

Penicillin or Poison?

Demystifying the Fear, Buzz and Hype of Healthcare Digitalization

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Conflict of Interest Disclosure



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Abstract



It's no secret that a thriving economy depends on the health of its citizens (simply put, there will be more people to conduct effective activities in the workforce) and healthcare systems around the world have been seeking cost-effective solutions to address the ever-rising myriad of challenges.

The Digitalization of healthcare promises many things to fill the gaps found in the traditional model of care while extending benefits to patients, their families, healthcare professionals; improving outcomes while making the healthcare industry more affordable and efficient. Technology without doubt, will have a profound role in the transformation of healthcare, potentially making it more effective, efficient, personalized, accessible and safe.

However, is Healthcare Digitalization really the panacea we desperately seek or is yet another fleeting buzzword found the in “basket of digital distraction”? Let us examine the **Fear, Hype, Myth, Hope** and more importantly, the **Reality** of Healthcare Digitalization to determine if it is fad or the future



Digital Transformation in Health(care)



Digital Transformation




- Digitalization
 - Define as “the use of digital technologies to change a business model and provide new revenue and value-producing opportunities
 - It is the process of moving to a digital business
- Digitalization is **not** a synonym for Digitization
- Digitization
 - Define as the process of changing from analog to digital form
 - While there is no Digitalization without Digitization (of paper and processes), the two terms are not the same



Digital Transformation (cont.)

Digitalization

The process of considering how best to apply digitized information to simplify specific operations.



change starts within



Digitization

The process of making information available and accessible in a digital format.

- **Note:** Digitalization in Health (care) is not a synonym for Digital Health
 - (We'll cover a little on what Digital Health is later)



Industry 4.0 (In a Nutshell)



- Industry 1.0 - Mechanization (Steam)
- Industry 2.0 - Electrification
- Industry 3.0 - Automation (Computerization)
- Industry 4.0
 - Current trend of automation and data exchange in manufacturing technologies
 - It includes Cyber-physical systems, the Internet of things, cloud computing and cognitive computing
 - Creates what has been called a "smart factory"
- Healthcare 4.0
 - The impact made by Industry 4.0 on the healthcare industry

Smart Health(care)

What is it (not)



Smart Health(care)



- Smart Systems are able to sense and diagnose complex situations
 - They are “predictive”, they have the capability to decide and help to decide as well as to interact with the environment. They may also be energy autonomous and networked
- Smart Health(care) can be seen as the application of Smart Systems in the domain of health(care)
 - Ultimately, Smart Health(care) leads to better diagnostic tools, better treatment for patients, and devices that improves the quality of life for anyone and everyone
- Smart Health(care) are enabled by two supporting disciplines;



Smart Health(care) Enablers



- **Health Informatics** (University of South Florida) is
 - A term describing the acquiring, storing, retrieving and using of healthcare information to foster better collaboration among a patient's various healthcare providers
- **Digital Health**
 - Describes the use of information and communication technologies to help address the health problems and challenges faced by patients
 - **HealthTech** is the latest buzzword replacing **Health IT**, **Health 2.0**, **Digital Health**
 - (Because the new scope encompasses more the just IT)



Health Informatics Vs Digital Health

- Digital Health is concerned with the application of Technology in the health(care) domain
- Health informatics is concern with more than the Technology aspects
- Health Informatics is best described as **“the science, the how and why, behind Digital Health”**



Smart Health(care) (cont.)



- As mentioned,
 - Smart Health(care) can be seen as the application of Smart Systems in the domain of health(care)
 - “Smart Systems are able to sense and diagnose complex situations”
 - They are “predictive”, they have the capability to decide and help to decide as well as to interact with the environment. They may also be energy autonomous and networked
 - Ultimately, Smart Health(care) leads to better diagnostic tools, better treatment for patients, and devices that improves the quality of life for anyone and everyone
- However, the above wall of text doesn't really give us a flavour of what Smart Health(care) really is
- This sense of ambiguity is further compounded as the term can mean different things to different people!



So... What is Smart Health(care)?



A Digital Hospital?

Cloud Computing?

That's a lot of
marketing
buzzwords!!

Telehealth / Mobile Health / Remote Monitoring?

A Paperless Hospital?

Serious Games?

AI & Data Analytics?



A Hospital with the latest Medical Equipment?

A Hospital with Robotic Prescription Dispensing Systems?

Block-chain!

Using Wearables, Sensors & IoT?



So... What is Smart Health(care)?



- To better illustrate what Smart Health(care) is, we will examine what it is **not**



Health(care) Practice Today

- Ever wonder why medicine is called a 'Practice'?
- Ever wonder why a patient is called a 'Patient'?



Health(care) Practice Today (cont.)



- Trial-and-Error medicine
 - The cholera epidemics in England during the 1800s, which resulted in more than 76,000 deaths, subside and stopped because John Snow (a physician) identified the problem source (via some detective work)
 - The organism that causes cholera (Vibrio Cholera) was discovered 25 years after John Snow's death by Robert Koch
- Trial-and-Error medicine is still being practice although it gets better and better
 - (Hence the need for Clinical Trials and Evidence-Based medicine)



So What Is My Point?

DO YOU SEE



WHAT I SEE?



Health(care) Practice Today (cont.)



- In order for scientific discoveries to improve human health, they must be moved from the laboratory bench and be incorporated into practical applications in the community
 - This is a “two-way street”
 - Scientists delivers new to clinicians tools to examine patients, who in return make novel observations about the nature and progression of disease that can stimulate scientific investigations in the laboratory
- However, the rapid expansion of knowledge and an explosion of medical literature have strained the ability of clinicians to keep up to date with the latest recommendations
- The lag time between when researchers identify life-saving clinical interventions and when they are put into practice ranges from 10 to 25 years, averaging **17 years** (to integrate **only 30%** of clinical recommendations)



Health(care) Practice Today (cont.)



- The current model of practice is becoming **obsolete**
- Not only because “health(care) can’t cope, it desperately needs to be more effective”
- Important: This has always been the case, what is different is “**things have changed**”



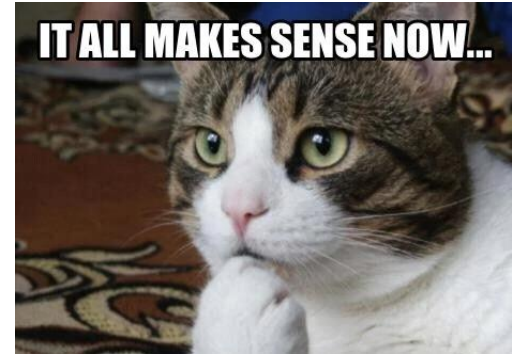
What Changed?

- Technology is now “possible”
 - Precision Medicine/Health(care) via AI enabled Machine Learning (powered by Big Data and Analytics) with Information obtained in real-time (via 5G enabled Cloud) through Wearables and IoT Devices (mobile devices)
 - This translates to the ability to transform provision of care - moving from reaction to prevention
- Not only is technology ready (and **affordable**), the consumers are also demanding it;
 - The Quantified Self :
 - A discipline of self-tracking for the purpose of self-awareness and personal improvement
 - Self-Actualization, Self Empowerment



Smart Health(care) (cont.)

- Smart Systems are able to sense and diagnose complex situations
 - They are “predictive”, they have the capability to decide and help to decide as well as to interact with the environment
- Smart Health(care) can be seen as the application of Smart Systems in the domain of health(care)
 - Ultimately, Smart Health(care) leads to better diagnostic tools, better treatment for patients, and devices that improves the quality of life for anyone and everyone



False Evidence Appearing Real



Fear, Hype, Myth, Hope and **Reality** of Healthcare Digitalization



Facts



- Smart Health(care) is meeting new milestones every day
 - Every now and then, we hear about a new discovery or invention in Digital Health
 - More importantly, we are now seeing those being applied to improve the patient experience
- Smart Health(care) has been able to fill the gaps in the traditional healthcare model and is even being used to treat and manage chronic (and incurable diseases)
- While the advantages of Smart Health(care) are countless, majority of the population isn't fully familiar with it yet. **This includes health(care) professionals**
 - Many people haven't been able to embrace the use of technology in healthcare
 - There is an uncertainty associated with it, largely because it's relatively new



Facts (cont.)



PEOPLE
FEAR
WHAT
THEY
DON'T
UNDERSTAND



Fear, Hype and Myth

- We need to;
 - Understand the challenges which have metamorphosed into fears when it comes to Smart Health(care)
 - Examine the (most common) 'Fear, Myth and Hype' in order to understand and overcome the associated resistance

Will Smart Health(care) commit errors that may lead to grave health mismanagement?

Data secured are not kept private & secure

Smart Health(care) will eliminate the need for humans



Hope & Reality



- Smart Health(care) isn't a substitute for health(care) professionals
 - It cannot function without any human involvement
 - It works alongside medical staff to streamline workflows and ensure a smooth care delivery
- In other words
 - It's only creating opportunities for us to focus more on value and quality removing redundancy from the process
- It is important to re-acknowledge that Health and Healthcare are **complex**
- And that technology has the **potential** to make healthcare more effective, efficient, safe, evidenced-based, preventive, accessible, affordable, convenient, personalized, & compassionate etc.



Hope & Reality (cont.)



- However, adopting Smart Health is **highly unlikely** to make healthcare perfect
 - We need to realise that it's not magic
 - Technology by itself will not solve all issues & must be part of a comprehensive strategy that addresses social, behavioural, & environmental determinants of health
- However, effective and sustainable adoption may
 - Help us monitor health and determine effective treatments
 - Help patients get a better view of their health and motivates them to maintain it



Wisdom Question

- Is your Smart Health(care) implementation;
 - Augmenting health(care) or
 - Augmenting the people providing Healthcare

- Due to the lack of time, I will (very) briefly illustrate the differences using “workflow”





What is Workflow?

- What is workflow?
 - The common response I get;
 - From “**Architects**” - it is the same as “**Use-Cases**”
 - From “**Analysts**” - it is the same as “**Processes**”
- Workflow is not the same as Use-Cases or Processes
 - The three are somehow related but they are definitely not the same
- I am going to use ‘luggage collection’ as an example to explain “**Workflow**”



What is Workflow? (cont.)

- **Use-Case**

- A Use Case defines a specific scenario / list of steps, defining interactions between a role (usually known as an 'actor') and a system to achieve a goal.
- Defining **use-cases** at the beginning of a project helps to understand how the system should be modeled, what are the important scenarios of interactions between the components.

- **Example**

- Passengers has to clear immigration, proceed to the baggage collection point and wait for their baggage to arrive for pickup



What is Workflow? (cont.)



- **Process**

- A collection of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a particular customer or customers.
- It often can be visualized with a flowchart as a sequence of activities with interleaving decision points as a sequence of activities with relevance rules based on the data in the process
- A process begins with a mission objective and ends with achievement of a specific objective



What is Workflow? (cont.)

- **Process** (cont.)
- Example:
 - A plane must first land, taxi and park into the correct dock, wait for the baggage transportation to arrive, open the cargo bay, unload the baggage onto the baggage transportation, which delivers the baggage to the loading bay where Baggage Handlers place them into the correct baggage collection point (and the correct conveyor belt) in a specific order
 - (e.g. First come first serve or fragile items first or bulk items first etc. whatever the rules are)



What is Workflow? (cont.)

- Workflow is ;
 - a depiction of the tasks, procedural steps, people, systems, inputs and outputs of information in a business process

- To better illustrate;



Workflow (cont.)

Scenario One – Ineffective Workflow



- Chaotic
- Passengers are standing in an un-orderly manner, some blocking the view of others who then are unable to see their baggage are on the conveyer belt, resulting in a 'mad rush' to retrieve their baggage when they do finally see it.

Scenario 2 - Effective Workflow



- Orderly
- Passenger observes at a distance if their baggage is on the conveyer belt, stepping forward to retrieve their baggage only when it is approaching.
- Fuss-free, smooth and 'within satisfaction'.

Workflow (cont.)

- If one does not focus on the workflow aspects of things, then the end result would be merely **Digitization** and not **Digitalization**
- Digitalization
 - Define as “the use of digital technologies to change a business model and provide new revenue and value-producing opportunities
 - It is the process of moving to a digital business
- Digitization
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Healthcare is Different



- Concepts originating from Industry 4.0 focuses on manufacturing technologies (factories)
- Healthcare happens to be different from every other “industry”
 - To implement Smart Health(care), it is important for one to understand how healthcare is different



Society 5.0



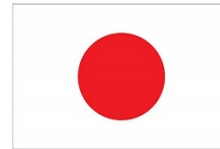
Industry 4.0 vs Society 5.0

- -
- -
- Industry 1.0 – Automation (Steam)
- Industry 2.0 – Electrification
- Industry 3.0 – Computerization
- Industry 4.0 – Smart Systems (Smart Factory)



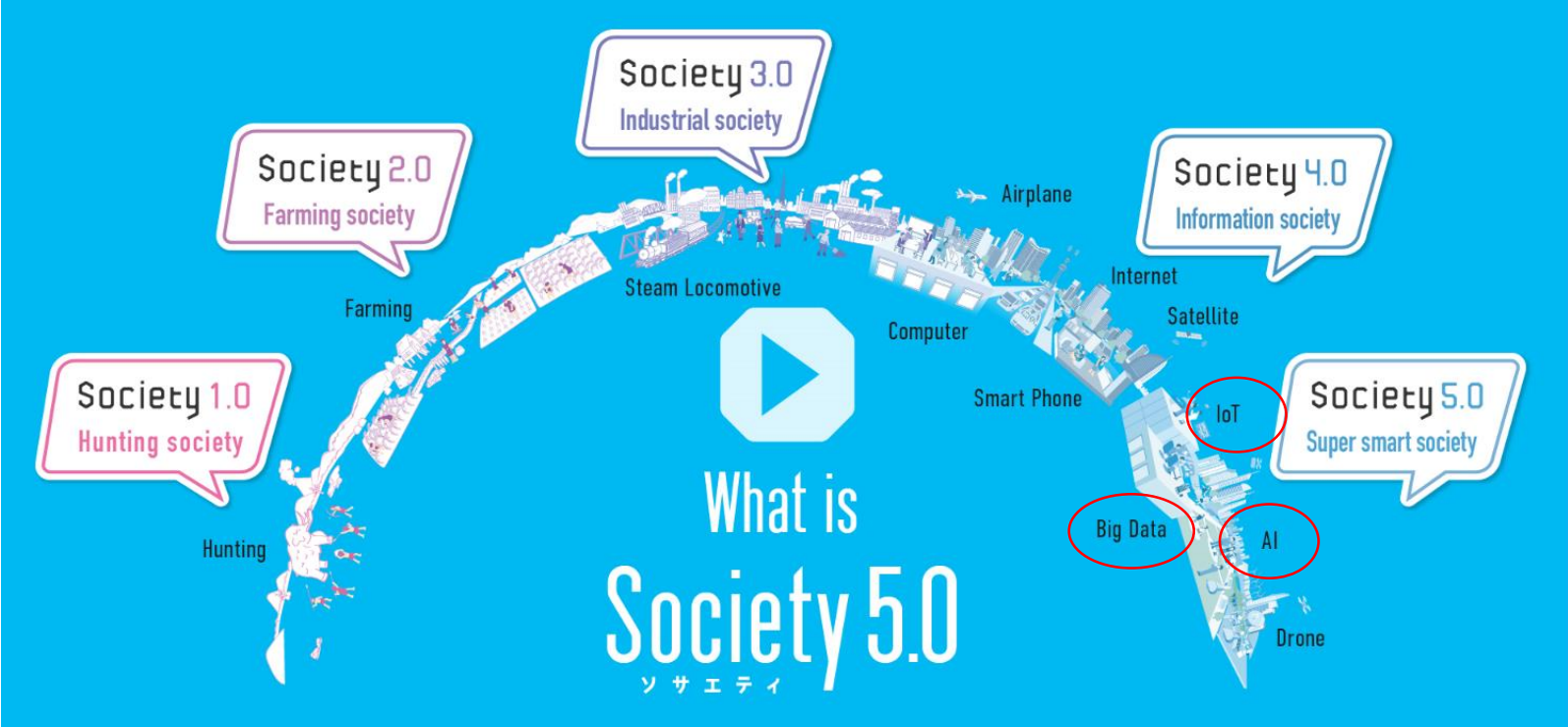
Digital Transformation
of Manufacturing

- Society 1.0 – Hunting society
- Society 2.0 – Agrarian society
- Society 3.0 – Industrial society
- -
- Society 4.0 – Information society
- Society 5.0 – Super-smart society



Digital Transformation
of Society

Society 5.0



Society 5.0



- Importantly;
 - Industry 4.0 is part of Society 5.0
 - Because Smart Systems serves merely as a **Tool**
- Healthcare Digitization: Penicillin or Poison?
 - It really depends if this tool is designed and used properly
- Hence the importance of understanding your “Workflow”
 - Is your Smart Health(care) implementation;
 - Augmenting health(care)? or
 - Augmenting the people providing Healthcare?



Before you start



- **Discovering Your 'Why' Is the No. 1 Move**
- Healthcare Digitization: Penicillin or Poison?
 - The choice is yours to make



BinaryHealthCare (BNHC)

Bridging the eHealth Divide

BinaryHealthCare, a social enterprise serving to “Bridge the eHealth Divide” (in both LAMIC and Developed Countries) by enabling sustainable innovation in patient-centered care through stakeholders empowerment to achieve context-effective adoption of Digital Health as an enabler

BNHC, a ‘purpose-driven’ consulting firm offering training, technical and market strategy, solutions and advisory services, specifically addressing the eHealth domains within (but not limited to) the ASEAN, North Asia and Middle East region

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*Thank
you*

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