TDT4900

Kenneth Børtveit

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Abstract

Chapter 1

Introduction

1.1 Philosophy

I will try to take on both an interpretive and a positivist view of my research. The reason I do this is that I believe that one does not exists without the other. No one really have a shared reality, and is never completely different. The positive researcher will concentrate on the shared knowledge in a community, while the interpretive will try to harmonize the different realities. The users of the knowledge I am trying to create are the academics, focused in the field of Information Systems and Computer Science. The quality of this research is of course, only evaluated by the reader.

1.2 Research Questions

Suggestions

1. Hva gjør det vanskelig for en bruker å benytte seg av IKT som verktøy?
2. Hva er grunnen til at en bruker, i ett land med begrensede ressurser, ikke får utnyttet IKT verktøy maksimalt?
3. Hvilke hinder er det som står imellom bruker og IKT som verktøy i et land med begrensede ressurser og i en helse-setting?
4. Hva karakteriserer utfordringen, "å ta ibruk IKT-verktøy" i helse-sektoren i et land med begrensede ressurser?

5. I denne oppgaven, hvordan skal jeg vinkle målet med IT (Tar gjerne imot forslag)?

   (a) Få slutt på fattigdom?

   (b) Øke livskvaliteten til folket?

   (c) Mer kontroll til staten?

   (d) Øke kunnskapsbasen om informasjons systemer?

   (e) Ved bruk av IT, kan en bruke begrensede ressurser mer effektivt?

Part I

Literature

Chapter 2

Electronic Health

2.1 In General

2.2 Updated Information

2.3 Time and space barriers

2.4 Mapping of user needs

2.5 The technology is there, why is it not used?

2.6 How can ICT's help us in the health sector?

2.7 Health personell interviews

2.8 Mobile

Chapter 3

Information and Communication Technologies for Developing Countries

3.1 In General

No correlation with productivity [4]

3.1.1 Objective

Productivity

Allocation of resources

Decision making

> Lack of literature in general: Until very recently, the entire literature on IS and developing countries would struggle to ll a single bookshelf. The attention of writers—from researchers to consultants to journalists—has been focused elsewhere.[4]
>
> Lack of evaluation: Those who have the will to evaluate—such as academics—often lack the resources and capacity. Those who have the resources—such as aid donor agencies—often lack the will to evaluate.[4]

> Focus on case studies: The literature on IS in DCs has grown, but it is a literature dominated by case studies of individual IS projects. Taken alone, these provide no basis for estimation of overall failure/success rates.[4]

3.2 Discourses

Chrisanthi [2] points out three main branches that characterizes implementation of information systems in developing countries.

3.2.1 Diffusion

Just move the technology and understanding to a new place. Usually from I-countries to D-countries.Usually a mismatch between actuality and design.

3.2.2 Transformative

Transforming the organization to operate in a new way with the technology. (My understanding should be confirmed.) Working towards a design while facilitating the design-actuality gap. The whole is seen as a process with a starting point and an end point.

3.2.3 Socially Embedded

Building the competence and technology from the ground up by including locals. User participation. Making the design and actuality gap smaller.

Diffusion and transformative development does not facilitate the already existing structures of the context the technology will be placed within. The implementation of information systems from this perspective requires the environment and the people in it to adapt to the new technology. This will in turn increase

the risk of the information system being rejected by the users. On the other hand, the socially embedded path will to some extent safeguard the underlying social structures by building upon what is already there. This might lead to unexpected results and be time consuming. Although, probably avoiding the sustainability pitfall.

3.3 Pitfalls in introducing IS in Developing Countries

3.3.1 Scalability

The problem of moving expertise and system to new locations with the lessons learned. By conceptualize the use of ICT's one can make it easier to transfer ICT's to other locations, making it scalable.[5].

3.3.2 Sustainability

What happens when the AID funded projects stops being funded? The donors are interested in sustainable solutions that keep existing after the investment. How does one maintain a project that is built on temporary donors. Unfortunately many IS projects are drained from resources [2]. Here should it be mentioned something about political commitment [5].

3.3.3 Assimilation In Dysfunctional Organizational Processes

One has to take into account that an already broken system can't be fixed by speeding it up. Automating a process that already does not produce the right result would only give us more of the result we are trying to change [3].

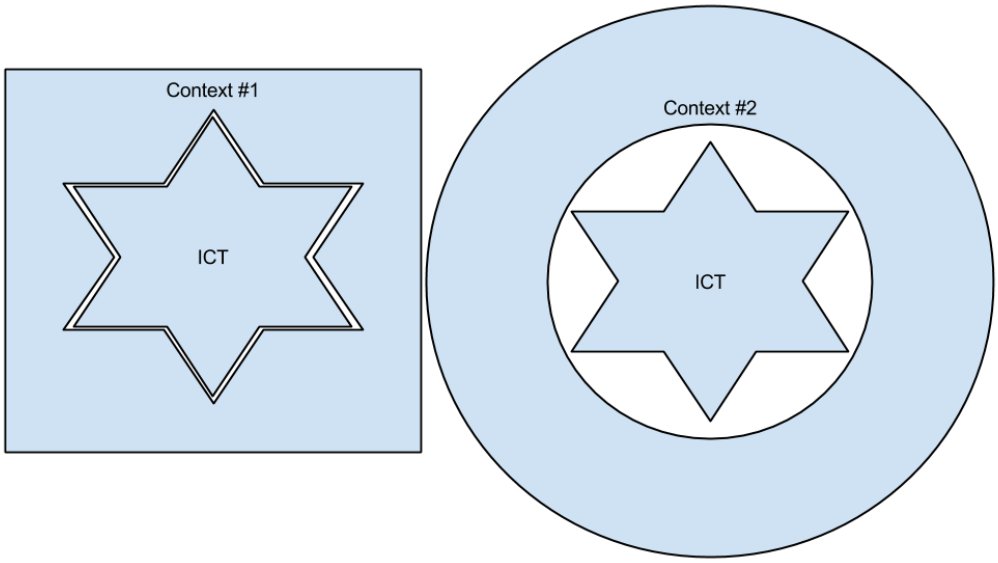

Figure 3.1: If it works for us it will work for you!

3.3.4 Lack of persistence on key areas

3.4 Updated Information

3.5 The design and actuality gap

3.6 Success or Failure

3.7 Success stories

3.7.1 short examples

3.8 Failure stories

3.8.1 short examples

3.9 Evidence base

Health information systems in South Africa: Braa and Hedberg (2002) reported widespread partial fail-

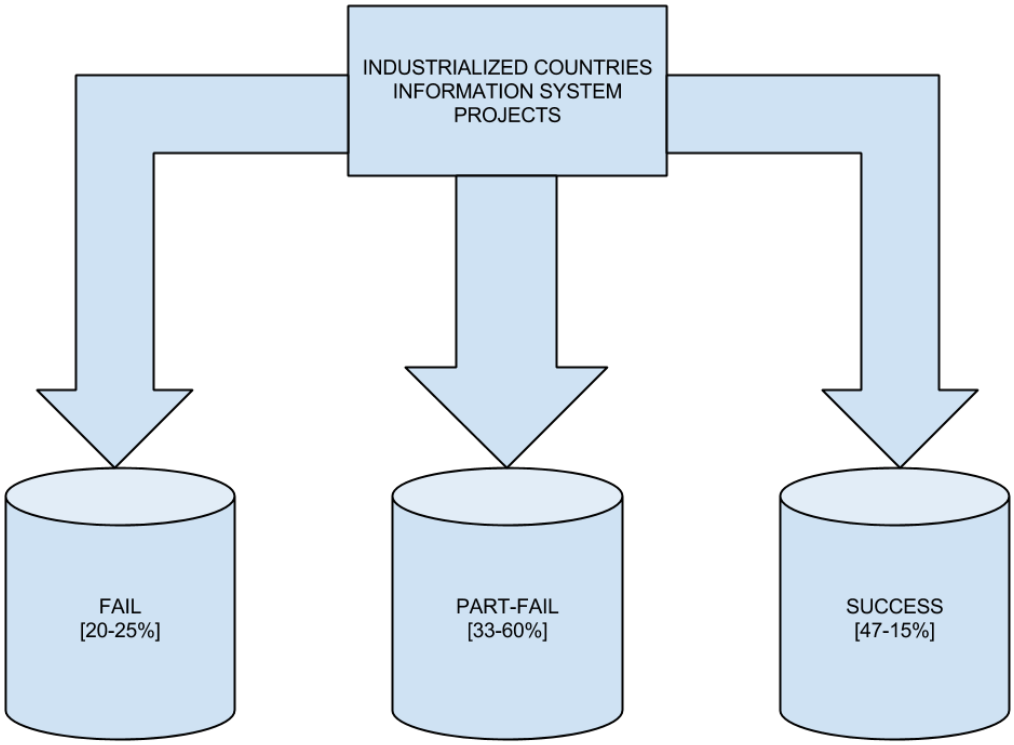

Figure 3.2: IS projects in Industrialized Countries. Year: 1995-2000 [4]

ure of high cost systems with little use of data.[4]

IS in the Thai public sector: Kitiyadisai (2000) reported "failure cases seem to be the norm in Thailand at all governmental levels."[4]

Donor-funded IT projects in China: Baark and Heeks (1999) reported that all were found to be partial failures.[4]

World Bank-funded IT projects in Africa: Moussa and Schware (1992) reported almost all as partial—often sustainability—failures.[4]

3.10 Digital Divide

3.11 Implicit and explicit components of Design

The explicit components of a computer application is the physical components the user would need in order to use the application. Examples include cost, computer hardware, operating system, monitor and such. The implicit ones are a little harder to quantify. These include knowledge, expectations and skill. When addressing the implicit, how would one go about evaluating if the user is qualified to use the application as intended and ensure that it is used for the proper intentions?

3.12 Outsourcing

IS has the potential of being more than just a tool for making processes better, more efficient etc. With enough knowledge a country may provide a service in the form of providing ICT solutions and support. Rwanda being a good example. Knowledge

is key, it requires little more than effort and some hardware, making it possible for countries with little natural resources to have the opportunity to contribute to the global market. India is currently being a great example of this.

3.13 Education and IS development

3.14 Untapped Marked

From a certain perspective one can see the developing countries as an untapped marked. By building up the countries infrastructure one has the opportunity to offer services that previously was not possible. Take Telenor and their agenda to offer insurance and banking services in the east. By building up the infrastructure they can now offer their services as "mobile providers" and even expand their services to banking with a fresh market and less competition.

3.15 IT and Economic Growth

With IT comes the assumption that it will in some way enable economic growth [1]. Although it can be said that highly successful businesses is using IT it would be wrong to say that more IT equals more money. For an example. The simple view of IT being able to enable economic growth is not enough. It can however increase productivity in several ways by automating existing processes, but the potential of IT lies in new ways of structuring organizations. Time and space can be compromised significantly.

In the 1980's there was invested 750 billion $ in IT [1], but this only lead to 0.7% increase in productivity. This was a decrease from the previous decade. There is findings that suggests that

ICT has a positive correlation with productivity. Data from 1983 to 1990 shows this for eleven Asia pacific countries [1]. May be a necessity in order to take part in the global economy and making it possible to trade. IT can also directly affect how organizations structure themselves by introducing new ways of working and increasing productivity. ICT should be used is withing the organization to enable better work processes, not automatize existing processes [3].

3.16 Sustainability[5]

Building networks running on the same concept will make the ICT initiative more sustainable.

User participation is another tool one can use in order to make ICT initiative more sustainable. When the concept is accepted and made by the users they understand how and why it works and are more likely to accept it.

Chapter 4

Implementation

4.1 In General

4.2 Updated Information

4.3 Changing Processes

With information technology comes the great advantage of cutting processes to more effective ones. In Michael Hammers article [3] he discusses how information technology can change how people execute their work. The idea is that computers should not automate existing processes, but rather make room for new and more effective ones to rise. Hammer's ideas are of some age, but it still highly relevant. **Some examples here**. Information passed by paper has the disadvantage of being bound by geography making an organization or system slower due to delivery. Information technology can bring an organization together and simulate being on the same place, but still being spread out. This allows for old work processes to be replaced by new ones making the turn-around for each task possibly much faster.

In big organizations the process of swap out old processes can be of very high risk. Change in work processes takes the personnel out of their comfort zones and they have to readjust

to the new environment. The new way of doing things may in a short term perspective seem unproductive.

This calls for leadership with strong vision and determination in order to implement the new processes and reap of the benefits.

4.4 Facilitate the transition

4.5 Over complicating

Chapter 5

Testing

5.1 In General

5.2 Updated Information

5.3 Defining success and failure

5.3.1 Categories

As mentioned by Richard Heeks [4], there are some ways of categorizing success and failure of information systems that I will use.

Total Failure These system is either not implemented at all or implemented and abandoned shortly after.

Partial Failure
- Significant undesirable outcomes.
- Major objectives unattained.
- Sustainability failure.
- Subjective goals unattained.

Success Obtains objectives and no significant undesirable outcomes.

Chapter 6

Use

6.1 In General

6.2 Updated Information

Part II

Empirical

Chapter 7

Case

Jeg funnet ut at brukere av systemet kan ta feil av 1 og l, og 0(null) og O. Dette er jo selvfølgelig viktig å tenke på når vi skal lage koder som skal brukes til å rapportere. Dette blir jo en del av diagnosen. Jeg lærte det av Lars Roland og fikk det litt bekreftet av Randy.

Videre er det en del basis kunnskap som burde vært på plass her som ikke vi lærer på skolen heller. Som kommandoer i Linux. Jeg er klar over at dette ikke har mye fokus blant forskere, men ting går tregt på grunn av det tror jeg. Forsknings koblingen vil kanskje gå på å få brukere til å stole på at datamaskinen gjør det den skal når en skal utføre en operasjon.

7.1 Stakeholders

Chapter 8

Method

8.1 Action Research

8.2 Data Generation

8.2.1 Interview

1. User objective
2. User desired outcome

8.2.2 Observation

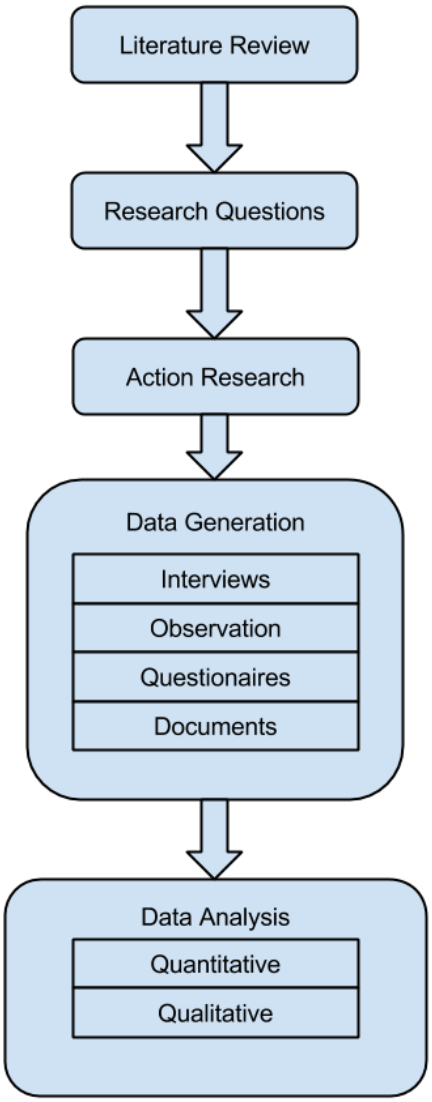

Figure 8.1: Overview of the research process

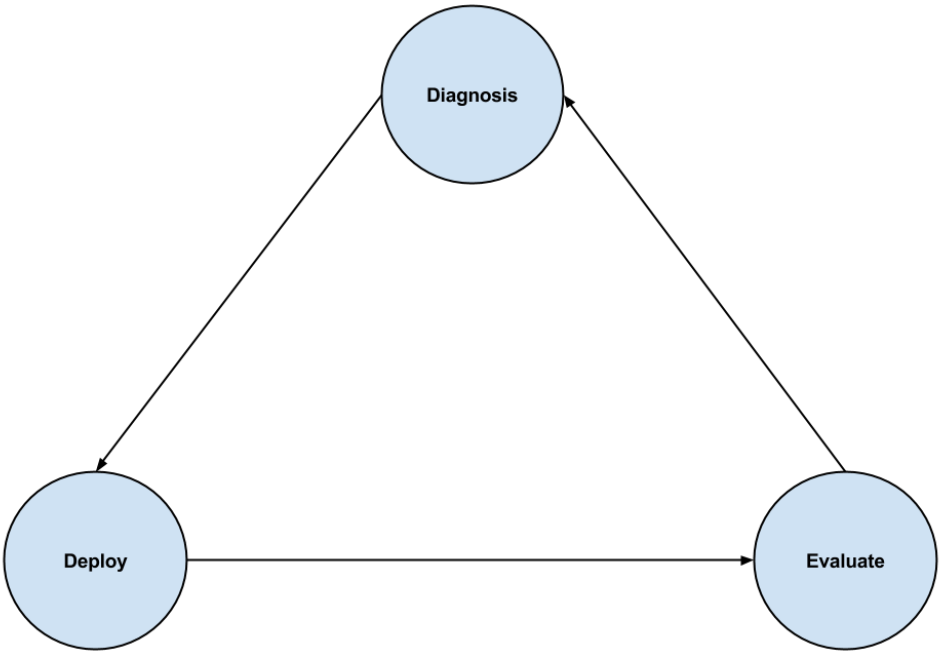

Figure 8.2: Overview of Method

Part III

Discussion

Part IV

Conclusion

Appendix A

Requirements Document

A.1 Context

This requirements document is for setting up a environment for a SMS based reporting system with the DHIS2. The system should be able to support these four use cases.

1. The users will be able to receive automated SMS and email notifications based on rules that compare database values.
2. The users will be able to receive an automated reminder if a report is more than 4 days delayed.
3. The users will be provided with a predefined format for reporting.
4. If the user reports values that does not get processed, then he/she will receive a notification of what has happened and directions for necessary steps in order to complete the report.

A.2 Setting up Testing Environment

A.2.1 Testing without phone

Operating System

Tomcat

DHIS2

The hierarchy has to be at a village level. This is the level we want to be reporting on.

Postgres

Dataelements

When creating data elements we store the zero values.

Testing Script

Number	Name
1	Oral Contra
?	
2	Oral Co
?	
3	Oral Cont
?	
4	Oral C
?	
5	
?	
6	
?	
7	Inject
?	
8	In
?	
9	M
?	
10	
?	
11	I
?	
12	
?	
13	P
14	
15	
?	
16	
?	
17	
?	
18	
?	
19	A
?	
20	
?	

http://localhost:8080/dhis2/sms/testSMS.action

Appendix B

Journal

B.1 Day 1

B.1.1 Breakfast

Missed on the time here today. Wrong time zone. I thought the devices configured themselves, so I just trusted the watch. Randy missed a part of his meeting because of that. Very embarrassing.

B.1.2 MSH Office

Got the first tasks. Should refine and define the requirements. I don't see any problems just yet. A little unclear just who are the ones involved. There are two guys, Patrick and Eric that i should meet with. Both working with logistics I think, at least in stock management. Haven't heard anything on the the SMPP protocol other than it should be there.

B.2 Day 2

B.2.1 New Office

Today we have a population count problem in DHIS2. I would try to make a postgres query to check our implementation of

DHIS2. Got a temporary seat. Gloria is out in the field. Gloria is probably checking if the data is correct. I am now at the HMIS's new office. Met, Venus again, Andrew, Adolph, Erick, Olive'something, and another. Got to get better on those names. I think I'm a little further up the road from the old offices :).

B.2.2 Beginning to collect the requirements

It seems like the solutions should in some way be more effective. I've been introduced to several people here.

Names	Institution	Phone	Em
Deogratias Leopold	ISI - SC4CCM	0788486509	?
Wane Olivier	IMOH/MCH/CHD	0788358649	oligen123@
Erick Gaju	MoH/Ehealth	0788517168	gerick3fh@
Mike Misengo	MoH/CHD	0788482804	mike.misengo
Venuste Nsanzumuhire	MoH/HMIS	0788606639	venuste.nsanzum

B.3 Day 3

B.3.1 Morning at the office

I am still trying to figure out the requirements or wishes of HMIS. Apparently there is not very much structure. No development cycle. No requirements document. Randy proposed that we need to be able to implement an algorithm. But there is still no sign of the famous algorithm. They don't know what they want I think.

B.3.2 Testing

I think we could start setting up the test environment and show what is possible so that they can see the opportunities.

B.3.3 Setting up the test environment with sms

This first time we will try with the SMS function in DHIS2. We've encountered a bug in 2.12 after setting up the data elements. The elements are there and connected to a data set. While trying to browse the data elements it never stops loading. Tried clearing cache, switch browser, update resource tables. We will try to update the local version to new one, then start over. Unfortunately I were told that we are the support, so I hope the HISP team in Oslo can help.

B.3.4 Tasks

I've got 2 tasks.

- Make the requirements document for the system that is being made.
- Make the testing environment.

B.3.5 End of the day

Try one more time to set up the test environment for tomorrow. The requirements document should be set up by 15th of March.

Got the backup from Randy and have to remember to run the analytic.

B.4 Day 4

B.5 Morning

The driver was about 20 minutes late. My goal was to be at the offfice by 08:00. Maybe I should arrange for some other transportation arrangements.

B.6 Before lunch

Will continue with trying to set up the testing environment and defining the requirements. I have a new database instance and a new database. If this works, everybody can probably learn how to do this locally, so that testing can get done much faster. Venuste and I should be able to set up the same system. We did not manage to set up the database. Got several error messages. "psql:healthfinance2014.sql:3450210: ERROR: role "hf-readonly" does not exist"

B.7 After lunch

I am still waiting for Randy to arrive so that he can describe the algorithm to Ola. I am really just sitting here doing nothing.

B.8 end of work day

I think we've had a very productive day. We've got a description of the algorithm and are trying to set up the testing environment. Tomorrow I will continue setting up a local instance of DHIS2 with Venuste.

B.9 Day 5

B.9.1 Before lunch

Forgot my charger today. We are still trying to set up a local instance. First we had to reinstall a new operating system on Venustes computer. Now we are trying to install postgres so that we can install the database. Venuste proposed that we do not install a DHIS2 instance on all of the computers.

B.10 Day 6

B.10.1 Getting TV

We went to the city to acquire a tv subscription. Patricia knows a guy. We got it for 60k a month.

B.10.2 Market

We shopped at Namukat. Probably the best place for getting supplies here in Kigali. Bought bread from a different store some reason.

B.10.3 Hash

To of the girls got their names today. One is called bend, the other over. It was the international womens day, so one old lady did not like the names. We met at Chez Lando and started running from the facebook pub.

B.10.4 Casino

I got to drunk. I got this note from this girl, Kayli. She is saying she wants to meet. I started out thinking it was not such a good idea, but later I got curios. Was afraid she might set up a kidnapping or something. She is a little bit religious I think.

B.11 Day 7

B.12 Waking up

Got up around 10:00 today. Did nothing but some texting with Kayli.

B.13 Night time

I should remember to bring along Venustes charger tomorrow. It's in my backpack already. It would be good to continue some on my thesis. Aiming for delivery before 1. July so that I can focus on my other courses.

Would be just perfect if I got finished this summer.

B.14 Day 8

B.14.1 Morning at the office

Should be able to set up a local instance today. It seems like it takes up much time to set up here. I've been here for a week and still I am not able run a local instance.

Installing the software is somewhat difficult. Today I am getting this up and running. Documentation should be better and easier.

I have not yet received a permanent seat to work at.

Gloria said that the data quality was so so.

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