	Self management	Number of logins	Intensity with which patients login to a portal, and/ or engage in (tele)consulting.



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