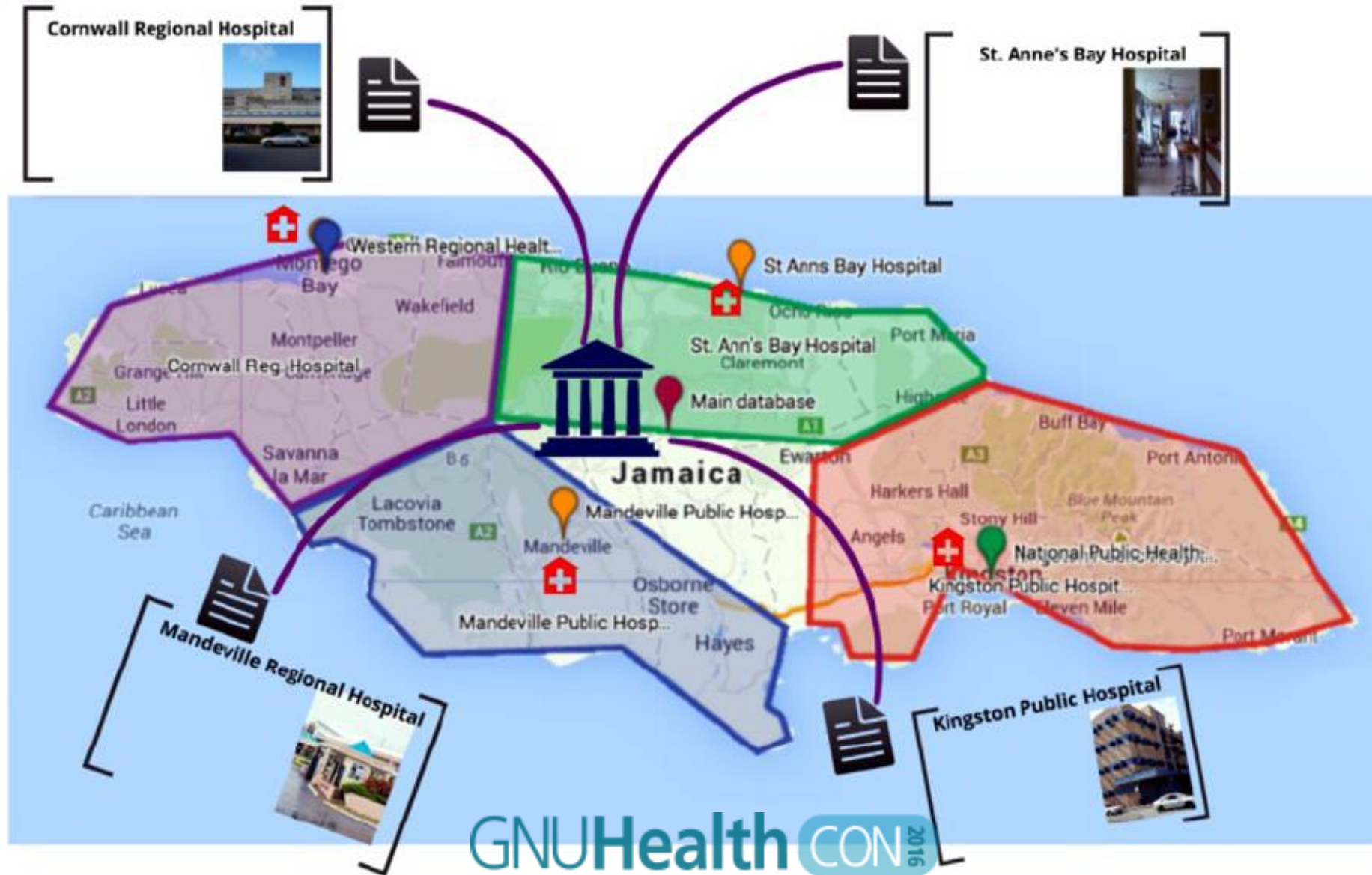


TOWARDS A value-based business model for large-scale installations of gnu health

Dr Tom Kane
Centre for Social Informatics
Edinburgh Napier University
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350+ "GNU" Health facilities nation-wide



Gnu Health Installation in Jamaica

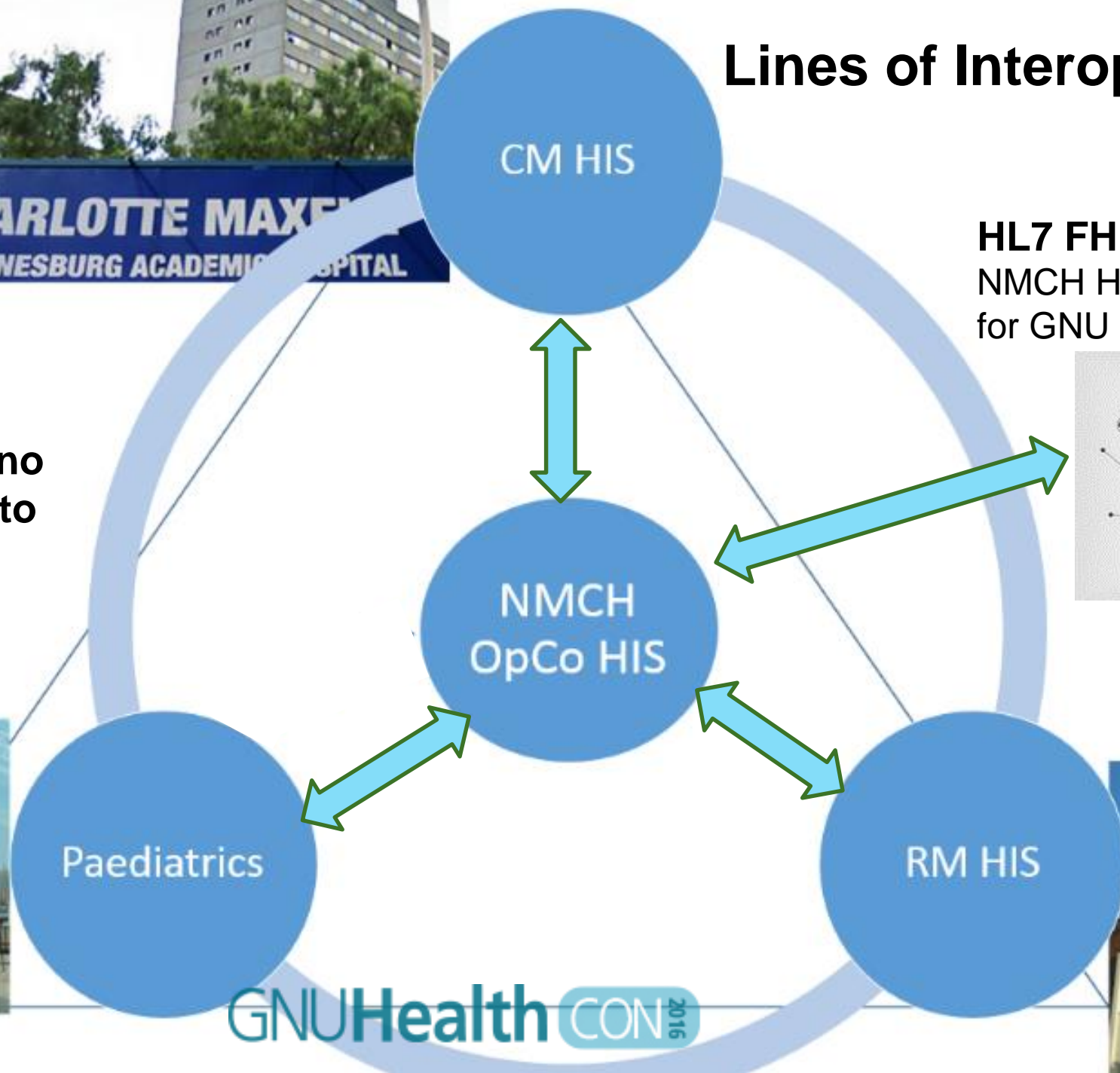
- Two years work
- Mostly voluntary work by Luis Falcon
- Operational across whole island's medical support network

Need to focus on a BUSINESS MODEL that pays consultants and professionals appropriately and is suitable for developing countries.

A Little Bit about the Nelson Mandela Children's Hospital

- Hospital Built by the Nelson Mandela Children' Hospital Trust, a Project of the Nelson Mandela Children's Fund
- [Opening in December 2016](#)
- Operating costs of hospital to be met by South African Government
- Second Children's Hospital in South Africa
- Quaternary Care Children's Hospital
- 150 Paediatric Clinicians
- 450 Paediatric Nurses
- The requirements of NMCH– emphasis on referrals, education, satellite units, research, etc.
- Has to enable the entire “care circle” and not only treatment in hospital

Lines of Interoperability



HL7 FHIR Interoperability
NMCH HIS offers a way in
for GNU Health



Procurors admired
GNU Health but had no
means of bringing it to
the table of options.
Went with T-Mobile
and SAP



Health Level 7 – Fast Hospital Interoperability Resources

It is on interoperability that initial hopes are pinned

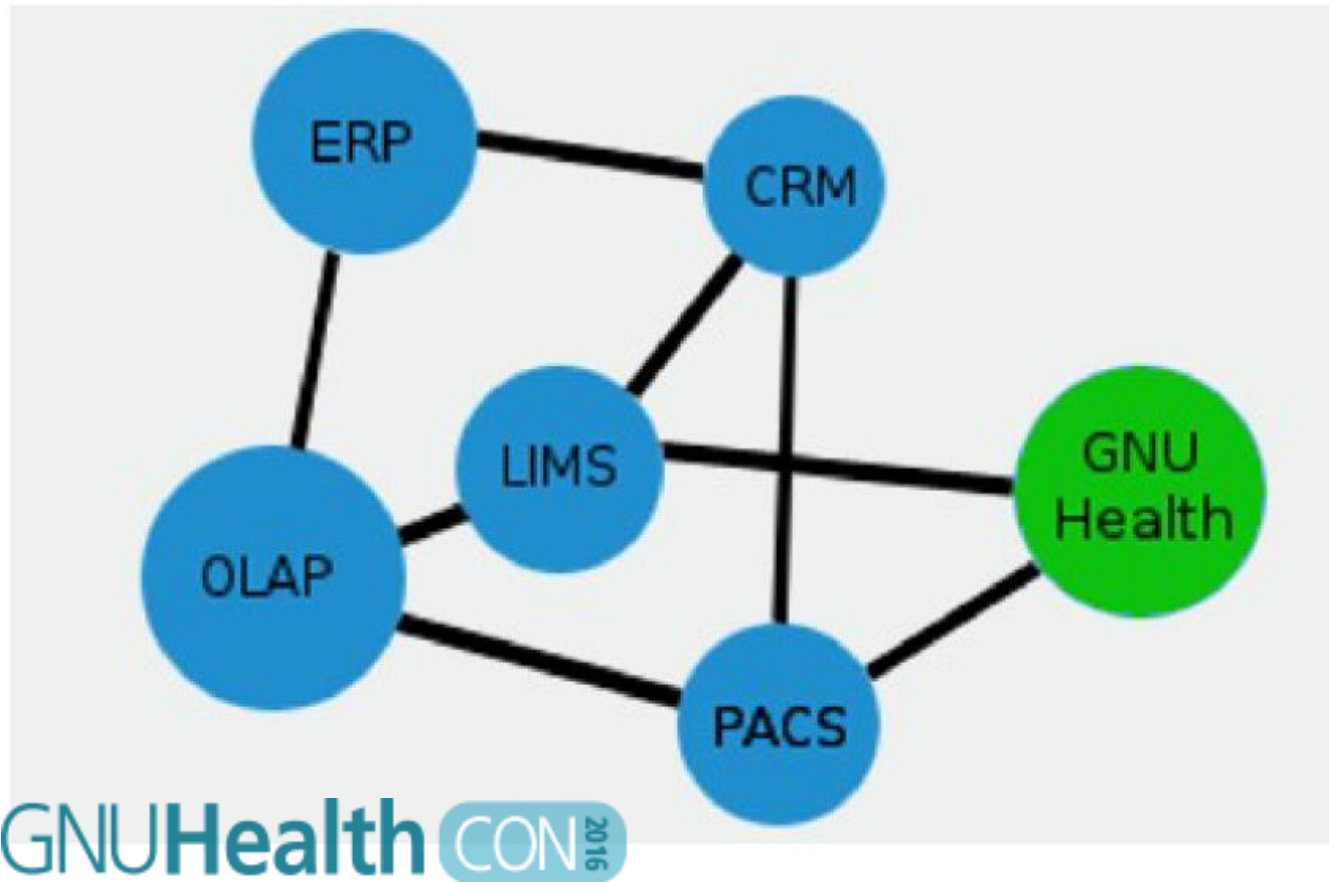
Interoperability - HL7



Eight Important, Co-operating Services

1. Enterprise Resource Planning
2. Customer (Patient) Relationship Manager
3. Laboratory Information Management System
4. Online Analytical Processing System
5. Picture Archiving and Communication System
6. GNU Health for Hospital
7. Gnu Health for Satellite Centres
8. Gnu Health for Government

Interoperability



Some work at Napier - A TOWER OF BABEL

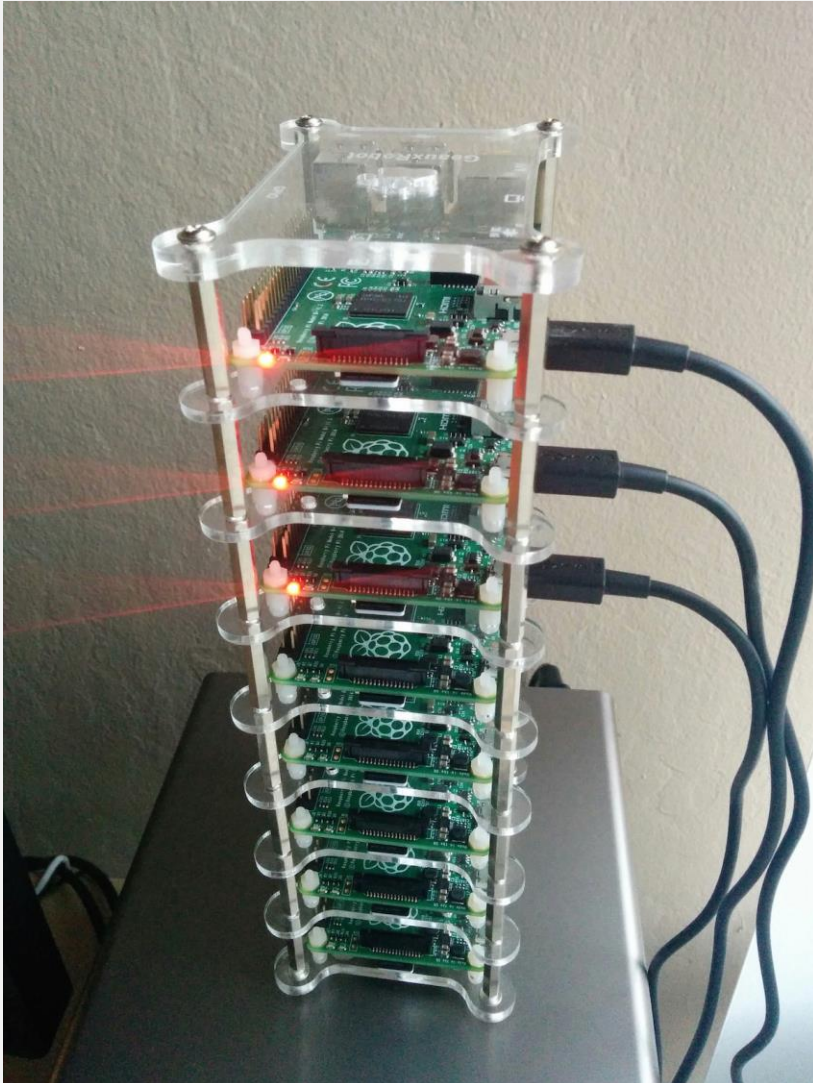
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UNIVERSITY

Helped NMCHT with HIS Procurement

Established acceptability of Raspberry Pi 3 implementations in Cloud Computing, Networking, Security

Established a complete implementation of GNU Health and other key software on tower of raspberry Pis - could offer cost-effective hardware and software eHealth solutions. Particularly for satellite centres.

Use of virtual machines and cheap hardware



EMERGING MODELS

Is it any wonder that new business models with fundamentally different economics are forming and solidifying, setting precedents and standards for others to follow and try to surpass? Already we see this happening beyond isolated use cases. We are seeing a bifurcation of strategies and business models between those catering to the needs of the mass market and those focused on serving niche groups/disease areas. In addition we see disruptors—those companies leveraging new technologies and new science to cut across traditional industry processes to make a step change in how healthcare is delivered and patient outcomes are affected.

For example, we're seeing players that are driving value by bringing the good science developed over the past 20 years to the market in the most efficient way possible. These *Lean Innovators*, many built on the chassis of a generics company, are arriving with extremely efficient, world-class manufacturing and supply chains. They have an eye for acquisition and aspirations of rapid growth, and they will challenge incumbents and the cost structures, productivity, and operating models of the past.

We are also seeing *Around-the-Patient Innovators*—companies (or divisions) that are bringing the latest scientific insights and a focus on the most devastating of patient diseases to bear to advance new specialty therapeutics and complementary product and service offerings.

Embracing outcomes as their strategic center, *Value Innovators*, a third model, will define and differentiate themselves on integrated, digitally enabled services that include remote sensors, devices, and centrally located clinical staff. These organizations will focus on improving patient and clinical outcomes on a broad scale; and they will be willing to tie economics of their business to their ability to achieve patient outcomes and system efficiencies in how healthcare resources are deployed.

Finally, we're seeing the fast rise of *New Health Digitals*, companies that most likely grew and evolved outside of healthcare and life sciences, that see this sector as a natural sector for their relationships, partnerships, infrastructure, performance systems, and capabilities. We are only just beginning to gain a sense of these organizations' interests, models, and influence. But it is clear that their economics—driven by global scale, vast ecosystems of devices and applications, broad developer communities, and the cloud—will provide some solutions at orders of magnitude with less cost and greater capability.

They will need to resolve all dilemmas—responsibilities to patients. They will take a defensive posture, with regulators as patients in the way that only health care can be founded on trust and courage, saving economic fundamentals and

and associates at all levels will also find barriers within their organization won't necessarily be shipping product and service with patients, health providers, patients connect the dots and outcomes. Managers, and those who have to think differently, well with people and organizations, with new immediate

the future, rather than be an opportunity, though, more far out of their comfort zone system that works as strategies and test-the-

environment by making reacting to growth, tive dynamics. This play in a broadly rewards value, and and taking a stand feet is moving to

For Companies: A New world of Informatics Possibilities...

Edinburgh Napier UNIVERSITY

Precedents

Around the Patient Innovators

New Health Digitals

Winning Business Models

Cloud Based

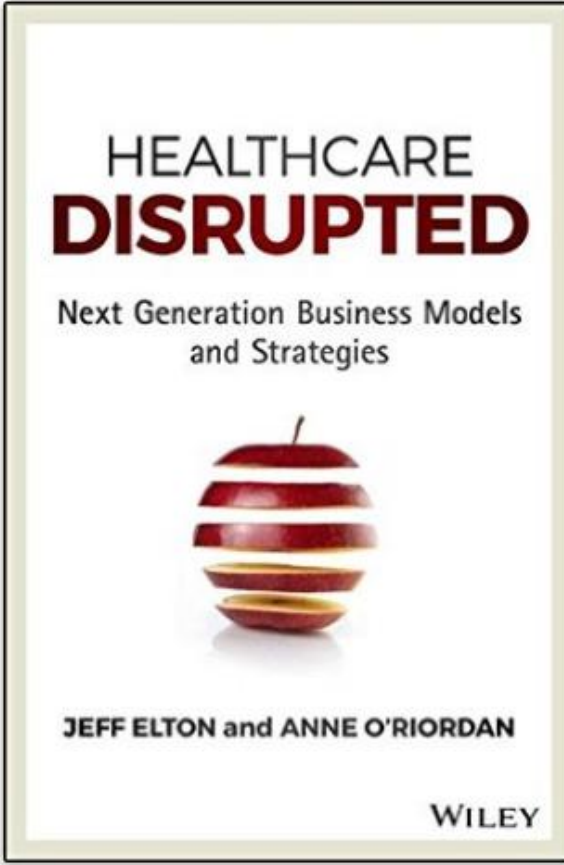
Global Scale

Lean Innovators

Remote Sensors

Value Innovators

Rewarding Value

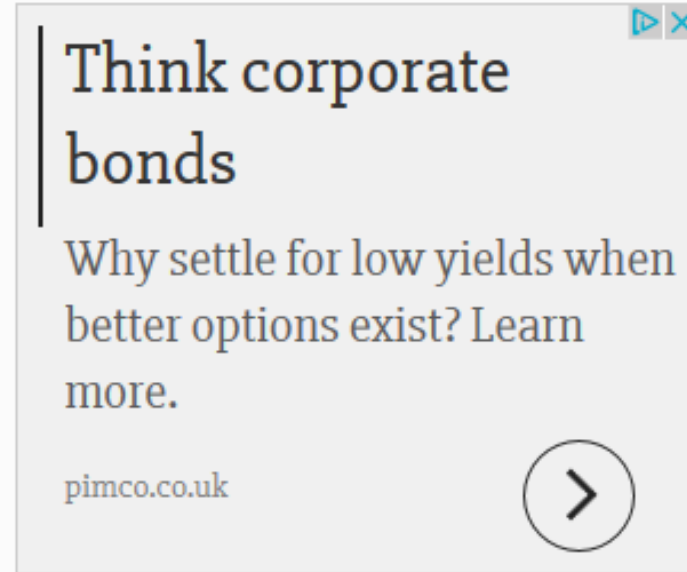


Who will do it?

- Apple?
- Google?
- Facebook?
- Microsoft?
- Nokia?
- Health 2.0?
- All of the above?
- Gnu Health?

Apple?

Now, major tech companies are seeing gold in new consumer health products.

An advertisement for Pimco bonds. It features a light gray background with a thin border. The text "Think corporate bonds" is in a large, dark font. Below it, in a smaller font, is "Why settle for low yields when better options exist? Learn more." At the bottom left is the URL "pimco.co.uk" and at the bottom right is a circular button with a right-pointing arrow.

Think corporate bonds

Why settle for low yields when better options exist? Learn more.

pimco.co.uk

At its annual developer conference in June, Apple introduced a new “Health” app for tracking a user’s heart rate, sleep patterns, calorie intake and other health metrics. Apple also launched “Health Kit,” an Internet platform for app developers that can store data from different devices and share it with a user’s doctor or health system. Three weeks later, Google announced its own initiative, called “Fit,” which includes developer tools and an online platform for collecting data.

Google co-founders Larry Page and Sergey Brin also have a long-standing interest in health research. Google Ventures is a longtime backer of 23andMe, the personal genetics startup led by Brin’s wife, Anne Wojcicki. While that firm has run into regulatory hurdles, Google launched a spinoff company last fall with the ambitious aim of combating “aging and associated diseases” on a cellular level.

Meanwhile, researchers at Google’s secretive X division are working on wearable medical devices, including a “smart” contact lens that monitors a wearer’s glucose level. The same team is building a database of genetic and molecular information from healthy volunteers, which they hope to analyze for useful medical knowledge.

Google?

- First stage of ambitions, closed in 2012... had some pretty big goals

<https://googleblog.blogspot.co.uk/2011/06/update-on-google-health-and-google.html>

When we launched Google Health, our goal was to create a service that would give people access to their personal health and wellness information. We wanted to translate our successful consumer-centered approach from other domains to healthcare and have a real impact on the day-to-day health experiences of millions of our users.

Now, with a few years of experience, we've observed that Google Health is not having the broad impact that we hoped it would. There has been adoption among certain groups of users like tech-savvy patients and their caregivers, and more recently fitness and wellness enthusiasts. But we haven't found a way to translate that limited usage into widespread adoption in the daily health routines of millions of people. That's why we've made the difficult decision to discontinue the Google Health service. We'll continue to operate the Google Health site as usual through January 1, 2012, and we'll provide an ongoing way for people to download their health data for an additional year beyond that, through January 1, 2013. Any data that remains in Google Health after that point will be permanently deleted.

If you're a Google Health user, we've made it easy for you to retrieve your data from Google Health any time before January 1, 2013. Just [go to the site](#) to download your information in any of several formats: you can print and save it, or transfer it to other services that support industry-standard data formats. Available formats include:

A decade into Facebook: where is psychiatry in the digital age?



Becky Inkster, David Stillwell, Michal Kosinski, Peter Jones

Introduction

Social networking sites are a part of everyday life for over a billion people worldwide.¹ They show no sign of declining popularity, with social media use increasing at three times the rate of other internet use.² Despite this proliferation, mental health care has yet to embrace this unprecedented resource. We argue that data from social networking sites should become a high priority for psychiatry research and mental health-care delivery.

We illustrate our views using the world's largest social networking site, Facebook, which currently has over 1 billion daily users¹ (one in seven people worldwide). Facebook users can create personal profiles, socialise, express feelings, and share content, which Facebook stores as time-stamped digital records dating back to when the user first joined. Evidence suggests that 92% of adolescents go online daily³ and disclose considerably more about themselves online than offline.⁴ Thus, working with Facebook data could further our understanding of the onset and early years of mental illness, a crucial period of interpersonal development.⁵ Furthermore, a diminishing so-called digital divide has allowed for a broader sociodemographic to access Facebook, including homeless youth,⁶ young veterans,⁷ immigrants, people with mental health problems,⁹ and

seniors,¹⁰ enabling greater contact with traditionally hard-to-reach populations.

While acknowledging that issues are far from settled about the role that social media should play in mental health, we argue that it should no longer be a debate about whether researchers and health-care providers engage with social networking sites, but rather how best to use this technology to promote positive change. We discuss how Facebook data can advance psychiatry research and how user-level data could potentially enhance the clinical delivery of personalised patient care. More specifically, we illustrate how Facebook data can assist with identification, intervention, and possibly prediction and prevention of mental illness.

Social media and advancing psychiatric research

Identification

To what extent might Facebook measures improve detection of mental health factors? We address this question by implementing a novel online-offline framework that combines Facebook data with pre-existing offline longitudinal cohort information (figure). This approach presents several opportunities to improve detection. Facebook data: (1) tends to be more reliable than offline self-reported information,^{11,12} (2) often reflects valid

Lancet Psychiatry 2016;
3: 1087–90

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For more on Facebook see
<http://www.facebook.com>



Dynamics is powering engagement and efficiency at Horizon...

11/07/2016

Industry leader Horizon Discovery is a UK based gene editing company, providing products and services for companies in the pharmaceutical...

[Read more >](#)



Azure powers donor registration and booking at NHS...

15/11/2016

Azure is accelerating the process of registering blood and transplant donors in the UK, providing lifesaving supplies for the NHS.

[Read more >](#)



SLAM gets connected with Office 365

15/11/2016

Office 365 is connecting staff and patients, empowering greater internal collaboration and reducing delays in patient treatment

[Read more >](#)

Microsoft?



Analytics at NATS takes flight with the cloud

15/11/2016

With 75 million passengers and nearly half a million flights moving through its doors in 2015, Heathrow Airport is the...

[Read more >](#)



Indivior poised for growth with Office 365

15/11/2016

Indivior taps into Office 365 E5 Suite existing capabilities to support the business and growth plans.

[Read more >](#)



East Kent improves treatment with Microsoft Azure

15/11/2016

East Kent Hospitals University NHS uses Microsoft Azure to minimise treatment delays for patients.

[Read more >](#)

<https://enterprise.microsoft.com/en-gb/industries/public-sector/health/>



Charity enables connectivity with Office 365



Improving patient care with technology collaboration



Brighton NHS treats stroke patients with Skype for...

Nokia?

Nokia is buying digital health firm Withings for \$191 million

by James Vincent | @jvincent | Apr 26, 2016, 3:34am EDT



SHARE



TWEET



LINKEDIN



Nokia has announced [plans to acquire Withings](#) — a French consumer electronics company focused on digital health — for €170 million (\$191 million) in cash. The acquisition will significantly boost Nokia's portfolio of wearables and fitness devices, bringing 200 Withings employees and products — including its [Activité smartwatch](#), [E-ink fitness tracker](#), and [Bluetooth thermometer](#) — into Nokia's advanced technologies division.

GNUHealth.com

"We have said consistently that digital health was an area of strategic interest to Nokia, and we are now taking concrete action to tap the opportunity in this large and important market," said Raajeev Suri, president & CEO of Nokia in a [press statement](#). "With this acquisition, Nokia



NOW TRENDING



<http://www.theverge.com/2016/4/26/11507226/nokia-acquire-withings>

Health 2?

Scanning,
Catalyzing,
Analyzing

<http://www.health2con.com/>

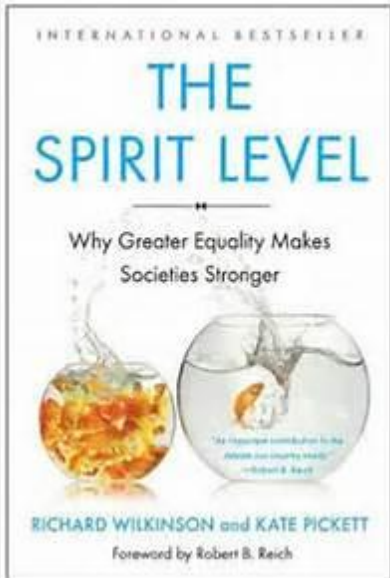
Conference, Barcelona
3-5 May 2017

<https://health2con.squarespace.com/market-intel#market-landing>



A Set of Workshop Questions

In the new, exploding domain of eHealth solutions: what kind of new business model invites in Gnu Health?



GNUHealth

DOCUMENTATION

DOWNLOAD

NETWORK

EVENTS

SUPPORT US!

English

Español

Social medicine



The field of social medicine seeks to: understand how social and economic conditions impact health, disease and the practice of medicine and foster conditions in which this understanding can lead to a healthier society. This type of study began formally in the early 19th century. The Industrial Revolution and the subsequent increase in poverty and disease among workers raised concerns about the effect of social processes on the health of the poor. Prominent figures

GNUHealth CON 2016

Social
Medicine

Partnership Opportunities



The Scientific and Technological Research Council of Turkey (TÜBİTAK) is the leading agency for management, funding and conduct of research in Turkey. It was established in 1963 with a mission to advance science and technology, conduct research and support Turkish researchers. The Council is an autonomous institution and is governed by a Scientific Board whose members are selected from prominent scholars from universities, industry and research institutions.

TÜBİTAK is responsible for promoting, developing, organizing, conducting and coordinating research and development in line with national targets and priorities.

Who could do it?

- Apple?
- Google?
- Facebook?
- Microsoft?
- Nokia?
- Health 2.0?
- All of the above?
- Gnu Health?

My other Research – The Artificial Intelligence of Artificial Persons

Each of these organisations is an Artificial Person

A Person under the law, can be afforded rights of representation and inclusion. Artificial Persons employ natural persons, who role-play a professional occupation for the good of the organisation.

The rules of the organisation become a form of Artificial Intelligence.

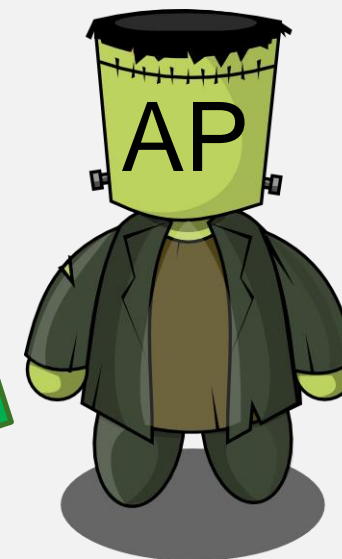
Why should only purely commercial organisations be in dialogue during business meetings?



Levels of Government



Edinburgh Napier
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Artificial Person: as Being in Time

What other Artificial
Persons are
stakeholders?

Citizenry
NGOs
Etc.



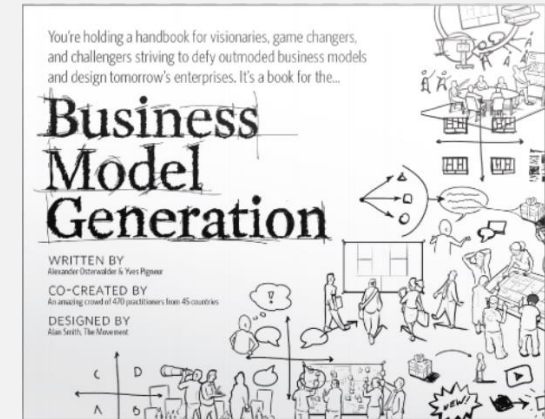
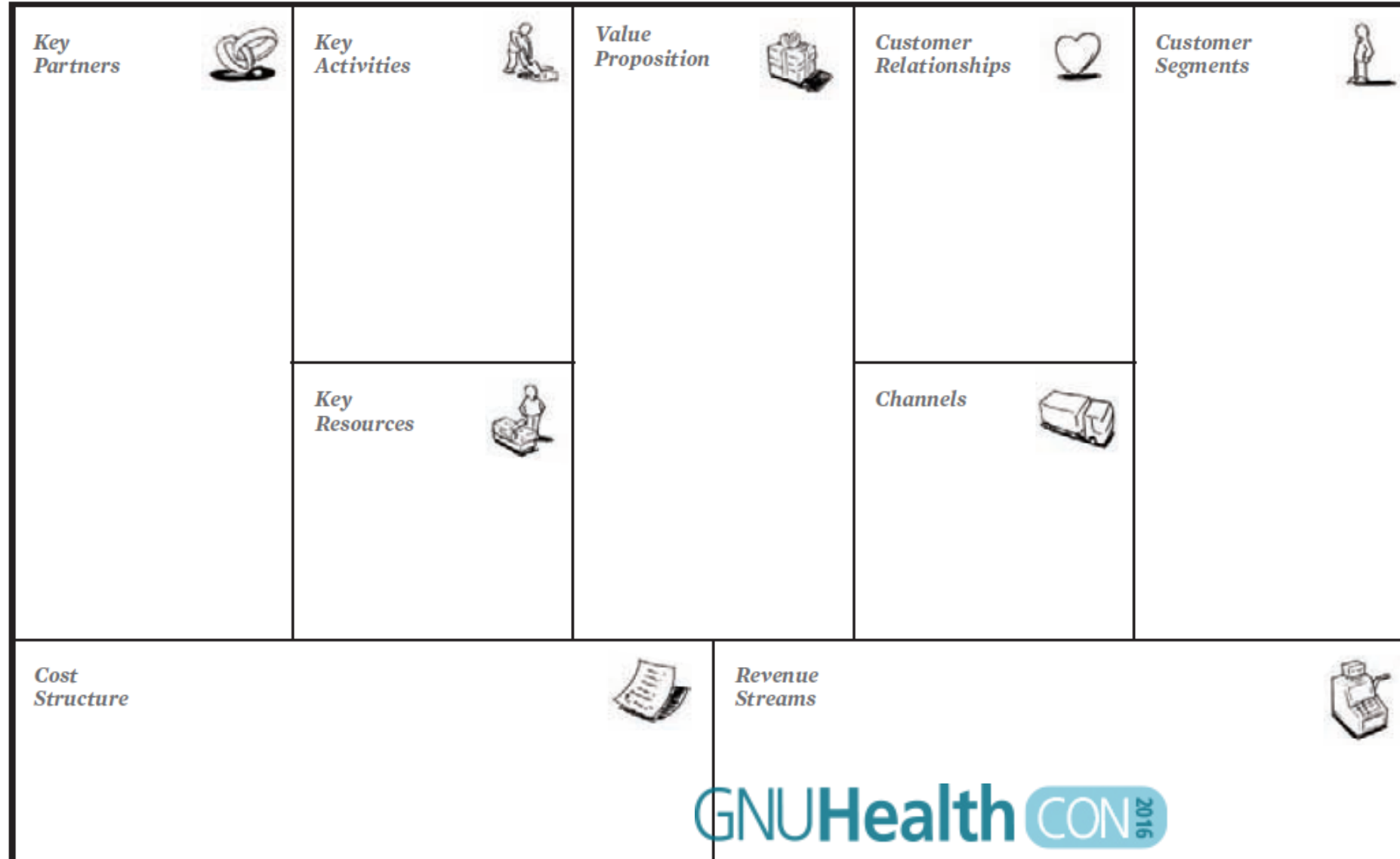
Some Workshop Questions:

1. What are optimal value systems and conditions for the implementation of a sustainable business model for the national implementation of free software solutions in eHealth?
2. What are the issues involved in the co-design and co-creation of civic systems and services to support citizen's health?
3. What are the issues of the design and use of health informatics that rely on mobile computing technologies that cross a number of communication devices and channels?
4. What are the issues of security, privacy, governance and ownership of data about people in health care information systems?
5. What are the issues involved in procurement of FLOSS solutions, the use of open source software and the business models for sustainable citizen informatics?
6. What are the routes of economic growth and wellbeing from socialized medicine?
7. What are appropriate medical and nursing solutions to health care issues in poor, displaced or otherwise unstable societies?
8. What are the issues concerning social media, news, opinion and content development and deployment for citizen and civic informatics?

Osterwalder and Pigneur, Business Model Generation

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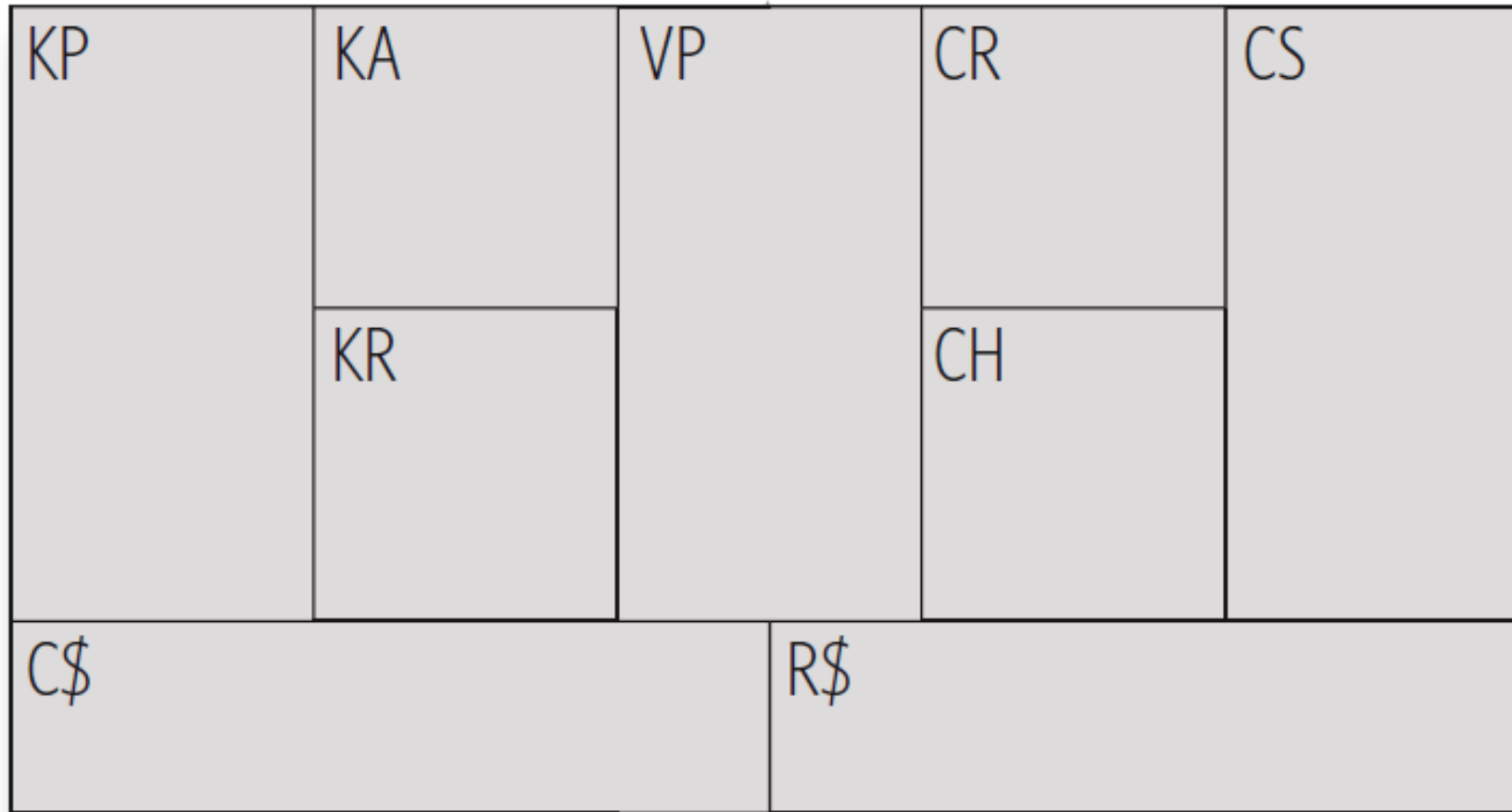
The Business Model Canvas





Developing The Business Model Canvas for Gnu Health Installations

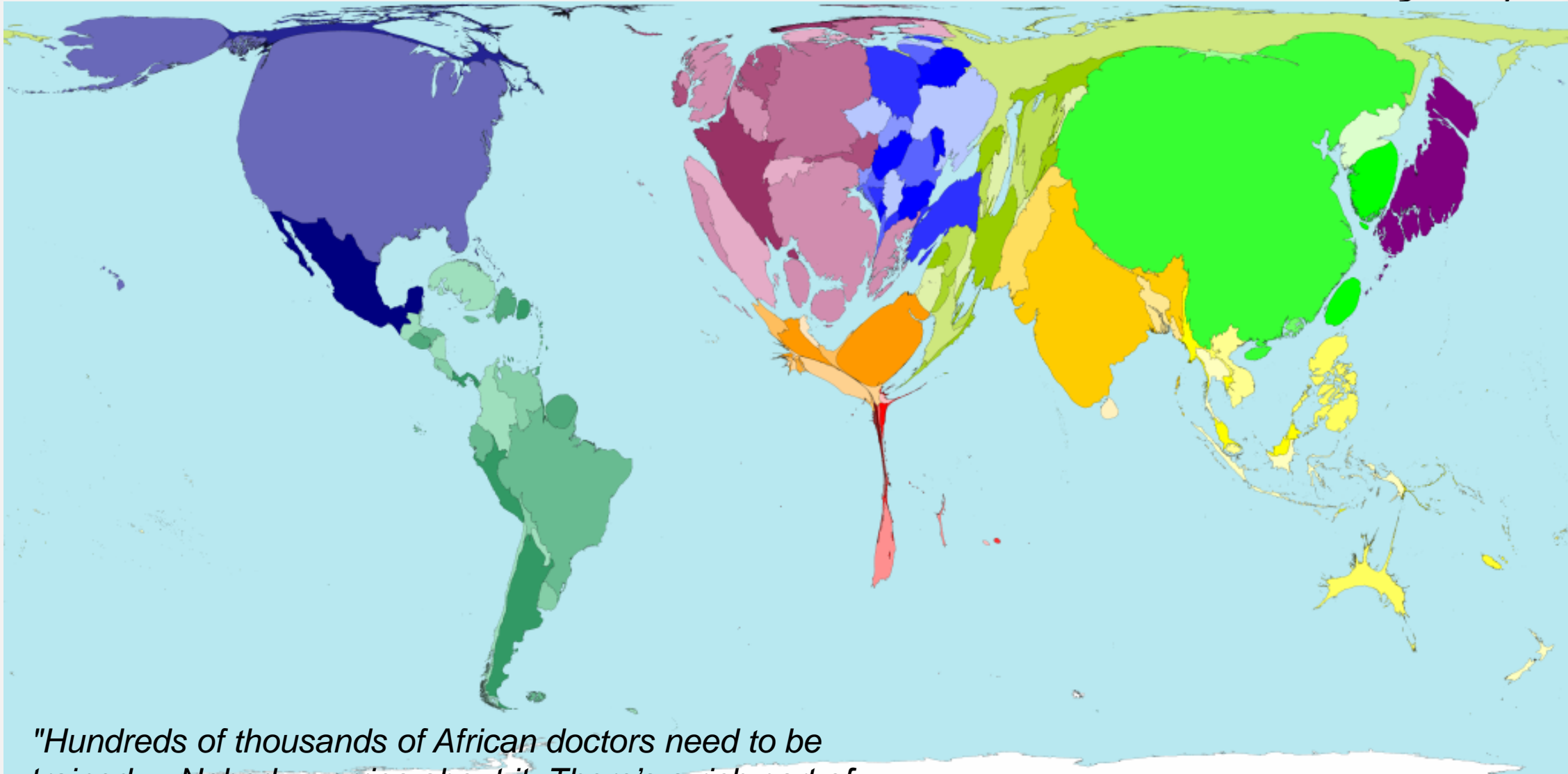
LEFT CANVAS
efficiency



RIGHT CANVAS
value

Values, What Values?

Edinburgh Napier



"Hundreds of thousands of African doctors need to be trained ... Nobody worries about it. There's a rich part of the world that only cares about oil, diamonds, minerals, forests, gas, cheap labour ..." Fidel Castro, 2001

GNUHealth CON 2016

<http://www.worldmapper.org/display.php?selected=219>

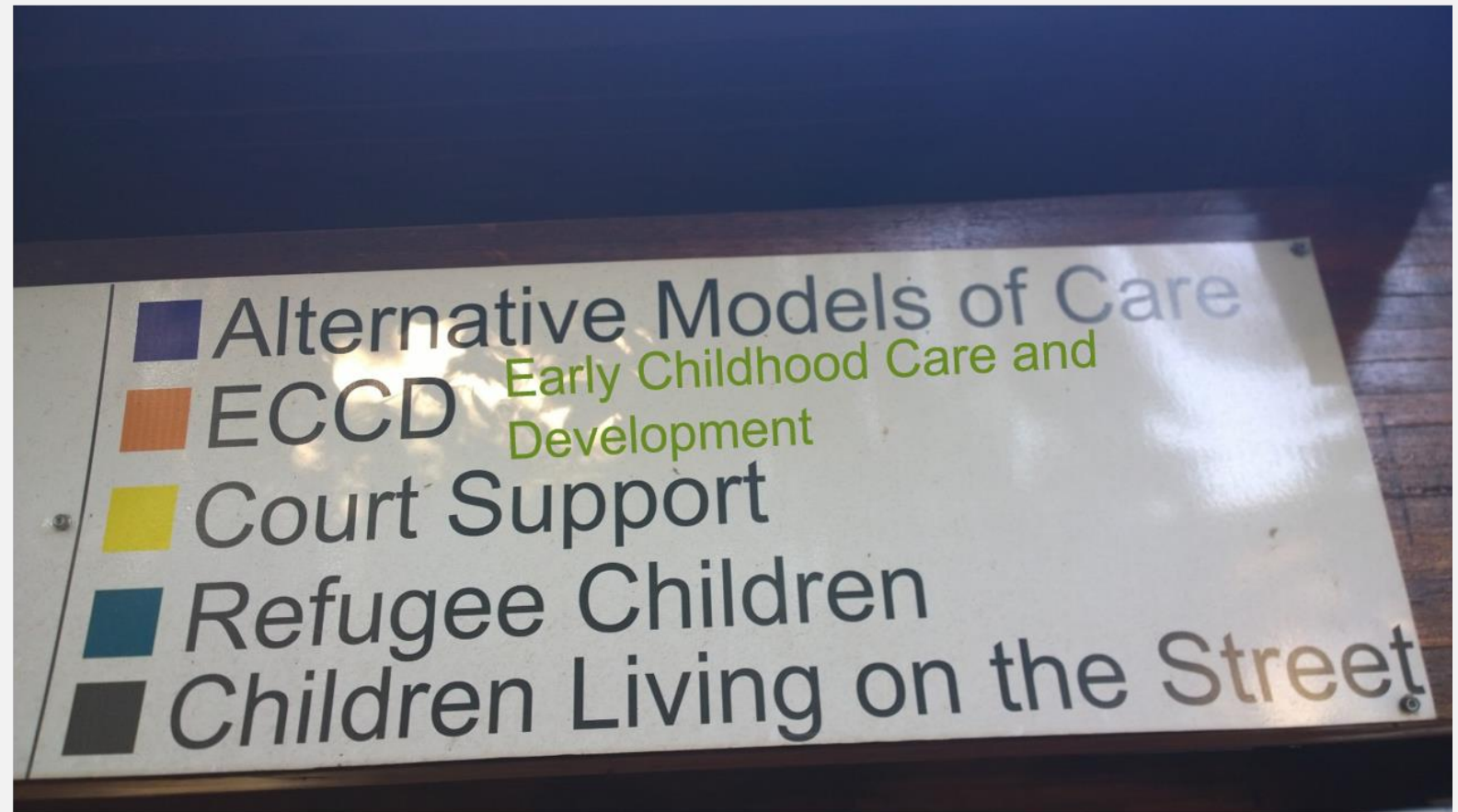
Values, What Values?



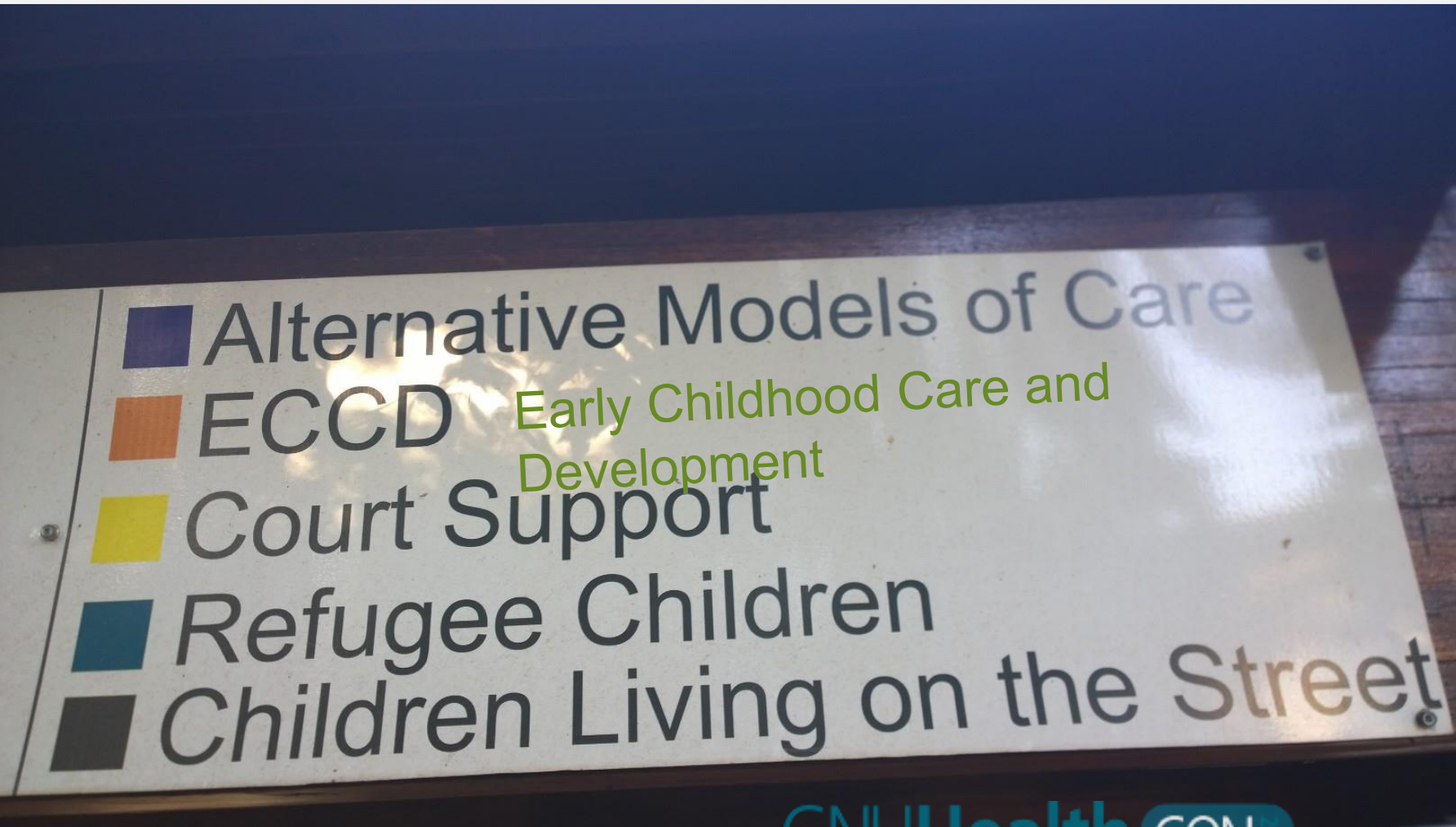
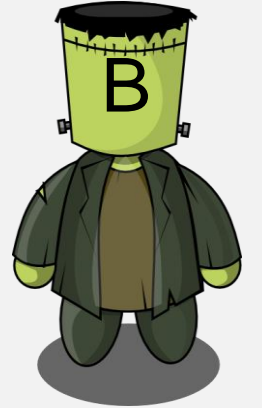
Long walk from Baragwanath to Taxi Rank



Legal Touts engaging the distressed

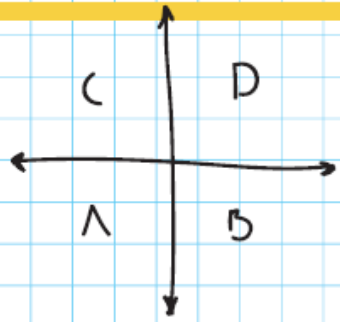


Sustainability - costs, long-term consequences
Advocacy - engagement with professional bodies
Ethos – BAU, medical ethics, moral leadership
Meetings and Events at NMCH



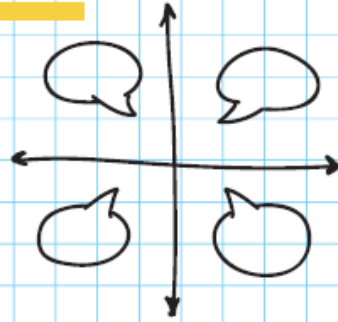
Given that the values of some stakeholders are totally different from commercial players, what accommodations should be pursued?

Future Scenarios and New Business Models



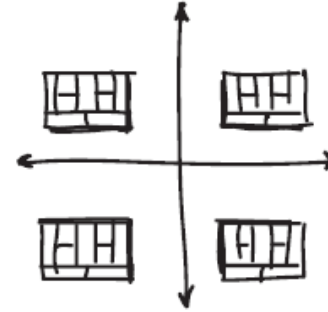
1

DEVELOP A SET OF FUTURE SCENARIOS BASED ON TWO OR MORE MAIN CRITERIA.



2

DESCRIBE EACH SCENARIO WITH A STORY THAT OUTLINES THE MAIN ELEMENTS OF THE SCENARIO



3 WORKSHOP

DEVELOP ONE OR MORE APPROPRIATE BUSINESS MODELS FOR EACH SCENARIO

Given a Multidimensional Grid for Value Definition

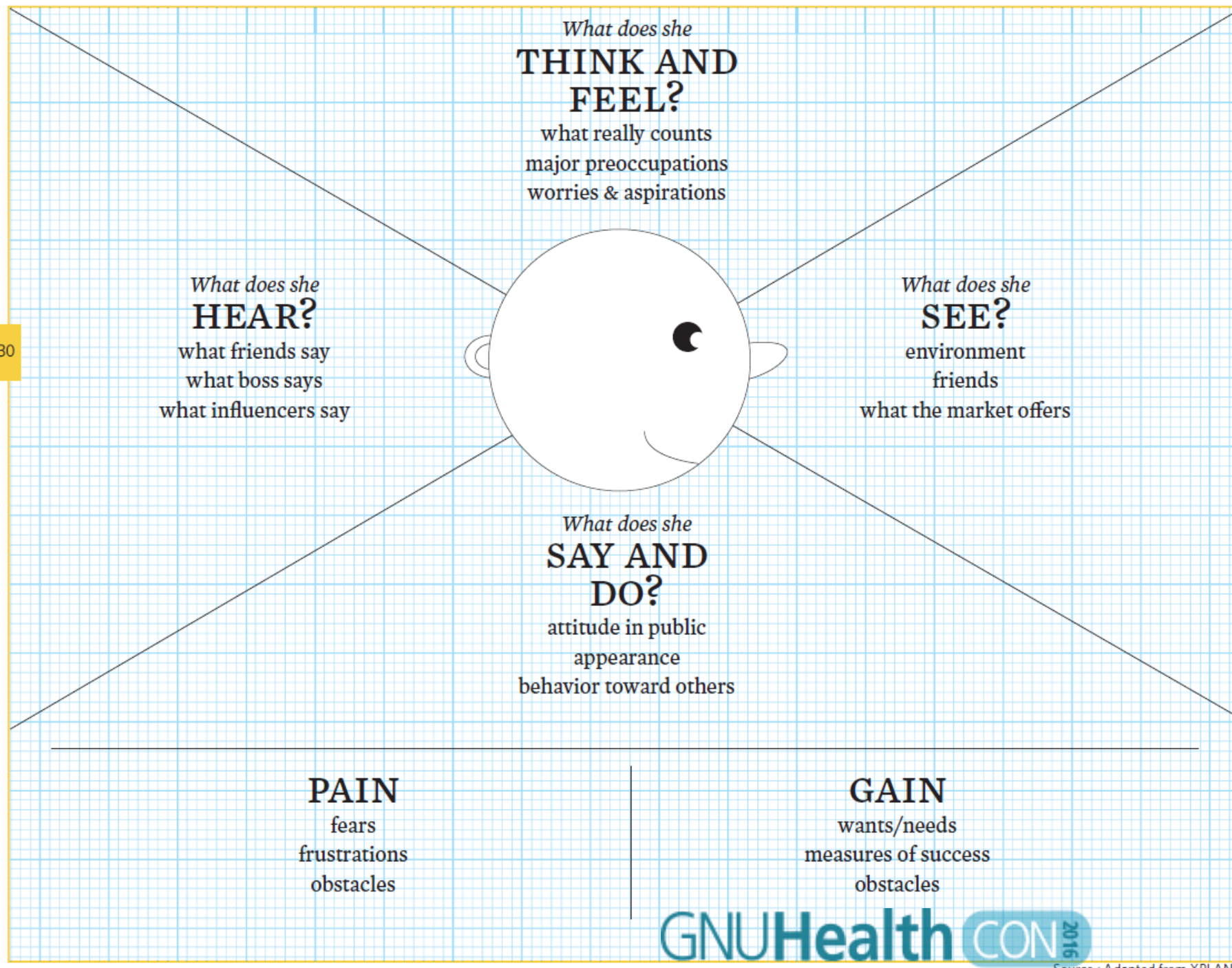
The goal of combining scenarios with business model innovation efforts is to help your organization prepare for the future. This process engenders meaningful discussion about a difficult topic, because it forces participants to project themselves into concrete “futures” underpinned by hard (though assumed) facts. When participants describe their business models they must be able to make a clear case for their choices within the context of the specific scenario.

Scenarios should be developed before the business model workshop begins. The sophistication of the “screenplays” will vary depending on your budget. Keep in mind that once you develop scenarios, they may be usable for other purposes as well. Even simple scenarios help jumpstart creativity and project participants into the future.

Ideally you should develop between two and four different scenarios based on two or more criteria in order to run a good business model scenario workshop. Each scenario should be titled and described with a short, specific narrative outlining the main elements.

Begin the workshop by asking participants to review the scenarios, then develop an appropriate business model for each. If your objective is to maximize a group's understanding of all the potential futures, you might want everyone to participate in a single group and let them collectively develop different business models for each scenario. If you are more interested in generating a set of very diverse future business models, you might decide to organize participants into different groups that work in parallel on separate solutions for the various scenarios.

Empathy Map for Each Stakeholder



Questions for Bringing Gnu Health to Procurement Discussions

Development of a FLOSS Business Model Canvas, looking to future scenarios, involving commercial and non-commercial stakeholders, exploring by means of an empathy map the production of a GNU Health Business Model for implementation of eHealth solutions in the Developing World, addressing:

- Stakeholders?
- Values, What Values?
- What aspects of FLOSS and Gnu Health values can translate on to Economic scales?
- How to establish technical trustworthiness, professional support?
- How to respectfully cost consultant expertise? Operational expertise?
- How to use specific scenarios to courageously explore the development of a bespoke GNU Health-friendly Business Model for any developing country wishing to employ it?
 - What are Appropriate Procurement Scenarios?
 - Societal Scenarios?