

# **Business Modeling: The Recipe for E-Health Success in Africa**

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**Abstract.** *The world has a new disease: successful e-health pilots that are ended before the actual product or service commercialization phase. It is an epidemic disorder that seems to spread rapidly. This paper searches for a remedy against this disease. By exploring five successful cases where e-health went beyond the pilot phase, we hope to explore some best practices that may show Africa the way to implementing sustainable e-health innovations. We reached the following results. Theoretically, we found that e-health business model designs can help in explaining the success of specific e-health service innovations but we also found that these models mostly neglect the actual effort needed to create value. When analyzing the cases, we see that the business model concept is often applied in a too late stadium (post ante) and focuses too much on efficiency and not so much on e.g. user experience quality or convenience. These efficiency goals are mostly not met. Practically, we found communalities in the successful projects that can help making future e-health initiatives more successful and sustainable based on which we conclude that the usage of ex ante business model designs that include human capacity, motivation and effort will improve the chance of sustaining e-health initiatives. In Europe, this can be regarded as a luxury challenge but in Africa this is a necessity.*

**Keywords:** E-health, Business modeling, success, viability, sustainability.

## **INTRODUCTION**

“The late James Grant declared that 80% of the children who died in Africa during his term as Executive Director of UNICEF could have been saved because the knowledge to save them existed.” (Kwankam, 2004). E-health is one of the most important instruments to cross the know-do gap. The diffusion of telemedicine can help the knowledge diffusion in Africa (Kifle, Mbarika et al. 2006). Despite the rising Internet usage and the mobile telecom revolution, the digital divide has not narrowed (Fuchs and Horak 2008). In practice, we see many technology focused e-health pilot projects that stop before the actual commercialization phase. In other words, a new disease seems to be emerging: the disease of successful e-health pilots that end before the actual product or service commercialization phase.

According to Al-Debei and Avison (2010), the business model concept still has a fuzzy and vague character, despite agreement within literature on the importance of business modeling to the success of an organization. The business model concept looks promising also in the context of e-health service

commercialization, despite the fact that literature on e-health business models is still limited (Kijl, Nieuwenhuis et al. 2010).

By studying five best practices of e-health initiatives, this paper wants to explore two main dimensions of business modeling: value creation and value capturing.

The paper is structured as follows: first, business modeling is defined and explained, after which the research method is shown. In the third section, five e-health pilot cases are described. Next, the main communalities and differences are described via a concise cross case analysis. The paper ends with conclusions and recommendations.

## **LITERATURE REVIEW**

During the Internet boom-bust cycle of 1998-2000, the term ‘business model’ was one of the great buzzwords. All a company needed at that time was a web-based business model that promised wild profits in a distant future (Magretta 2002). After the boom-bust cycle, research focused on how to define and decompose business models.

In the 1970s, the business model concept was already being used but mainly for describing IT-related business processes (Konczal 1975; Stähler 2002). More recently, the business model concept has been used for analysing market structures as well as strategic choices related to positioning of organizations within these market structures (Porter 2001; Chesbrough 2003; Hedman and Kalling 2003; Bouwman, Faber et al. 2008).

In most business model definitions, we can recognize the assumption that a business model should describe the business logic behind value creation with a specific product or service (Magretta 2002). The business model concept may support simulating, analysing, and understanding current or new business ideas and exploiting these ideas (Osterwalder, Pigneur et al. 2005; Osterwalder and Pigneur 2009).

Main question is how to create value, for the participating organizations needed for offering the product or service as well as for their customers: it’s about how to optimally combine maximum value creation with maximum value capturing. A business model therefore can be defined as a description of how an organization or group of organizations offers value to their customers and end users and how these organizations will be compensated for offering this value, e.g. by a one-time payment, via subscription fees or via advertisements (Haaker, Faber et al. 2006; Bouwman, Faber et al. 2008; Osterwalder and Pigneur 2009) and as such as a concept that can be positioned between the competitive strategy and business processes of organizations (Magretta 2002). A widely used business model definition within this context is that of Chesbrough and Rosenbloom (2002), who define a business model as “a blueprint for how a network of organizations co-operates in creating and capturing value from technological innovation”.

In other words, a business model focuses on value from two perspectives (Bouwman, Faber et al. 2008; Teece 2010):

1. The *value creation* perspective with a focus on the value offered to the customer (who pays for a service) and end user (who uses a product or service) – cf. the value proposition concept. The main question here is: who do you expect to consume or pay for your product or service and why would he or she do so?
2. The *value capturing* perspective with a focus on the organizations needed for offering a specific product or service – cf. the value network concept with an overview of organizational roles needed and the revenue model concept that describes how value can be captured. In this case the main question is: how do you make money with a specific product or service?

As of yet there is no consensus regarding business model components – some researchers focus on

revenue models only, whereas others have a broader perspective and also look at concepts like value propositions and technological architectures when describing or analysing business models. However, recent work by Al-Debei and Avison (2010) on developing a unified framework of the business model concept identifies four primary value dimensions or components: value-proposition (offering value structure), value-architecture (technological architecture and organizational infrastructure), value-network (business and customer actors web), and value-finance (financial setups and returns). These dimensions resemble the ones as identified by Bouwman et al. (2008) and Osterwalder et al. (2005; 2009) and to a lesser extend also Shafer et al. (2005). Table 1 compares the dimensions of Al De-bei and Avison (2010) with the dimensions of four other business modeling contributions.

Al Debei & Avison	Osterwalder et al.	Chesbrough and Rosenbloom	Bouwman et al.	Shafer et al.
value proposition	value proposition	value proposition	service domain	create value
value network	customer interface	market segment	service + organization domain	value network
value architecture	infrastructure management	structure of value chain	organization domain	value network
		position in the value chain	technology domain	strategic choices
value economics	financial aspects	cost structure	financial domain	capture value

Table 1 - Business Modeling Dimensions comparison

The overview shows that researchers agree on the two main business model dimensions, value creation (mostly called value proposition) and value capturing (financials, economics, costs and revenues). As costs are handled within the value capturing dimension that we consider as monetary effort (Murphy and Enis 1986), we handle the non-monetary efforts, capability and time, in the value creation dimension. The other two dimensions are more diffuse in literature. Table 2 shows the conceptual research model in which we want to describe the relation between value creation levels and value capturing levels by staying close to the definition of business modeling from Chesbrough and Rosenbloom (2002) as mentioned above.

→ Value creation level ↓ Value capturing level	Low	Medium	High
Low	Lowest business model viability (inverse assumption)		
Medium			
High			Highest business model viability (assumption)

Table 2 – Relation between value creation and value capturing

The main assumption of this study can be formulated in relation with Table 2:

*An e-health initiative will be successful and sustainable when both the levels of value creation and value capturing are high.*

## **RESEARCH METHODOLOGY**

This research focuses on theory development for design and action as primary goal (Gregor 2006) based on design oriented case study research (Yin 2002). The goal is to develop theory that is both relevant in its context (relevance) as well as grounded in scientific theories and methods (rigor) (Hevner, March et al. 2004; Gregor and Jones 2007; Hevner 2007). The two business models perspectives – value creation and value capturing – play a central role in this context.

Value creation is operationalized in this study with two assumptions:

1. To be successful and sustainable the value proposition must be high;
2. To be successful and sustainable the effort to reach the value creation must be low.

Value capturing is also operationalized with two assumptions:

3. To be successful and sustainable the revenue should be high;
4. To be successful and sustainable the costs have to be low.

In total 13 interviews were done in five organizations and the assumptions were analyzed with the theory of Miles and Huberman (1994). In order to apply our model as presented in Table 2, we decided to conduct case studies. Yin (2002) and Stoop and Berg (2003) have argued in favor of case studies for theory development. Qualitative studies like case studies are capable of generating insights that can explain the effects of healthcare specific peculiarities (Stoop and Berg 2003). With the help of purposive or judgmental sampling (Babbie 2007) five best practices were selected. The criteria include the maturity of the e-health initiative and the length of the longitudinal case.

## **CASE STUDY RESULTS**

Below, we describe a synopsis of and the most important value creation and value capturing aspects related to our five e-health initiatives.

### **Research Case 1 – Telebaby**

#### **Synopsis**

The concept of Telebaby was initiated in an academic hospital in the Netherlands. When a new child-hospital was built in 1999, it was already possible for mothers in the nursing ward of this hospital to watch their baby in a different ward via an internal analog video connection. In 2001, the idea was expanded outside the hospital walls. The Telebaby project was implemented at the department of neonatology in the hospital and is, after the implementation of a renewed system in 2008, still running successfully today. In the meanwhile other hospitals also started to apply the Telebaby concept.

#### **Value Creation**

The *value proposition*, which ‘defines the relationship between what a supplier offers and what a customer purchases’ (Kambil, Ginsberg et al. 1997), could be classified as unanticipated (Albrecht 1992). When having a baby taken care of by the hospital, parents would like to watch them often, but would not ask for an internet-video connection. Since we are dealing with a service that is provided for free, there are no direct financial costs for the parents. There is a small risk of malfunction of the technology, but since the parents do not have to pay for the product, this only causes inconvenience and no financial losses. We conclude that, given the performance of the Telebaby concept and the *free of charge* service, the value for the parents is high. The effort to reach the value proposition is very low. Just a webcam and some software will take care of the technology. No effort is needed from the professional staff.

### **Value Capturing**

The *cost structure* of the Telebaby project is value-driven. The most emphasis is on the value proposition and the costs are less relevant. The cost components can be categorized in investment costs and recurring costs.

There are three *revenue streams*: sponsoring, the hospital and the parents. In the current concept, the sponsors finance the investment costs and the hospitals the recurring costs. The parents are not yet used as a revenue stream source. We have no clear view on the motivation of the sponsor's willingness to participate in the Telebaby project and therefore it is uncertain if this revenue stream is sustainable. For the hospital, the extra human resources required and the extra costs for maintenance are marginal comparing to other supportive projects. One of the main reasons for hospitals to give their support to the Telebaby project is that it supports the common vision to be innovative and to improve care. Conversations with parents showed that they are willing to pay 5 - 10 euro per day for the Telebaby service, while the costs per camera is approximately 5 euro per day. So, if other revenue streams might deplete (e.g. sponsors stop financing the Telebaby concept), the Telebaby service could be financed by charging parents for the service.

### **Research Case 2 – Telephysics**

#### **Synopsis**

The idea of this project consists of the exchange of digital video material supporting efficient development of medical second opinions. The children who are under treatment of the doctors at a medical center in the Netherlands are filmed. These movies are uploaded to the intranet. Other doctors in the country can see the movies of the patients and give a second opinion with use of the uploaded movies.

#### **Value Creation**

Telephysics enables distant health care providers – especially physiotherapists – to consult each other about the treatment of patients with postural and movement problems using video tele-consultation made available by means of broadband video recordings, other patient data and information on a secure website. To analyze how Telephysics adds value to the health care of patients with posture and movement problems, we use the diagnosis focused value configuration diagram by Stabell and Fjeldstad (1998) that illustrates the instantiation of the primary activity categories of the value shop diagram to the general practitioner shop similar to the Telephysics case.

The use of Telephysics requires a certain effort from its users, the physiotherapists. It requires computer knowledge not only of web (2.0) services but also the ability to use video editing software. Because one of the main advantages of Telephysics is the use of video in asking other professionals their opinion, the use of such software is a necessity. The physiotherapists have to learn this capability. During the implementation of the Telephysics project, there was a learning phase of over 12 months before physiotherapists entered the consultation phase. This was considerably more time than originally anticipated. Additionally, the user manuals were revised to include more detailed step-by-step proceedings on using Telephysics. It can be assumed that implementations of Telephysics in other organizations also require an extended learning phase to create the user capabilities needed.

After completion of the learning phase, an average time of constructing and formulating a question was 115 minutes and 43 minutes for an answer. Because the time required for recording and editing video files and formulating a question, these 115 minutes are a considerable amount of time. Physiotherapists or other professionals using Telephysics therefore have to be able to allocate sufficient time needed for constructing questions (and answers). In addition they have to be able to respond to questions in a timely manner. This requires some flexibility in allocating time to answer questions. The effort measured by time and capability is medium as mentioned in two interviews.

### **Value Capturing**

Telephysics generates revenue by employing a usage fee. For every “question” a physiotherapist asks, they can charge their patient a consultation fee of 72,00 euro. Likewise for every “answer” a physiotherapist gives, they can ask a fee of 27,25 euro. Several healthcare insurers have these consultation fees included in their healthcare insurance packages. A maximum of 3 questions (and answers) can be declared per patient/year.

In the case of Telephysics there are development costs incurred in the creation of the Telephysics environment and the costs incurred by the healthcare providers using the initiative. These operating costs are the costs for bandwidth, control and technical support which are shared between involved users (physiotherapists).

## **Research Case 3 – Digital Outpatient Clinic**

### **Synopsis**

Patients using a specific so-called digital polyclinic are able to online monitor their treatment track and use an interactive module to chat with medical staff or share their experiences with other patients on a forum. This initiative was started in 2001 and from there on the system was created and tested on a group of 50 people. In essence, the system can be described as a personal interactive health record and at the time it was the first of its kind in the world. After a successful clinical trial in 2005, the system was accepted and offered to all the IVF (In Vitro Fertilization) patients in the academic hospital. Currently, it is used by approximately 95% of the IVF patients that are treated in the hospital. The system is now expanded to more sectors: heart failure, amyotrophic lateral sclerosis (ALS), psoriasis, prostate cancer, kidney donors, congenital adrenal hyperplasia (CAH), hemophilia and cardiovascular disease.

### **Value Creation**

The value proposition of the digital outpatient clinic is threefold:

First, patients are able to use the ‘my treatment’ part of the system to access all data relevant to their treatment. This is newly created value, because previously patients could only get information directly from a doctor.

Second, patients are able to interact with other patients as well as medical staff using the system. In this way they are able to get a quick response to their questions related to their treatment or they can share experiences with patients undergoing the same treatment. This is newly created value as well, because previously the only way to get such information was by going to or calling the hospital.

Third, doctors and nurses are able to monitor the patient’s condition. This can be seen as a new form of value offered to doctors. As patients share information on their condition at home, doctors get a better picture of how the patient is doing from a distance. In this way, doctors are able to act sooner on critical changes.

To create this value, a lot of effort from the organization is needed.

The IVF department has shown that they were able to implement the digital polyclinic as a separate and independent department of the hospital. To do this, they used the staff they already had and used the help of the IT department to get the system up and running.

When expanding the system to the other departments, it is assumed this can be done using the same number of medical professionals. What the hospital should be aware of is that with a wider usage of the system the need to keep the system running all the time is also higher. The role of the IT department therefore becomes more critical.

Expanding an IT system across divisions is a time consuming process. The hospital will be no exception to this. Most of the time will be consumed by training the hospital staff and the adaption of the IT system. Doctors and nurses will have to learn to handle the system, but more importantly will have to learn to change their way of working. They will have to make time in their schedule to chat with patients or to answer questions on the forum.

As multiple divisions of the hospital will need to dedicate time to the system and doctors and nurses need to spend time chatting and answering forum questions, it might be a good idea to hire extra staff that is cross divisional and is dedicated to updating system information, making appointments and answering basic forum questions. This doesn't need to be medical staff, but can be staff highly trained in the usage of the system but with only basic medical knowledge. One of the hurdles here could be that this cross divisional digital polyclinic staff might not stroke with the divisional structure of the hospital. The effort needed in this case is therefore high.

### **Value Capturing**

The revenues part of the model represents the cash flows that can be conceived from the implementation of the system. Due to the characteristics of the revenue streams within a hospital and between the hospital and the health insurer, pinpointing the revenue streams is a complex task and cannot be directly assigned to the IT system. For example, patients will not pay the hospital for the access to the system. In general, the implementation of the IT system in the IVF department will create indirect revenue streams. The revenue streams are indirect in the sense that when the quality of the IVF treatment or the delivered service is increased, the hospital could gain more revenue by attracting more patients or negotiate a better fee with the health insurer.

### **Research Case 4 – Electronic First Aid**

The general product of Electronic First Aid is an e-learning first aid course with one practice training. For specific customer groups the product is adapted to specific needs, as for the 'households with children from 6 months to 7 years' a first aid course is offered with a focus on children. There is also a first aid course with a focus on children with a certificate for the 'host parents'.

### **Value Creation**

Five aspects can be defined that makes this e-learning first aid course as successful as it is right now. Customers can follow the online course in their own time and can work through the course at their own pace. The online course does not take much time and the material offered within the online course is provided in an easy way. Finally the balance between price and quality of the offered course is very attractive. This makes the value proposition high especially from a customer side of view. The effort needed for this e-health system is low. Users can use it from home and do not need extra training or capabilities. Implementing the system can be lengthy while a full course program has to be put on the web but while the course already exists.

### **Value Capturing**

E-First Aid earns money through selling on-line First Aid courses B2C (business-to-consumer) along with refreshment courses. These revenues are "transaction revenues" resulting from one-time customer payments, unlike recurring revenues resulting from ongoing payments to the organization in exchange for the delivery of a value proposition or post-purchase customer support (Osterwalder and Pigneur 2009). The revenue derived from customers that purchase courses can be seen as a subscription fee, meaning that the revenue stream is generated by selling continuous access to a service for, in this case, a year. The revenue derived from a single practice session can be classified as a so called usage fee. Currently, E-First Aid uses a fixed pricing mechanism for the products it provides with prices being only dependent on the type of product purchased (so called list pricing). Pricing can also partially be viewed as volume dependent; discounts are not given for bulk purchases but purchasing a theoretical course together with a practice session is more lucrative for the customer. Periodical revenues from customers that fall in the recurring customer segment are slightly lower than those of new customers (refreshment courses are slightly cheaper).

Fixed costs play an important role within the cost structure of E-First Aid in comparison to the variable costs since the number of courses sold has little effect on the costs incurred. Important fixed costs are



related to the renting of office spaces, salaries and of course the sunk costs for developing e-learning software and courses and further development of these software and courses. Also the costs for sending emails to clients by an external organization can be seen as part of these fixed costs.

As mentioned these are not a major factor within the initiative since the process of selling and delivering courses is fully automated and no material costs are incurred per product sold since the product is non-physical. Some important variable costs that do occur are the hiring of external experts from Rescue Nederland and the cost of air time for commercials, along with occasionally hiring of actors. The costs of having a helpdesk may be viewed partially as variable costs since these are somewhat sensitive to the number of courses sold.

## **Research Case 5 – BUDDY Telehealth**

### **Synopsis**

BUDDY can be seen as a daily life medical assistant. By making use of BUDDY, a customer at home can approach a medical institution about his or her health. Via a video connection, it is possible to contact a nurse from the home care setting. In this way, health care professionals can be contacted quickly.

### **Value Creation**

Beyond the basic functions as mentioned above, BUDDY offers many opportunities in the field of entertainment. Games can be played and it is also possible to video call other users of BUDDY. In this manner, BUDDY helps their clients to create and maintaining social networks (a form of co-creation). BUDDY also offers information on regional activities and news. These additional opportunities are perceived as very pleasant. The system can be rented, allowing a customer to be flexible in the acquisition or disposal of a system (acquisition and transfer). The main value though is being able to contact a nurse at home very quickly in a simple way. This brings certainty and allows patients to live longer on their own. The effort for the customers is low, the human interface is easy and no extra training is needed. The technical equipment is delivered by a specialized firm. In general, the effort is low.

### **Value Capturing**

The customers of BUDDY are generally satisfied, also with respect to the related support services. The quality of support is critical because the target group mostly grew up without ICT. However, partly due to this lack of affinity with ICT, the amount of users is still relatively low. In order to create a strong future market position for BUDDY, a critical mass for the social network functionality may be needed so that current users may convince potential new clients to use BUDDY as well. In sum, the costs associated with effort and risks that a customer has to make are small.

Because the system is currently offered for free, there are no costs for the patients. If, in a later stage, the product will be offered in a more commercial way as well, a financial contribution from clients may be required. The value capture for the suppliers is done with funding from government. That means that the business model is heavily dependent on government support and future analysis should find a way to get another way of value capturing.

## **CROSS CASE ANALYSIS**

We start this concise cross case analysis with a short summary of the results from the case studies in relation to the four (sub) assumptions as mentioned above. The scores are derived from the Miles & Huberman (1994) analysis of the interviews. For each sub assumption, the interviews were checked on sentences that supported or rejected the assumption. When one interview supported the assumption it was considered low, with two interviews supportive medium and high when three interviews supported the assumption. With effort and costs the score is the other way around.

↓ <i>Case</i>	Value creation		Value capturing	
	Value	Effort	Costs	Revenue
<i>Telebaby</i>	High	Low	Low	Low
<i>Telephysics</i>	High	Medium	Medium	Medium
<i>Digital outpatients</i>	High	High	Medium	Medium
<i>Electronic First Aid</i>	High	Low	Medium	Low
<i>BUDDY Telehealth</i>	High	Low	Medium	Low

Table 3 – Case results summary

In order to be successful and sustainable, an e-health initiative needs to deliver a high value to customers and/or users of the initiative. In four cases the value proposition was considered as high. Maybe even more important, the effort is low in three of the five cases. In one case, the effort was medium and in this case it took longer than anticipated to get the users the capabilities needed for using the product and it therefore also took longer to make the initiative a success. In the fifth case, the effort needed was high and a strong charismatic leader was needed to make the initiative sustain. In Africa, the e-health success is even more dependent on creating high value proposition, low effort because the availability of doctors for these projects will be even less than in Europe.

In general, we can see that the value creation part of the e-health cases scored better than value capturing (the left part of the table is greener whereas the right part is mostly yellow / red). Actually, none of the five successful cases was able to really capture the value as promised in the value proposition. Besides, the actual value delivered in these cases wasn't so much an increase in efficiency but had a more qualitative character; e.g. in the form of an increase of convenience. Saving of lives is not easy to quantify but even without value capture e-health can deliver knowledge and decrease the know-do gap.

The first lesson from this cross case analysis is that a stronger focus on the value capturing part is needed – keeping costs low and generating profits seems to be relatively problematic in all cases. Especially generating revenue to keep the cycle going. However, because e-health is relatively new, the related technological costs are mostly higher than initially expected and can't always be compensated by the level of value creation delivered. In other words, offering low cost e-health solutions is relatively difficult in the current stage of e-health technology development. The second related lesson we can learn is therefore that probably too many e-health initiatives are started with the aim to win efficiency only – it might be better to start with a high value and quality (e.g. convenience) focus and let the efficiency follow in a later stage of the initiative; e.g. by capitalizing on the fact that e-health technology will probably become more cost-effective over time. In Africa the mobile revolution might enable African doctors and patients to skip a step in the evolution using relatively inexpensive mobile equipment instead of expensive e-health infrastructures.

These lessons also follow from Table 3, which combines the assumption (Table 2) with the cross case study results:

→ <i>Value creation level</i> ↓ <i>Value capturing level</i>	<b>Low</b>	<b>Medium</b>	<b>High</b>
<b>Low</b>	Lowest business model viability (inverse assumption)		Telebaby (Case 1) E-First Aid (Case 4) BUDDY Telehealth (Case 5)
<b>Medium</b>		Digital Outpatient Clinic (Case 3)	Telephysics (Case 2)
<b>High</b>			Highest business model viability (assumption)

Table 3 – Cross case analysis of value creation and value capturing levels

Ideally, all cases would end up in the lower right corner of Table 3. All cases score high on the value creation level – that’s why they can be found in the right corner of the table. Because the value capturing is relatively problematic (with only low to medium scores), none of the cases ended up in the lower right corner.

## CONCLUSION

There are only a few cases available of e-health initiatives that are successful and sustainable. This study took five best practices and explained with the two main dimensions of business modeling (value creation and value capturing) why these initiatives were successful.

The practical contribution of this study is twofold:

E-health initiatives in the future have to be ex ante tested on their value creation potential. The value created to patients and/or health professionals must be high in order to be successful and sustainable.

Within the value creation concept, the practitioners should not forget the effort that is needed in order to create this value. When a high effort is needed, the value proposition must be even higher.

The theoretical contribution of this study is as follows:

Within the business model concept, the two main dimensions – value creation and value capturing – can be measured to explain the success and sustainability of an e-health initiative. We expect that this analysis can also be done ex ante – see also e.g. (Kijl, Nieuwenhuis et al. 2010).

Within the value creation dimension, the effort to reach this value is not or not well enough addressed. We propose to compare the value proposition with the creation effort measured by capability and time. E-health initiatives seem to lean too heavily on efficiency improvements and mostly fail in delivering in efficiency improvements. Maybe a stronger, more qualitative focus on actual value creation (i.e. improvement of service quality or convenience levels) may help improving the success and sustainability of e-health services. In the end, a high level of actual value creation forms the basis for a sustainable level of value capturing.

Finally, we get back to our main assumption: *An e-health initiative will be successful and sustainable when both the level of value creation and value capturing is high.* This study does not completely support this assumption. We found high value creation in four of the five cases but did not find any case with a high level of value capturing. Main conclusion therefore is that high value capturing is not a prerequisite for the success and sustainability of current successful e-health initiatives. This probably has to do with the relatively early stage of e-health technology development. When the technology will be developed further, costs may go down with higher value capturing levels as a result. More case research is needed to further develop and test our research model that is relating value creation and value capturing levels with the success and sustainability of e-health initiatives. Especially, the addition of failed e-health initiatives may improve our understanding of the critical success factors.

Limitations of the study are that the inverse assumption is not measured. Future research has to prove that low value creation and low value capture will lead to failure of e-health success. The authors want to continue this study with studying African projects and help new projects to reach sustainable and successful e-health projects without making the mistakes that were made in Europe, also by leveraging capabilities.

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