IOTWeek

Dublin — June 20-23, 2022

Trustworthy in Artificial Intelligence in the healthcare domain

5:15 PM, Tuesday 21 Jun 2022 (1 hour 15 minutes)

Croke Park Conference Centre - Hogan Mezzanine 2

GLOBAL VISION:

IoT TODAY AND BEYOND

IOTForum

Speakers

IOTWeek
Dublin — June 20-23, 2022

Giuseppe Fico

Head of Health Area at Life Supporting Technologies at UPM.

FAITH project

Pietro Dionisio

MEDEA organization.

Chairman of the Health Working Group within the ***AIOTI association***

Giorgio Micheletti

Consulting Director at IDC.

OPEN DEI project

Filippo Cavallo

Industrial Engineering department in the University of Florence

Pharaon project

Artur Krukowski

Intracom company

SHAPES project

Alliance for Internet of Things Innovation

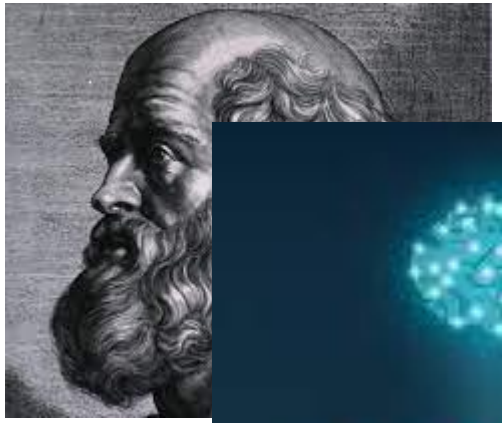
IoT Week - Trustworthy in Artificial Intelligence in the healthcare domain

AI for Health – the AIOTI vision for a wider adoption

Pietro Dionisio – AIOTI WG Health

Dublin - 21.06.2022

From Hippocrates to AI in Health



(Hipp
physicia
37

Medicine must be based on detailed observation,
and experience in order to establish a diagnosis,
is, and treatments

New technologies produce close to a zettabit (1 billion gigabytes) of data per year

methodology → physicians of ancient times
o use their intellect and five senses in order to
nformation about their patients.

AI-powered systems can now process huge amounts of data, generating information that facilitates the creation of new knowledge and insights

AIOTI

AI for a better health

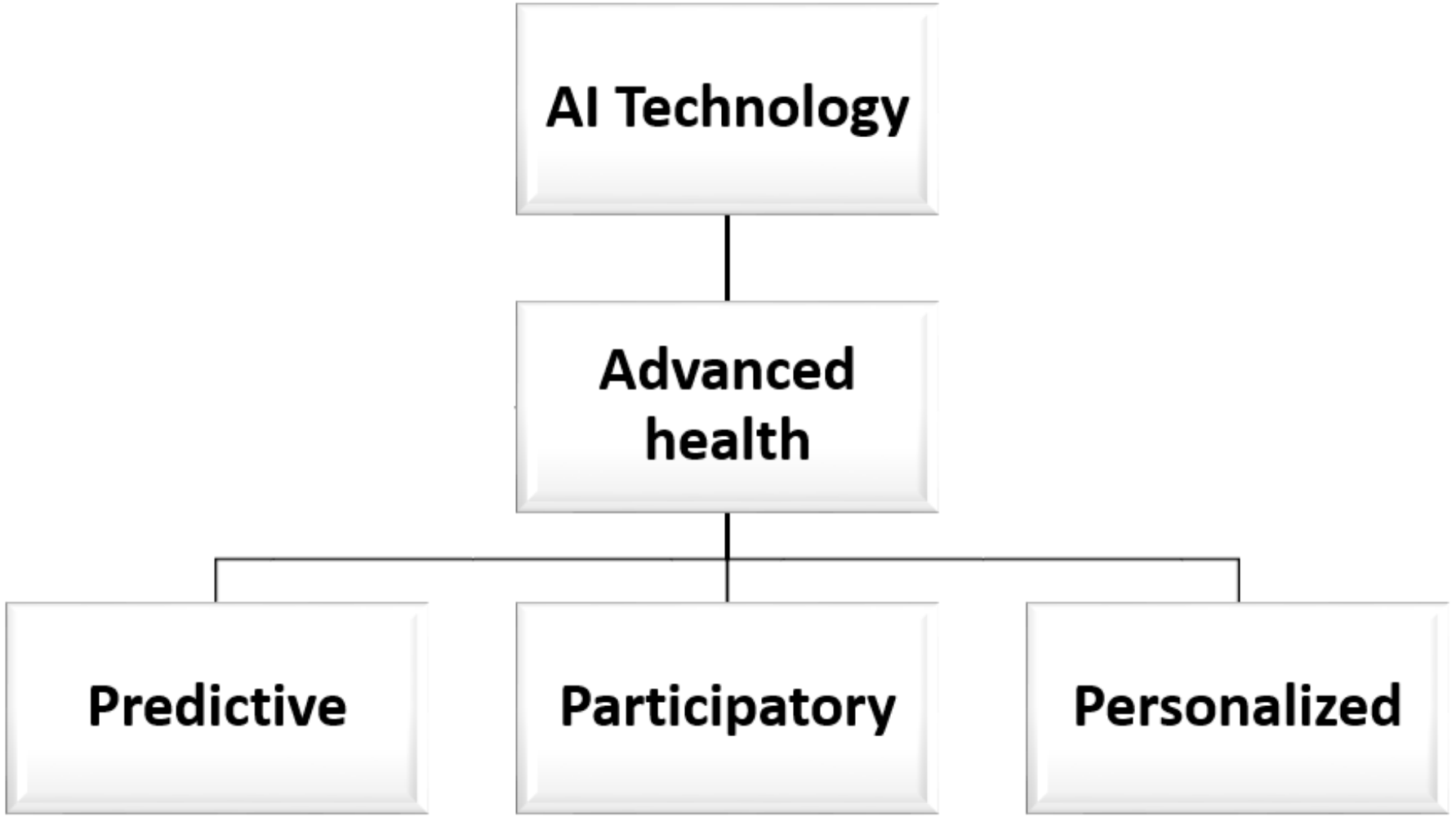
AI in Health

better health monitoring, better diagnoses and more personalized treatments, as well as live a healthier and more independent life

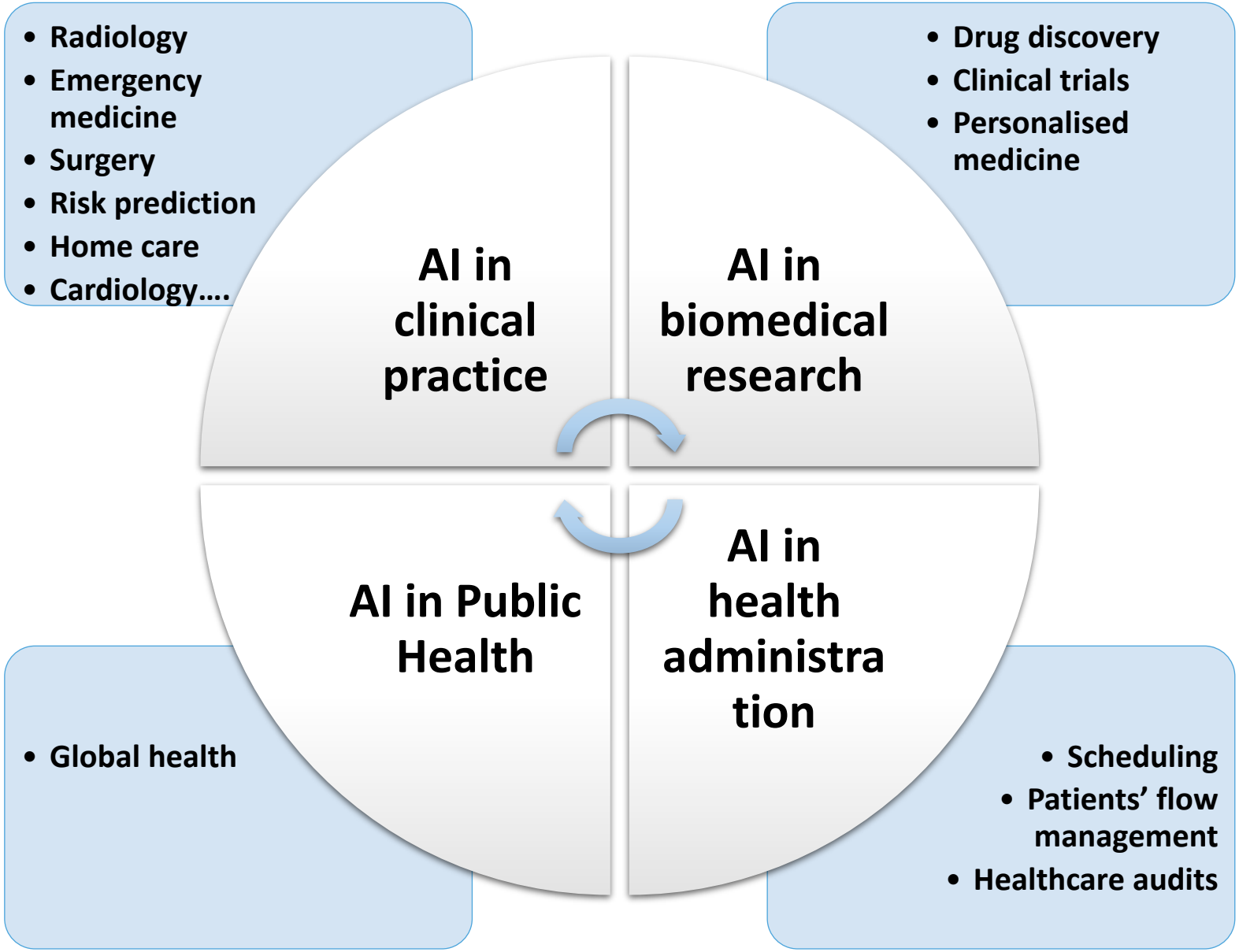
To address….

- ***Ageing population and chronic diseases***
- ***Lack of health personnel***
- ***Sustainability***
- ***Inefficiency of healthcare systems***
- ***Healthcare inequities***

AI as a key driver



Main application domains in the healthcare sector



Barriers and Risks

Risks……

AI algorithms errors due to exs: data shift between AI training data and real-world data, unexpected variations in clinical contexts and environments

Lack of transparency and trust: lack of understanding and trust in AI

Privacy and security issue: risk of data being exposed, shared without any consent, re-purposing, etc.

Gaps in AI accountability: Legal gaps in current regulations, lack of ethical and legal governance for AI

AND…

The **lack of trust in** technologies into curr

indering the wider adoption, while issues around integrating new challenges identified by relevant stakeholders in EU MS

Misuse of medical AI tools: lack of training, lack of digital literacy among patients….

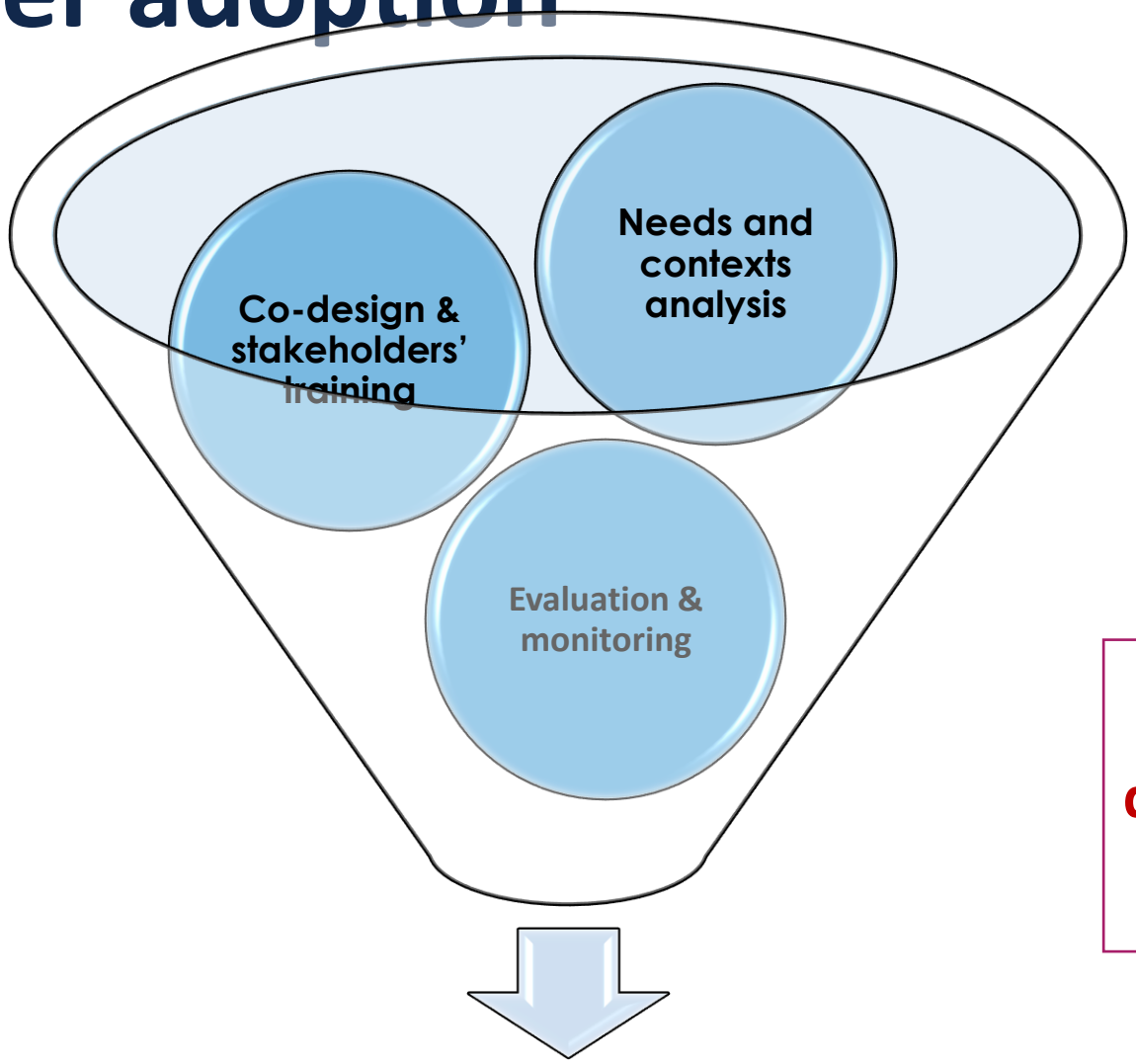
Obstacles to implementation in real-world healthcare: limited data quality, lack of clinical & technical integration and interoperability of AI with existing clinical workflows

Strategies for AI wider adoption

Innovation is such only when: it is implemented and **produces benefits** towards a **specific goal**

Starting from **the need** and analyzing a possible solution in terms of: **feasibility, available resources, acceptance from users standpoint, management and sustainability elements**

Steps for AI wider adoption



AI based services/tools

To ensure, **data quality** → **trust** → & **AI adoption**

AI TI

WG Health case studies

MINISTERIO DE CIENCIA E INNOVACIÓN

UNIÓN EUROPEA
FONDO EUROPEO DE DESARROLLO REGIONAL
"Una manera de hacer Europa"

AGENCIA ESTATAL DE INVESTIGACIÓN

Intelligent decision system based on activity recognition in the operational environment of aging

State Program for R&D&I Oriented to the Challenges of Society.

IP: Macarena Espinilla Estévez (Universidad de Jaén)

Funding Entity: University of Jaén (ASIA) and Ageing Lab Foundation

Partners: FIWOO - Emergya

Universidad de Jaén

ASIA

ageing_lab foundation

FIWOO

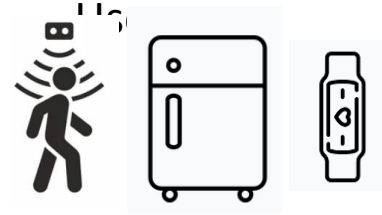
The ACTIVA case study

ACTIVA

- Inteligent Decision System
  - Based on activity recognition
  - Older adults homes/residences
- Object:
  - To improve QoL
    - Older Adults: **increases their security by knowing that they are being monitored in real time and that any anomalies are immediately reported.**
    - Formal/informal caregivers: **reduces stress by knowing at all times where each elderly person is and what he/she is doing in the nursing home**
- System
  - To recognize older adults' activities
  - To notify unusual habits to the caregiver through a dedicated app

Co-designed with end users and according to their reported needs (primary; and elderly people. And secondary users; carers, nursing home staff)

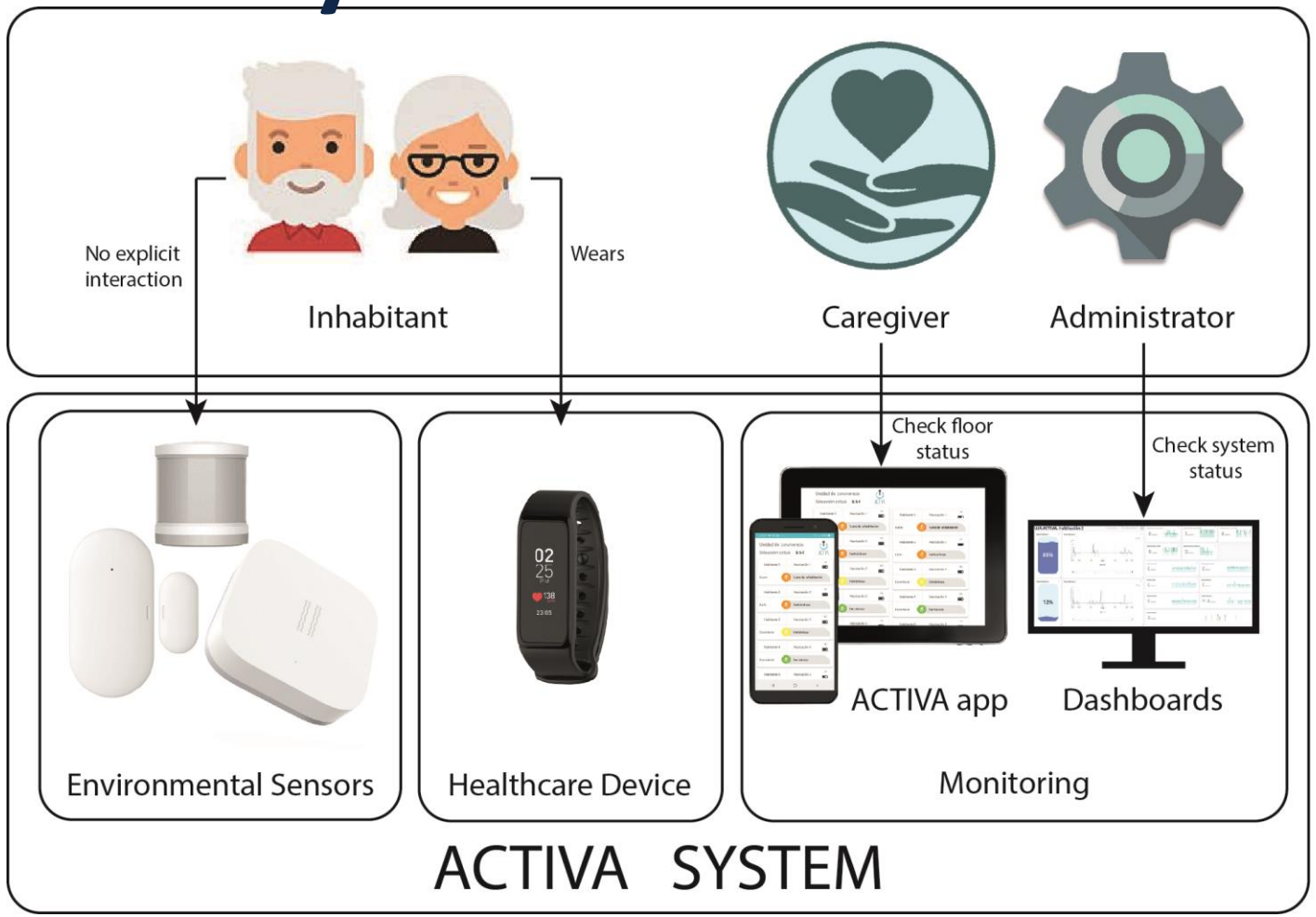
Sensors
- Environment
- Objects



AICTI

The ACTIVA case study

Explainable AI algorithms: used to locate the person within the residence and monitor activity. AI to classify the location of the person and the performed activity in REAL TIME.



Predictivity and descriptive

Personalised monitoring

Alliance for
Internet of Things
Innovation

Thank you

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What the future holds for AI in Healthcare

Giorgio Micheletti (IDC)

GLOBAL VISION:
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IDC

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Switching to a data-driven healthcare to enable an integrated and personalized care model

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of European healthcare organizations considers **integrated care and new care delivery models** as a top business priority

THE KEY CHALLENGES

- **Data is proliferating but attaining the full value from it remains a challenge.**
- **The movement to a value-based care model, focusing on prevention and wellbeing**
- **The accelerated adoption of digital technologies, data access, and analytics**

Source: IDC Europe, Healthcare and Life Sciences Insights, Internal, February 2022

AI can transform the way healthcare is delivered

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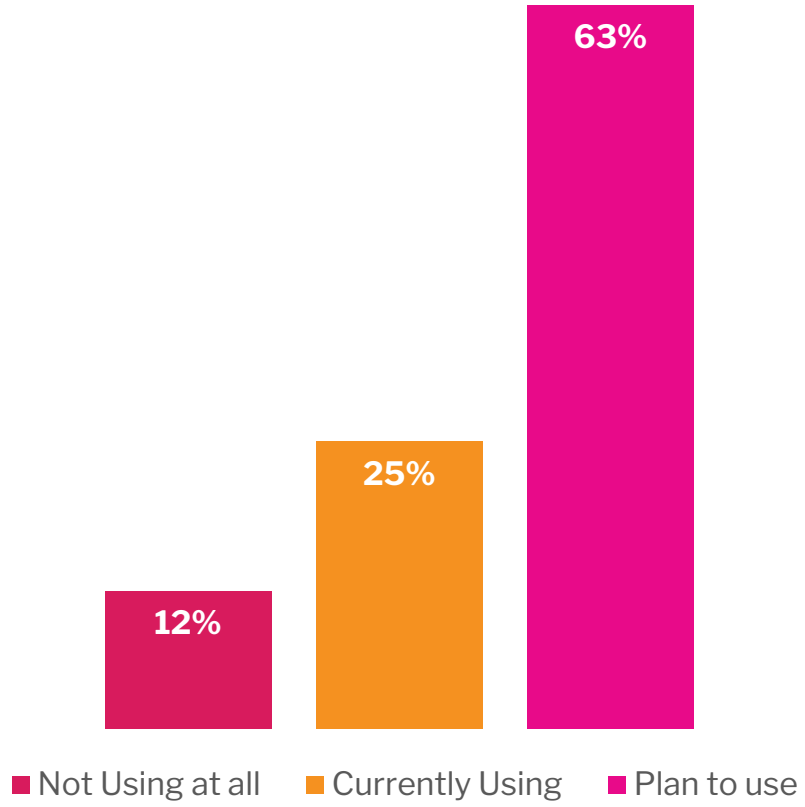
European Healthcare providers adoption and investment plan for AI



Source: IDC Europe, Healthcare and Life Sciences Insights, Internal, February 2022

By 2025, 35% more providers will have adopted AI-driven solutions and algorithms to support predictive care models

IDC FutureScape

Internet of Medical Things (IoMT) is making patient more engaged in their own health

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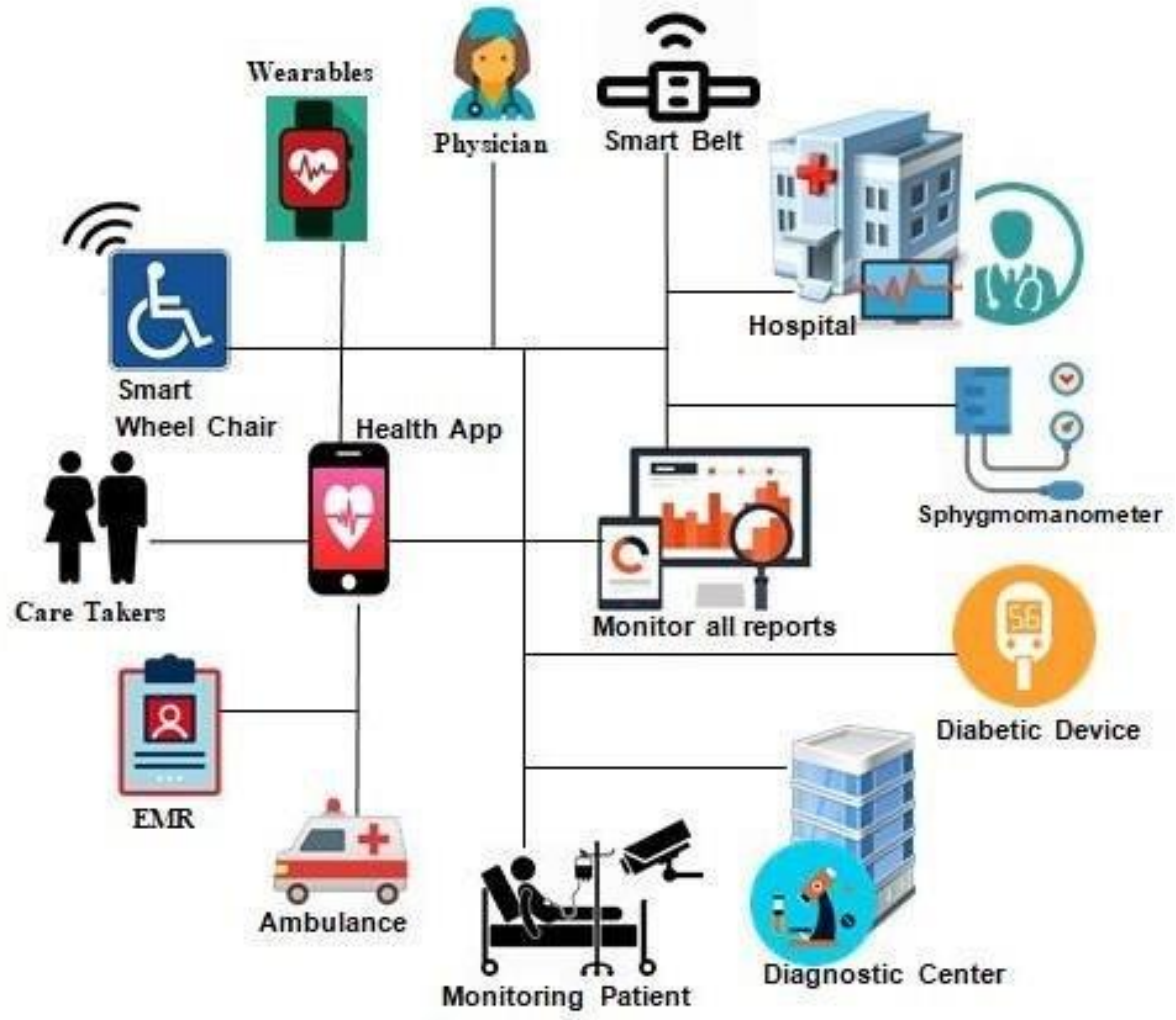

Telehealth and virtual care platform support the shift from hospital-based to home-based care

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of European healthcare organizations are investing in **telehealth and virtual care platform** for the first time

THE RISE OF TELEHEALTH AND VIRTUAL CARE

A home monitoring project implemented at Leiden University Medical Center in the Netherlands (the "COVID-box" project) used home monitoring devices to monitor patients' vital parameters upon discharge, combined with video consultations. The home monitoring system was estimated to bring **a threefold reduction** in the risk of hospital readmissions.

Source: Dirikgil et al: "Home-monitoring reduced short stay admissions in suspected COVID-19 patients: COVID-box project;" the European Respiratory Journal, April, 2021.

Source: IDC Europe, Healthcare and Life Sciences Insights, Internal, February 2022

3 ways to scale the adoption of AI in healthcare

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1

Develop a new approach to health data management, where **data** are a strategic asset for clinical and administrative decisions to increase patient value. Consequently, develop the **IT digital capabilities** to embed this approach, including **infrastructure modernization** and **intelligent data architecture.**

2

Adopt a **data governance strategy** to meet **regulatory compliance requirements** in terms of **data security** and **data protection**. At the same time focus on data availability, quality and integrity that are essential to become a data-driven organization. Consider these elements when defining the KPIs for performance and reliability of the digital platform

3

Start with small pilot projects to test the acceptance both from patients and workforce. Then plan to invest in those business case that benefit more patients and clinicians.

European Value-based Healthcare Digital Transformation Strategies

Major Themes

Population Health Management

- How do data and analytic technologies support the delivery of integrated and personalized health care in Europe?
- What are the benefits for adopting population health management systems? What are the challenges?

Healthcare Digital Ecosystem

- How are technologies enabling care integration across different health settings in Europe?
- How does data integration support the evolution of new care delivery models?
- What technologies are supporting health providers and healthcare systems in expanded ecosystem collaboration across the healthcare value chain and enable more personalized approaches throughout patients' journeys?

Connected Health for Better Patient Experience

- How are connected health technologies enabling value-based healthcare in Europe?
- How are healthcare providers, payers, and public health policy makers' digital strategies and best practices supporting value-based healthcare to maximize value for patients?

Research agenda

IDC TechBuyer Presentation: Harnessing the Convergence on Patient Value
The Pulse of IT in the European Healthcare Market: Key Deals and Initiatives, Oct-Dec 2021
IDC PlanScape: Social Determinants of Health in Europe
The Pulse of IT in the European Healthcare Market: Key Deals and Initiatives, Jan-Mar 2022
IDC PlanScape Remote health monitoring in Europe
IDC Survey: Population health analytics
IDC Health Insight Summit 2022 - key takeaways
IDC PeerScape: Cancer integrated care from prevention to treatment
The Pulse of IT in the European Healthcare Market: : Key Deals and Initiatives, Apr-Jun 2022
IDC Survey: New care delivery models
The Pulse of IT in the European Healthcare Market: : Key Deals and Initiatives, Jul-Sep 2022
Connected Care for a Better Patient Experience
The New Healthcare Digital Ecosystem
IDC FutureScape: Worldwide Healthcare Industry 2023 Predictions

Planned Research Published Research

European Digital Hospital

Major Themes

Core Clinical Applications Driving Digital Transformation of Hospitals

- What are the best practices related to business processes and technology alignment in Europe?
- Electronic health records (EHR), enterprise medical imaging, RIS/PACS, patient information sharing, clinical decision support, clinical collaboration systems, patient portals, mobile apps: evaluations of technologies and providers serving the digital hospital marketplace.

Data-driven Culture for the Intelligent Hospital of the Future

- How intelligent automation technologies are reshaping the industry?
- How do the concerns about privacy and compliance regulations challenge the access to patient data?
- What are the benefits of data-driven culture for healthcare organizations and patients?
- Which systems and integration are necessary to monetize data?

Workforce Transformation

- What are the technologies and the systems that can improve employee experience?
- How can hospitals optimize workflows to improve patient experience and enhance engagement with employees?

Research Agenda

The Pulse of IT In European Hospitals: Key Deals and Initiatives, Oct-Dec 2021
Setting up the Stage for the Future Of Work In European Hospitals: The Case of HCA Healthcare In the UK
IDC Survey Spotlight: Why Do European Hospitals Are Moving to Cloud?
IDC Marketscape: Europe Enterprise Medical Imaging Vendor Assessment 2022
IDC Peerscape: Enterprise Medical Imaging
The Pulse of IT In European Hospitals: Key Deals and Initiatives, Key Deals and Initiatives, Jan-Mar 2022
Case Study- Information Strategy At Ramsay Health
The Pulse of IT In European Hospitals: Key Deals and Initiatives, Apr-Jun 2022
IDC Survey: Intelligent Automation Opportunities For Euorpean Hospitals
IDC Survey: The Future Of Work In Digital Hospital
The Pulse of IT In European Hospitals: : Key Deals and Initiatives, Jul-Sep 2022
The Uptake of Digital Front Door
IDC Survey: The Modernization of IT Infrastructure For The Hospital Of The Future
IDC FutureScape: Worldwide Healthcare Industry 2023 Predictions

Planned Research Published Research

European Life Science and Pharma

Major Themes

Digital Transformation in European Life Sciences

- How can European life science companies maximize value of digital investments, keep ahead of the industry evolution, and accelerate DX across the whole value chain from R&D to sales to distribution? What are the regional best practices?
- How to derive maximum value from regulatory investments beyond compliance to EU's GDPR and other requirements?

360-degree Insights: AI Reshaping the Industry

- How are European life science firms using AI and advanced analytic tools to turn data into a strategic asset, accelerate R&D, and advance personalized and precision medicine?
- How can more effective use of data, information, and knowledge enable an intelligent life science enterprise?

Digital Engagement with Patients and Customers

- How are European pharma organization leveraging technologies such as IoT, AI, social, and cloud to support patient engagement and patient-centric clinical trials?
- What are the broader patient engagement opportunities for European pharma companies to innovate "beyond the pill"?

Transforming Supply Chain Operations

- How are life science companies in Europe using technology to optimize supply chain operations and reduce costs?
- How should life science firms leverage technologies as cloud, IoT, AI and blockchain to optimize supply chains?

Intelligent Ecosystems

- How to drive digital engagement with partners, customers, peers and enable broader ecosystem-wide collaboration?

Research Agenda

European Life Sciences Key IT Deals and Initiatives Quarterly Update Q1 2022
IDC Survey: Transforming Engagement with Patients and Customers in European Life Sciences
IDC Survey: Supply Chain Technology Investment Trends in European Life Sciences
Survey Spotlight: How European Life Sciences Organizations are Using Real-World Data
IDC PeerScape: Practices to Successfully Leverage Customer Engagement Technologies in European Life Sciences
European Life Sciences Key IT Deals and Initiatives Update, Q2 2022
IDC Survey: Future of Intelligence: How European Life Sciences Organizations Use AI
IDC PlanScape: Real-world Evidence for European Life Sciences
European Life Sciences Key IT Deals and Initiatives Update, Q3 2022
IDC Survey: How European Life Sciences Organizations are Enabling Future of Work
IDC TechScape: AI-enabled Drug Development in European Life Sciences
IDC FutureScape: Worldwide Life Sciences 2023 Predictions

Planned Research | Published Research

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Thank you!

Find more:

IDC Health Insights

https://www.idc.com/prodserv/insights/#health

iotweek.org

Pilots for Healthy and Active Ageing (PHARAON)

IoT Week - Trustworthy in Artificial Intelligence in the healthcare domain

University of Florence – Department of Industrial Engineering

Prof. Filippo Cavallo
Filippo.cavallo@unifi.it

Dublin, June 21st, 2022

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No

Pharaon – Pilots for Healthy and Active Ageing

CALL: Societal Challenges – Health, demographic change and wellbeing
Trusted digital solutions and Cybersecurity in Health and Care
Focus Area on Digitising and transforming European Industry and services

Internet of Things
Horizon 2020 call:
DT-TDS-01-2019:
Smart and healthy living at home

Project Coordinator: **Prof. Filippo Cavallo (UNIFI)**

[Dec 2019 – Nov 2023]

Total Budget: **21.3 M€** (funding budget 18.8M€)

This research has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement **No 857188**

Contact:
Website: www.pharaon.eu;
Facebook: fb.me/pharaon.project
Twitter: @PharaonProject;
LinkedIn: Pharaon - Pilots for Healthy and Active Ageing
https://www.linkedin.com/groups/12335464/

Pharaon Pilot Sites

3’400 users including older adults, professionals, volunteers, informal caregivers
over **6 pilot sites**
in **5 EU countries**

6 different pilot sites in multiple domains:
Murcia (Spain)
Andalusia (Spain)
Portugal
The Netherlands
Slovenia
Italy

Overview of Use Cases and most important needs

5/6

- Monitor Health
- Receive tailored advice
- Receive information about activities/courses/ initiatives

4/6

- Receive supportive services
- Monitor environment
- Socialize with friend and family

3/6

- Make emergency call

Italy use-cases (some examples)

SERVICE A: SOCIALIZATION & STIMULATION

PUCS_I01: Manage Health (Stimulation)

PUCS_I02: Socialize

SENTAB

SERVICE B: MONITORING

PUCS_I01.1: Monitor Health

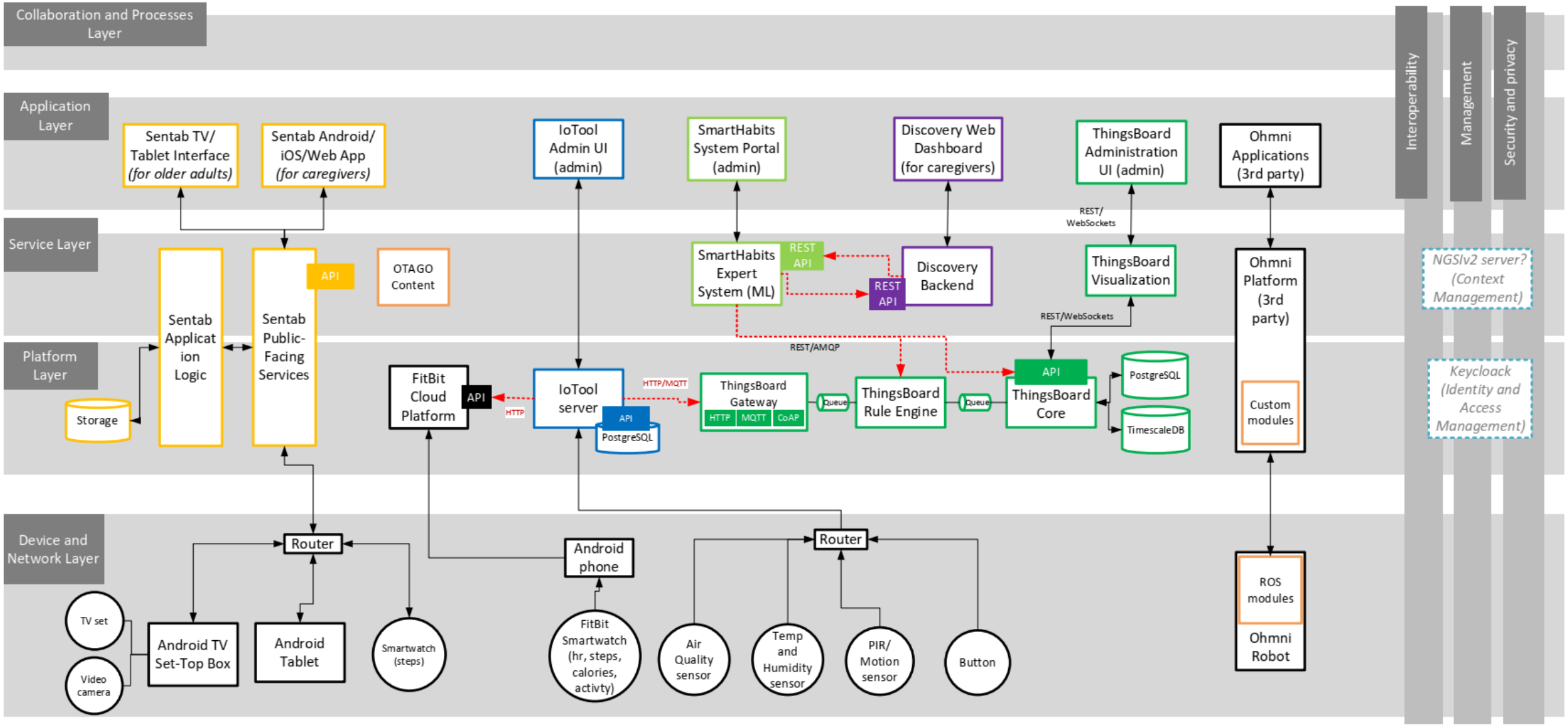
SenLab

ERICSSON
Ericsson Nikola Tesla d.d.

CO-ROBOTICS
THE WORKFORCE MULTIPLIER

ASCORA

Italian System View Diagram

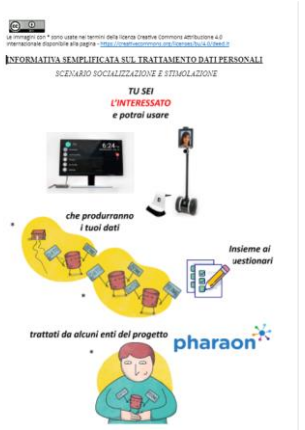


Grguric A, Mosmondor M, Huljenic D. Integration and Deployment of Cloud-Based Assistance System in Pharaon Large Scale Pilots—Experiences and Lessons Learned. *Electronics*. 2022; 11(9):1496. https://doi.org/10.3390/electronics11091496

Ethics, Privacy and Data Protection

- **Approval of the study protocol by the Ethical Committees**

- **Standardization of the procedure to recruit participants**
  - Preparation of the materials for user enrollment (Informed consent, Privacy Note and consent to data processing)
  - Simplified privacy note with icons for end users
  - Privacy by Design culture



- **Data Processing Agreements**
  - Agreement on controllership
  - Cybersecurity Questionnaire

- **Data server outside EU**
  - Meetings to check the Privacy Compliance of the wristband alternatives
  - DPIA

Open Issue

- **Risk minimization actions (Research and Innovation)**
  - Agreement between partner, Update of cybersecurity questionnaire, Inform EC

The Data Flow with FitBit

Action to minimize the risks according to DPIA

pharaon

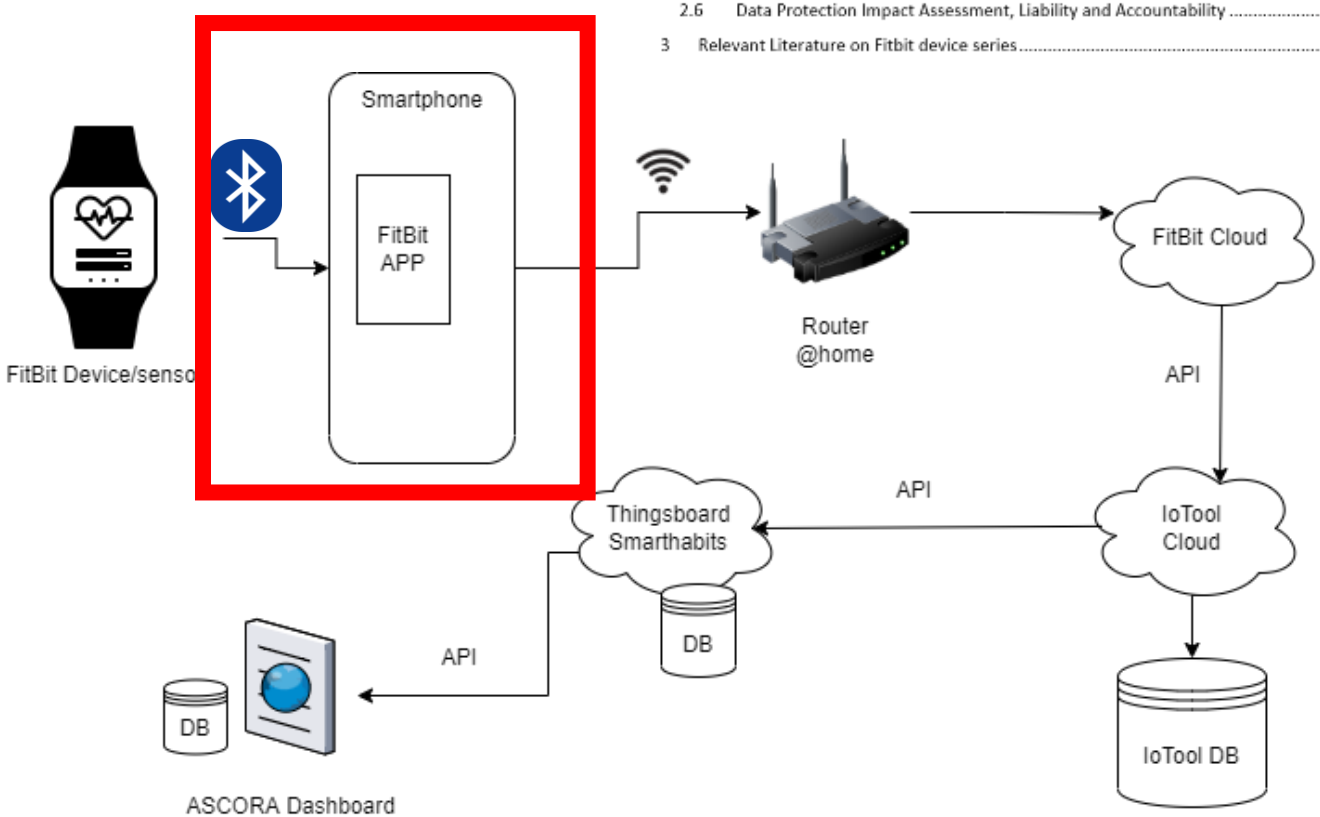
PILOTS FOR HEALTHY AND ACTIVE AGEING

Grant Agreement: 857188

Notes on the adoption of the Fitbit device to start the deployment of the monitoring service in the Italian Pilot

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 857188.

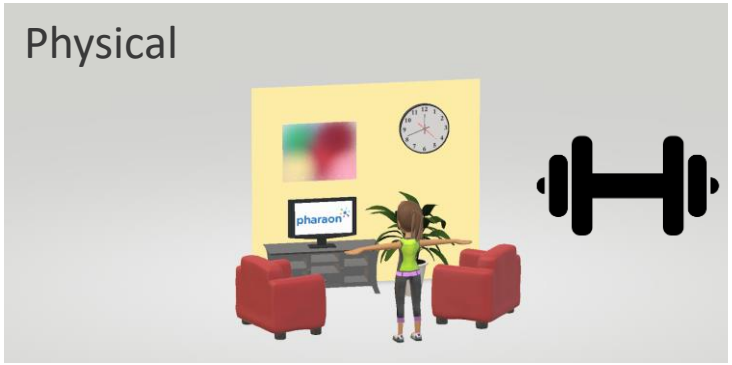
Contents



Actions to minimize the impact on data privacy

- ✓ The smartphone delivered to the patient will be limited in its functions, as far this would be possible, so that it can only serve the purpose of data exchange between the device and the FitBit cloud
- ✓ No user personal data will be put in the smartphone
- ✓ When setting up the user profile in the FitBit application the pilot team will:
  - adopt a pseudonym that will not be intelligible enough so as to be linked to the identity of the person to whom the data refer
  - use ghost data for the parameters (name, surname, body and weight) that don't affect device measurements. The convention is to approximate body and weight to the closest higher multiple of 5 or 10.
- Considering all these elements in the production of the DPIA

Decision support systems in healthcare



Digital rehabilitation

Prevention

Digital therapy, diagnosis

Follow-ups @ home

- Novel digital technologies represent a fundamental and strategic topic in future research in healthcare
- Customization of technologies is necessary for acquiring high-quality data, from rough to the aggregate level;
- Customization also for personalization concerning patients and stakeholders;

Ecosystem approach at EU level

Ecosystems can facilitate Thustworthy AI, but several issues should be achieved, among which:

- Regulatory, ethical and legal compliance
- Medical compliance and certification
- Standardization in regulatory procedures
- Data ownership and sharing (datasets)
- Easy interoperable integration for new vendors or service providers
- Standardization in data management, representation and communication
- User experience, acceptance and dependability
- Co-Creation and user centred design for AI technology (reflection)
- Stakeholders and policy makers involvement


THANK
YOU
ASANTE
GRAZIE
MERCI
MULTUMESC
MAAKE
MATONDO
KIITOS
OBRIGADO
DANK JE
SPASIBO
ARIGATO
VINAKA
WELALIN
JUSPAXAR
KIA ORA
MERCI
OBRIGADO
MULTUMESC
TERMA KASIH
RAIBH MAITH AGAT
CAM ON BAN
SALAMAT
MOCHCHAKKERAM
CHOKRANE
MATUR NUWUN
UA TSAUG RAU KOJ
DANKON
NIRRINGRAZZJAK
MAMANA

SHAPES

Smart and **H**ealth **A**geing through **P**eople **E**ngaging in supporting **S**ystems

SHAPES Project Presentation

IoT Week Conference

21st June 2022

Dublin, Ireland

Representative:

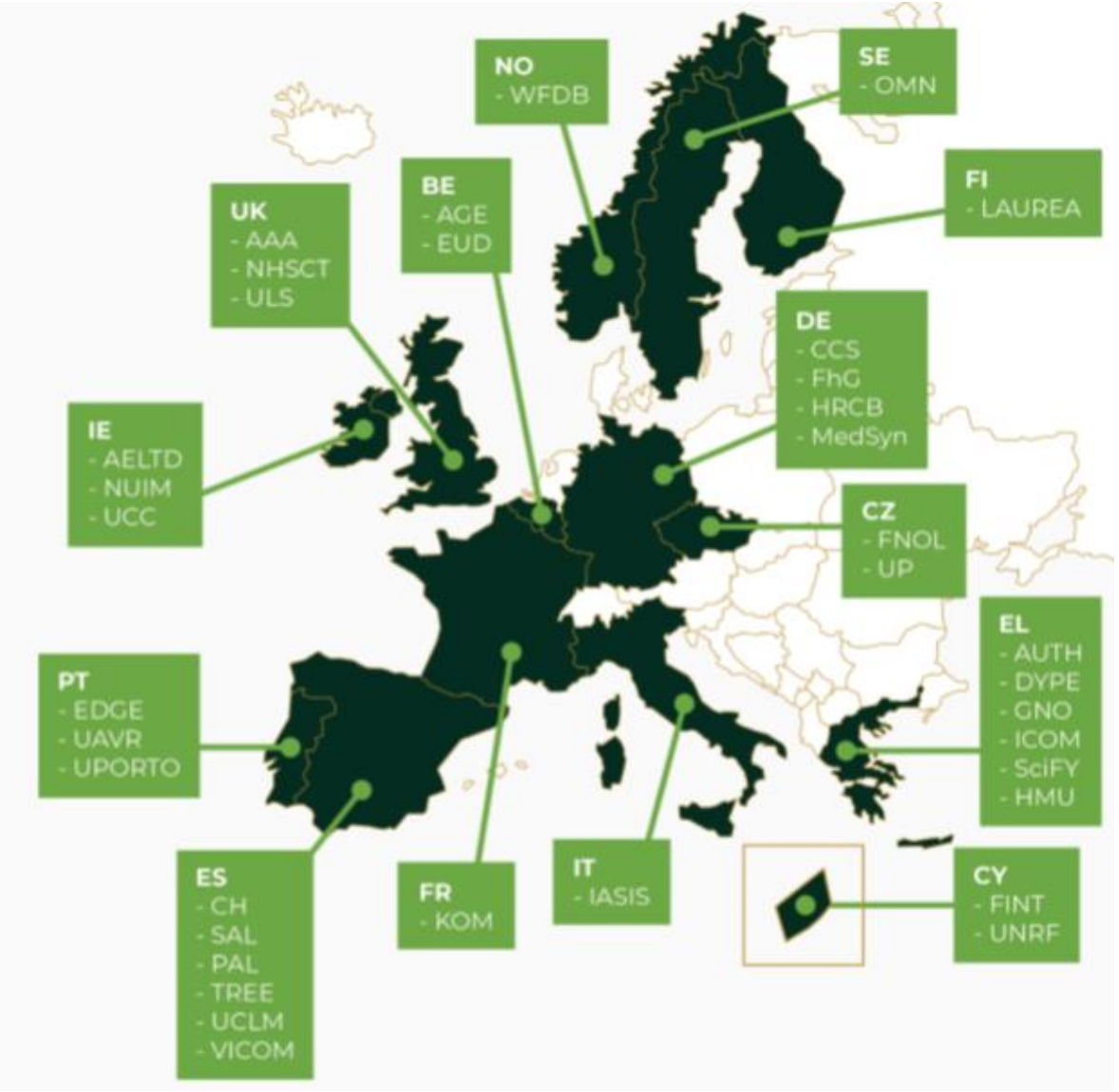
Dr Artur Krukowski

Intracom S. A. Telecom Solutions (Greece)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

SHAPES Challenge

SHAPES aims to create an **open Ecosystem** enabling the large-scale deployment of digital solutions for healthy and independent living addressed to older individuals who face reduced functionality and capabilities.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

About SHAPES (Horizon 2020)

- Timeframe: Nov. 2019 – Oct. 2023, budget of 21 MEuros
- SHAPES builds, pilots and deploys a large-scale, EU-standardised open and inter-operable healthcare platform
- Integrates a broad range of technological, organisational, clinical, educational and societal solutions seeks to facilitate long-term healthy and active ageing and the maintenance of a high-quality standard of life
- > 2000 older individuals
  10 EU Member States
  15 pilot sites
- 6 Reference Sites of *European Innovation Partnership* (EIP) on *Active and Healthy Ageing* (AHA)
- hundreds of stakeholders aiming to improve the health, wellbeing, independence and autonomy of older individuals

SHAPES Digital Solutions: Include assistive robots, eHealth sensors and wearables, Internet of Things (IoT)-enabled devices and mobile applications.

SHAPES Ecosystem: A network of relevant users and key stakeholders working together to scale-up Platform and digital solutions.

SHAPES Marketplace: Seeks to connect demand and supply across H&C delivery, and to facilitate the co-creation of affordable, effective and trustworthy solutions.

SHAPES Recommendations: Provide guidelines, a roadmap and an action plan, including a set of priorities dedicated to standardisation, to support key EU stakeholders to foster the large-scale deployment and adoption of digital solutions and new integrated car services in Europe.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

SHAPES Open Calls for Innovation and Collaboration

Objective: three (3) SHAPES Open Calls

Budget: 1mln Euros for up to 20 small-scale projects

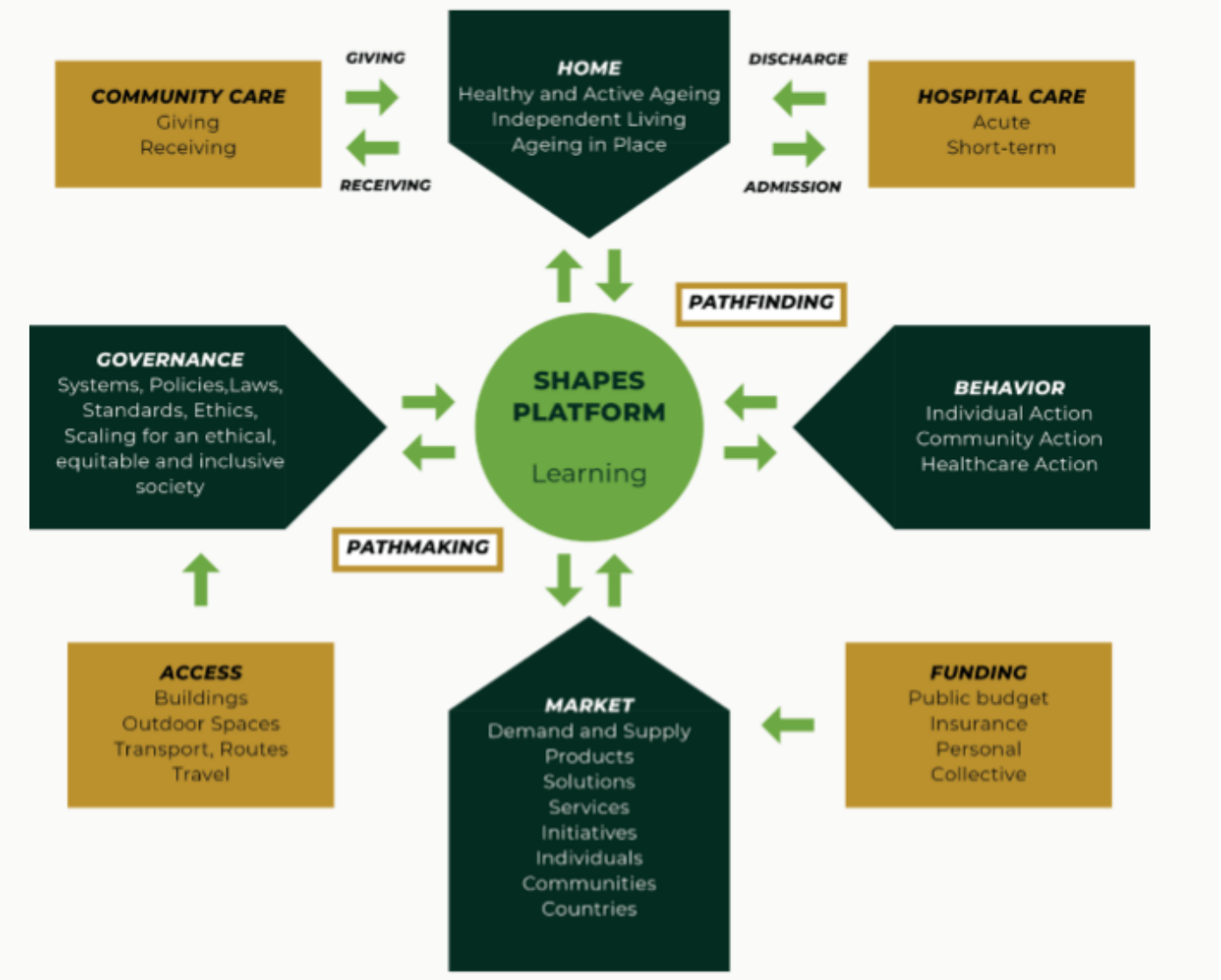
Open Call #1 Enablers (2021):
additional sensor devices complementing needs of SHAPES Pilot Themes.

Open Call #2 Solutions (2022):
new Digital Solutions extending SHAPES portfolio of services

Open Call #3 Market (2023):
additional clinical trial sites to test SHAPES solutions

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

SHAPES Framework



SHAPES Integrated Care Platform is an open platform based on four factors:

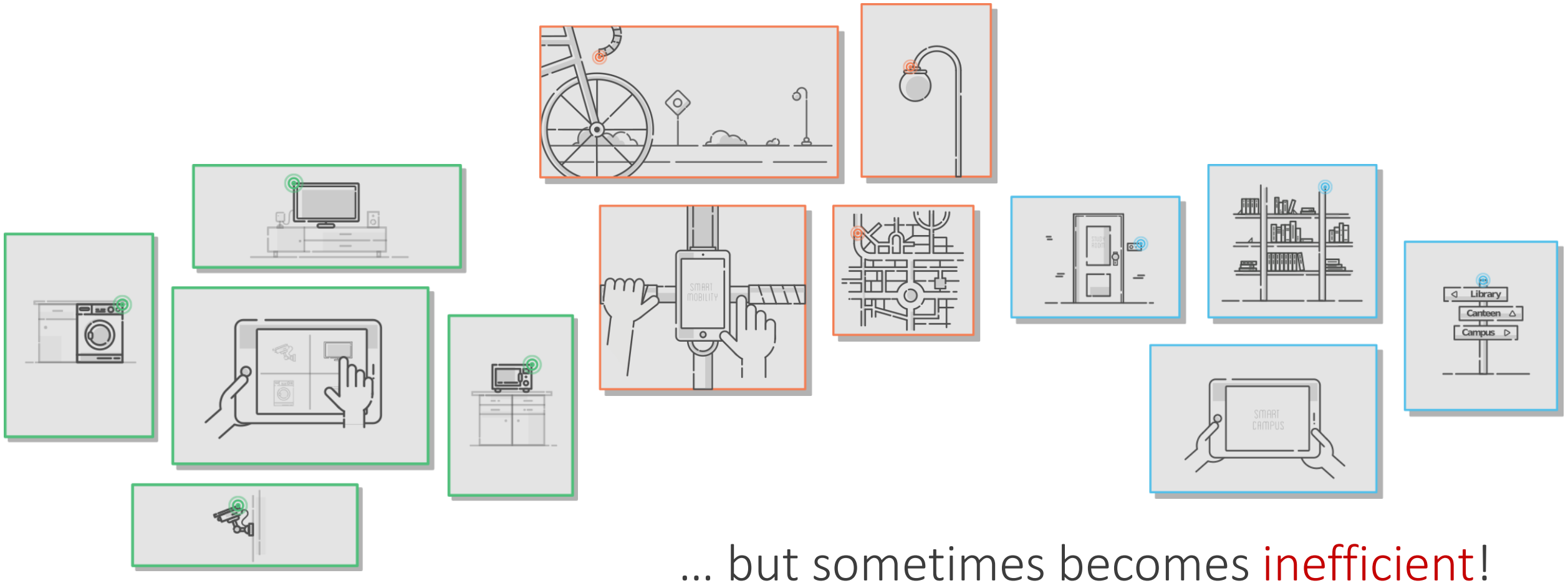
- Home
- Behaviour
- Market
- Governance

Big Data Analytics and Artificial Intelligence (AI) process info related to health, environment, lifestyle and individual needs, create user profiles for delivering personalised solutions.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

IoT Diversity

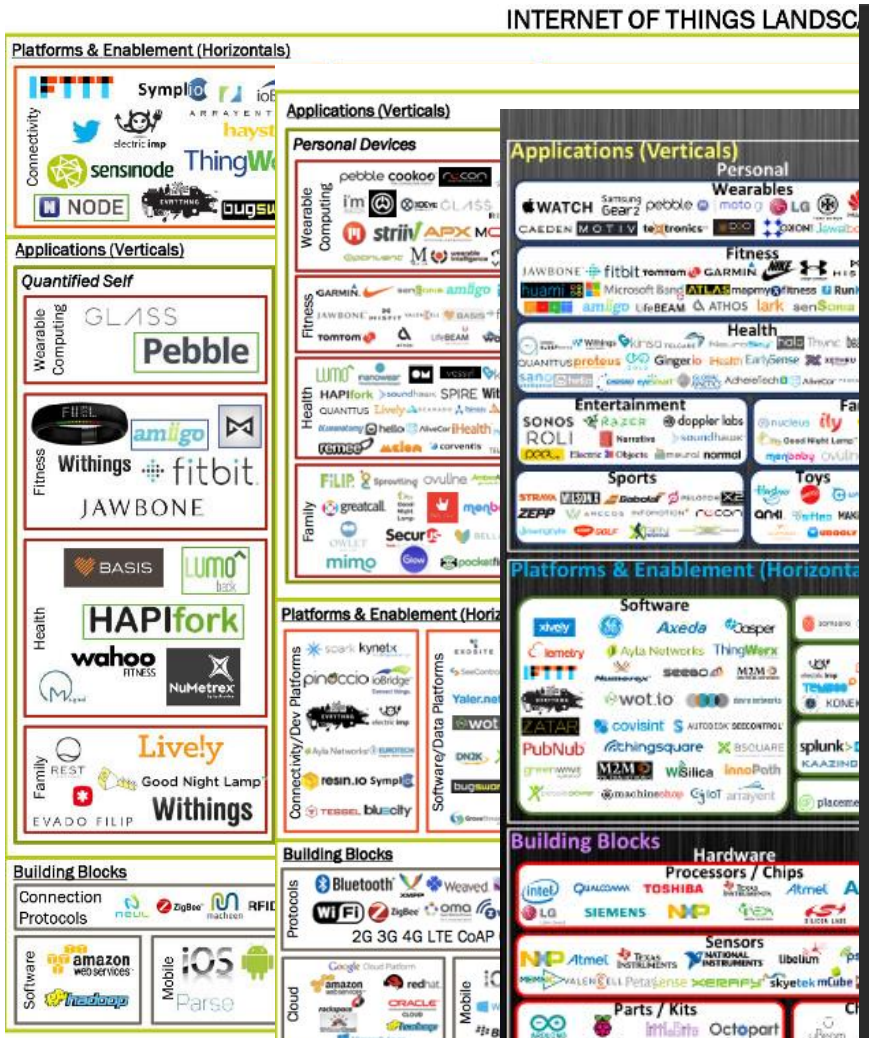
variety is the spice of IoT!

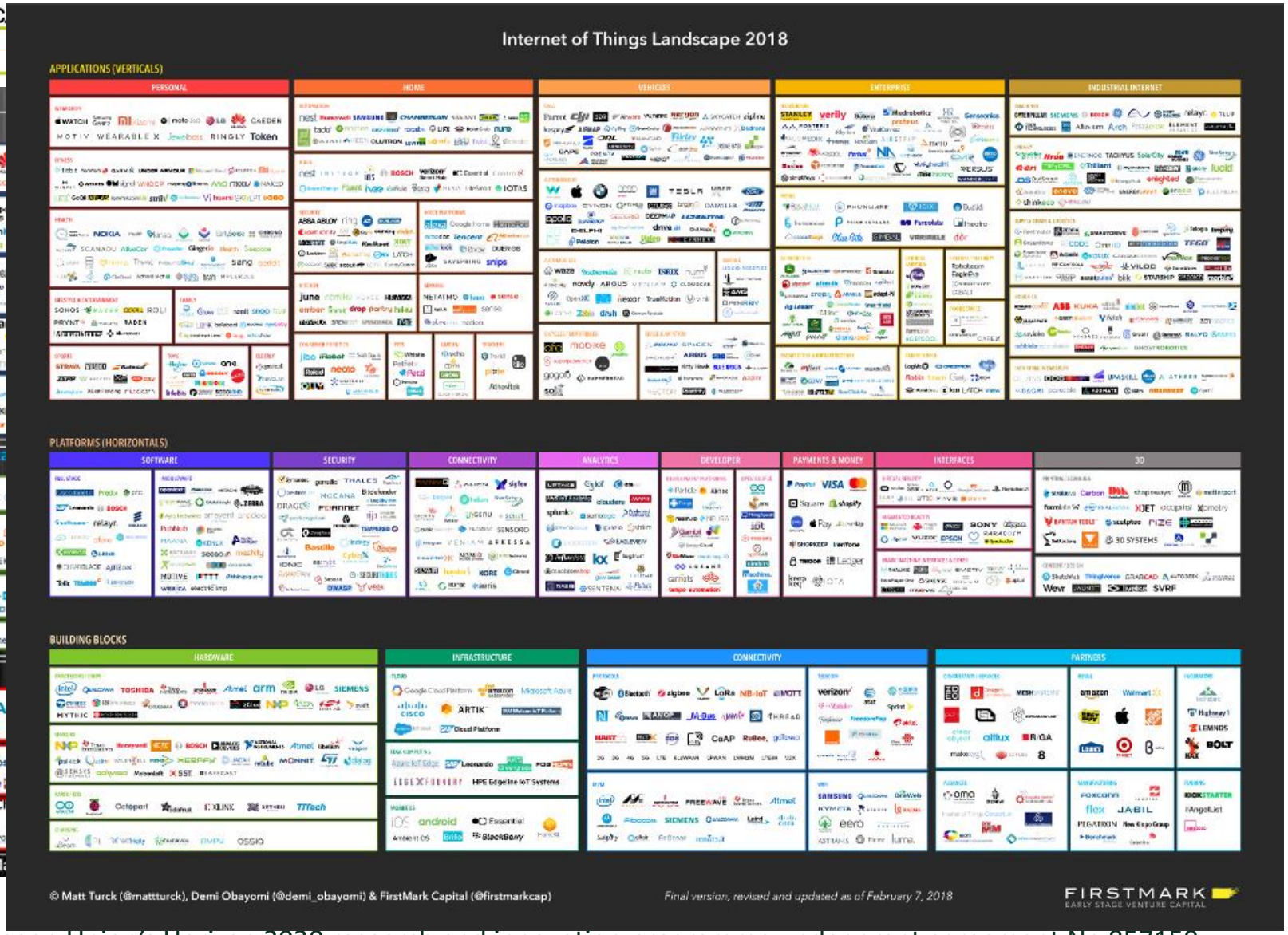


… but sometimes becomes inefficient!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857159

IoT Landscape Evolution



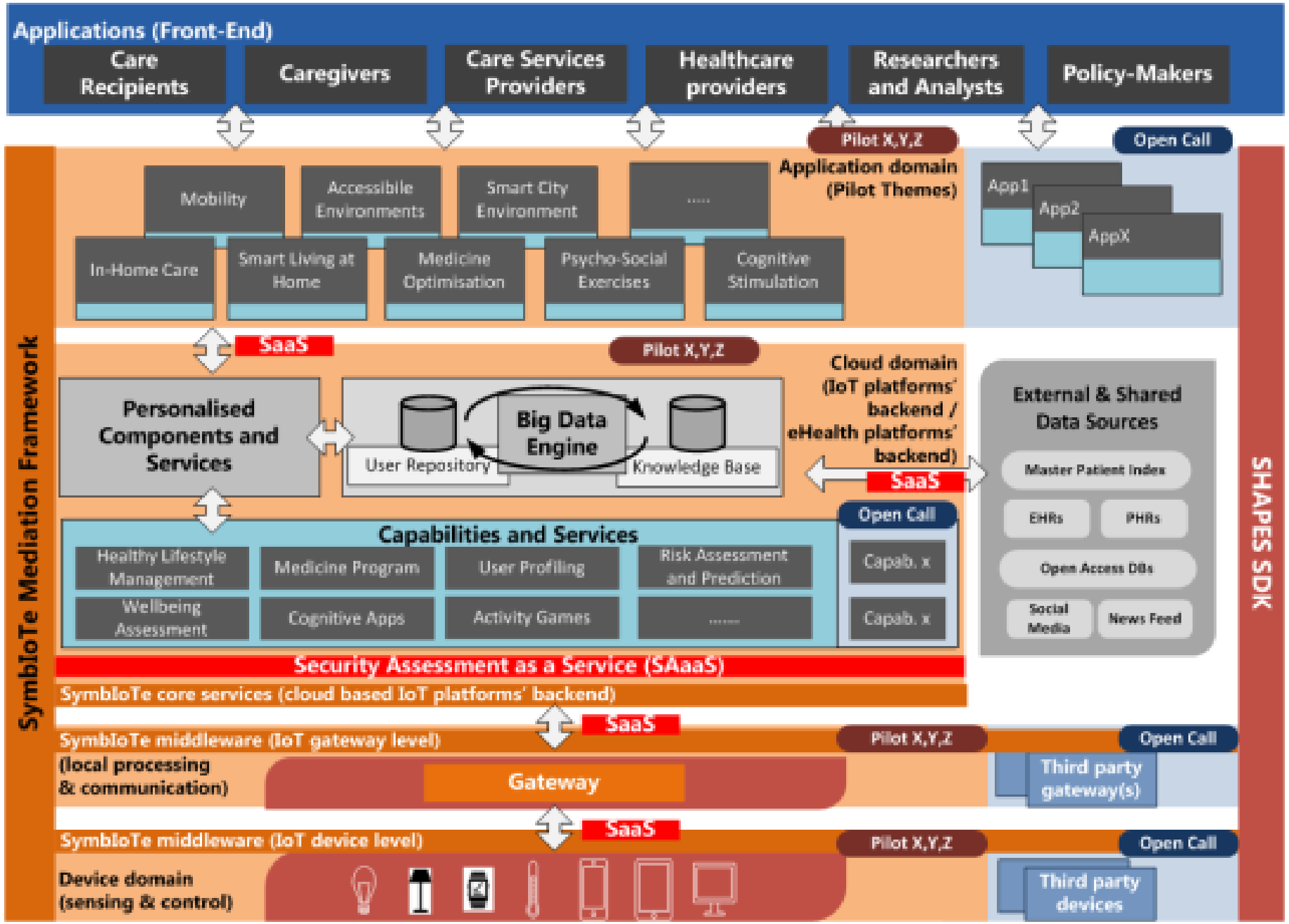


2013 **2014** **2016** **2018**

This project has receiv fr opean Union's Horizon 2020 research and innovation programme under grant agreement No 857159

SHAPES Framework

High level Architecture



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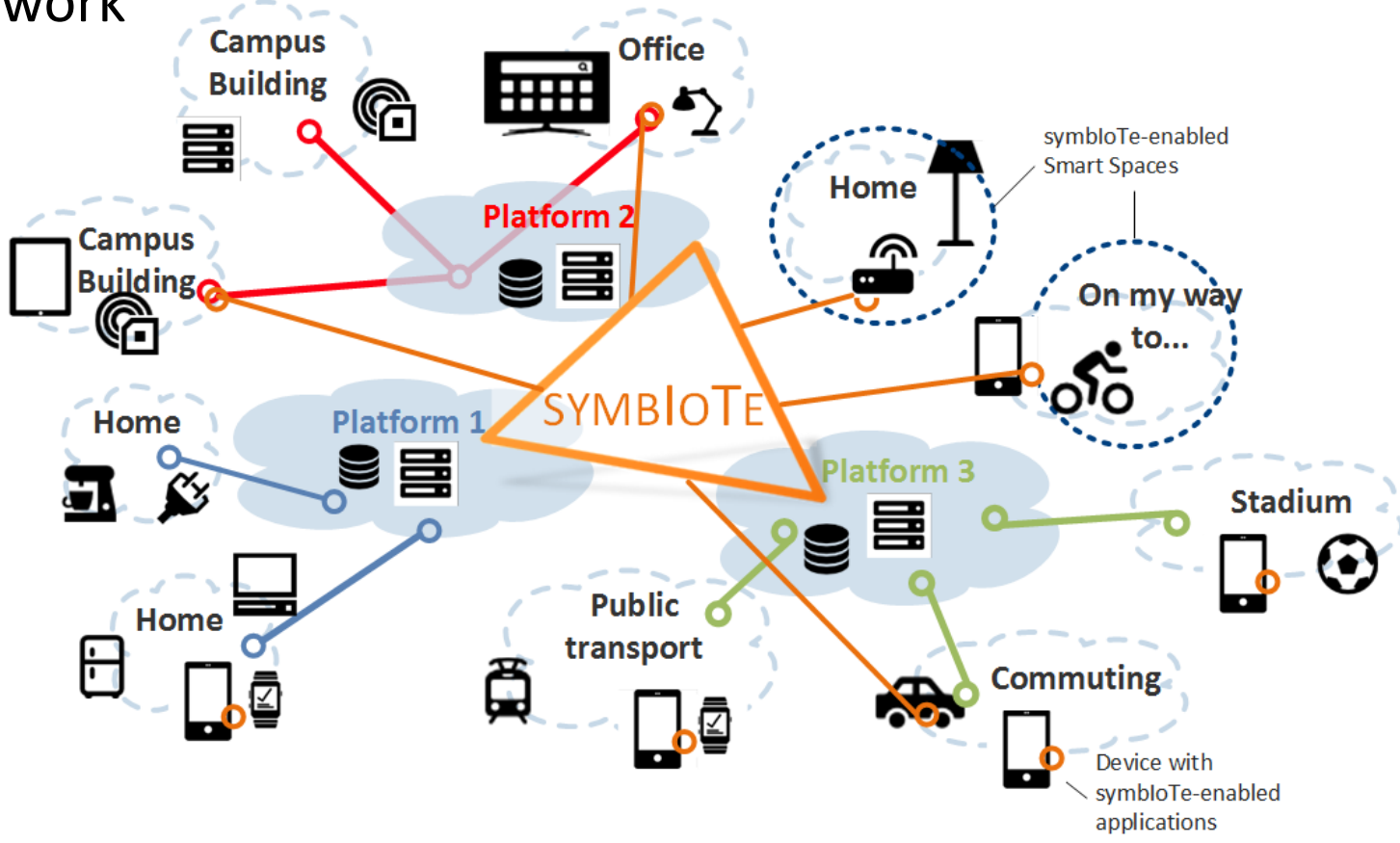
SymbIoTe Approach to IoT interoperability

- collaboration of IoT platforms towards the creation of cross-domain applications
- symbiosis of smart objects across IoT environments
- interoperability and mediation framework



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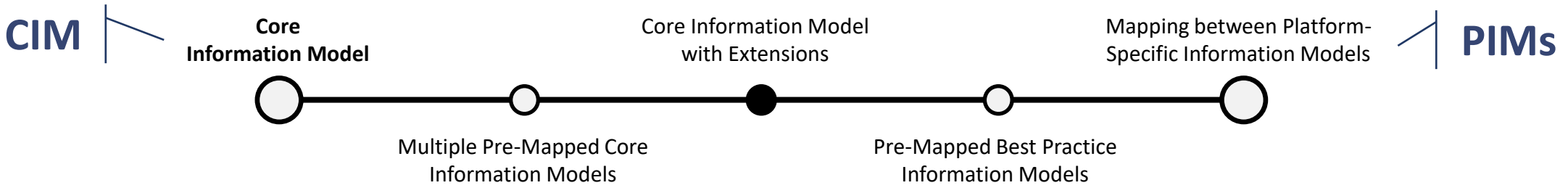
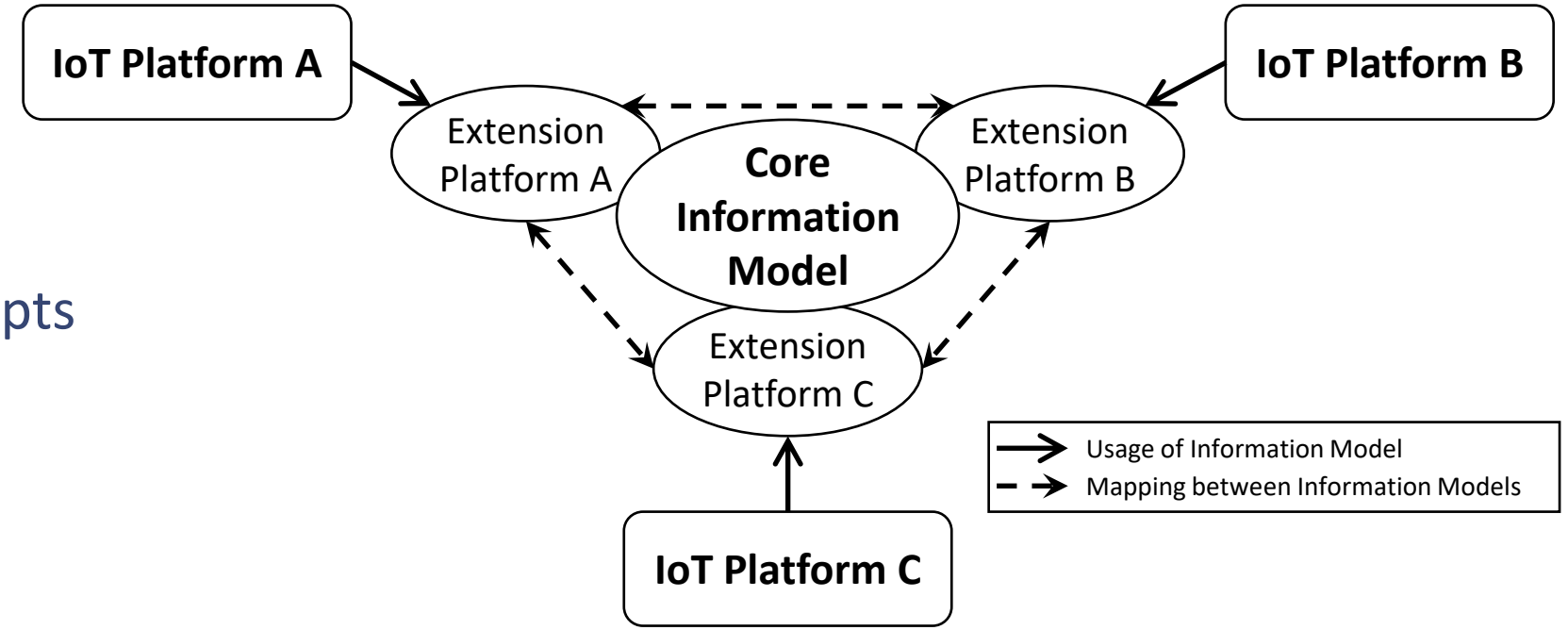
Semantic IoT Interoperability

- “the capability to understand exchanged data”



- **CIM** defines basic concepts
- **PIM** defines proprietary concepts



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a Federated Artificial Intelligence solution for moniToring mental Health status after cancer treatment

FAITH
intelligent post-cancer support

Preparing the FAITH project DataSpace

IoT Week, June 21st 2022

By: Universidad Politécnica de Madrid
Giuseppe FICO/ Maria Eugenia BELTRAN

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 875358.

Why the FAITH project?

FAITH
intelligent post-cancer support

Cancer patients face several challenges, which may affect their **mental health** and potentially lead to anxiety, depression, and therefore worsen their quality of life.

Cancer has an incidence of 18 million new cases per year.

Depression may affect up to 21% of cancer patients survivors*.

As the world population increases in age, we are faced with **a rising occurrence of cancer**.

In parallel, advances in medical science ensure an increasing number of people survive cancer, and some of them can **feel that their quality of life could be affected**, experiencing feelings of anxiety and depression after treatment has completed.

*Brandenbarg et al. (2019)

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The project

FAITH
intelligent post-cancer support

FAITH is creating an innovative solution that uses **Artificial Intelligence based technologies** to track targeted depression markers in cancer survivors to be able to **monitor downward trajectories**, and ultimately **inform their point of care** of these changes.

By doing this, cancer survivors who begin to experience such declines get the chance to receive as early as possible attention from their healthcare services and **intelligent post-cancer support**, and therefore, in the end, **improve their quality of life**.

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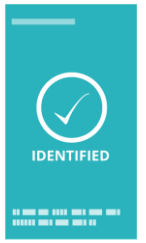
The FAITH solution ecosystem

The goal of the FAITH project is to develop a **better model for mental health monitoring** in cancer patients, thus improving their quality of life.

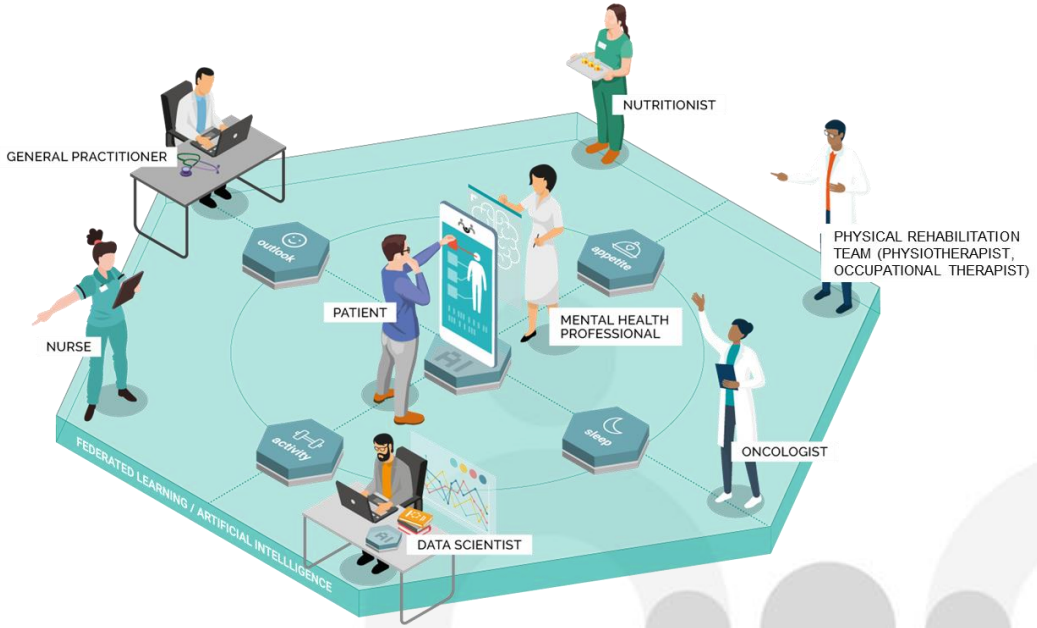
AI Validated SOLUTION

To develop an AI solution that identifies and analyses depression markers.



At the end of the project, the FAITH solution will be employed in an ecosystem which involves several actors, such as:

- The **patient**, who provides input to the FAITH app.
- A team of **healthcare professionals** revolving around the patient.
- **Data scientists**.
- IT stakeholders: The **Federated Learning Artificial Intelligence** for data gathering and monitoring.



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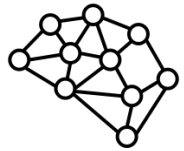
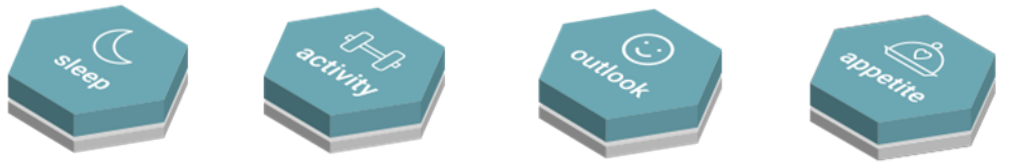
The FAITH project framework

Federated Learning vs. traditional AI

FAITH relies on Federated Learning, which moves the computation to the device. By updating AI models on a user's device, the data stay local and are not sent to the Cloud. More privacy, personalised AI models.



Central Unit / Cloud



Sleep Profile | Activity Profile | Voice Patterns | Nutrition Profile

Traditional Centralized AI Models
move data to “central unit”

Patient

FAITH App

Central Unit / Cloud

Federated Learning
Move AI to local device

Patient

FAITH App

Local AI

Sleep Profile | Activity Profile | Voice Patterns | Nutrition Profile

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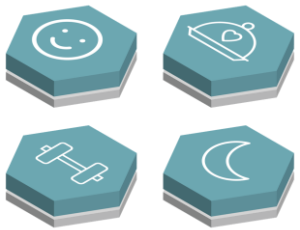
The FAITH project challenges

Which major challenges does the FAITH project address?



IDENTIFYING THE RIGHT INDICATORS

FAITH monitors activity, voice patterns, sleep, and nutrition as depression markers to possibly predict negative trends in patients' mental health.

TACKLING PRIVACY ISSUES

To safeguard user's privacy, FAITH records and processes data on the user's mobile phone only.

SUPPORTING CLINICIANS

FAITH does not make diagnoses of depression and anxiety.
By monitoring patients' mental health, FAITH works to support clinicians, rather than to replace them.

AI TRUST

Explainable AI provides the healthcare team with a reason for its output, allowing results' interpretation and informed clinical decisions.

ENGAGING USERS

The FAITH App is designed with user experience in mind to foster proactive and regular engagement, keeping the data collection smooth and efficient at the same time.

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How we see the FAITH Data Space

FAITH can be seen as a project where the federated approach allows to generate a **dataspace for preventing, detecting and treating depression in cancer survivors**, based on data co-existence approach.

FAITH integrate diverse **data sets from multiple distributed hospitals and individual patients** (it can be seen as different data owners) supporting functionalities over all data sources (e.g., discovery, access, sharing and learning, amongst others), regardless of how integrated they are.

This enables **collaboration, improved decentralized and federated governance** as well as trust; thus, **enabling AI trusted services** under a federated learning approach

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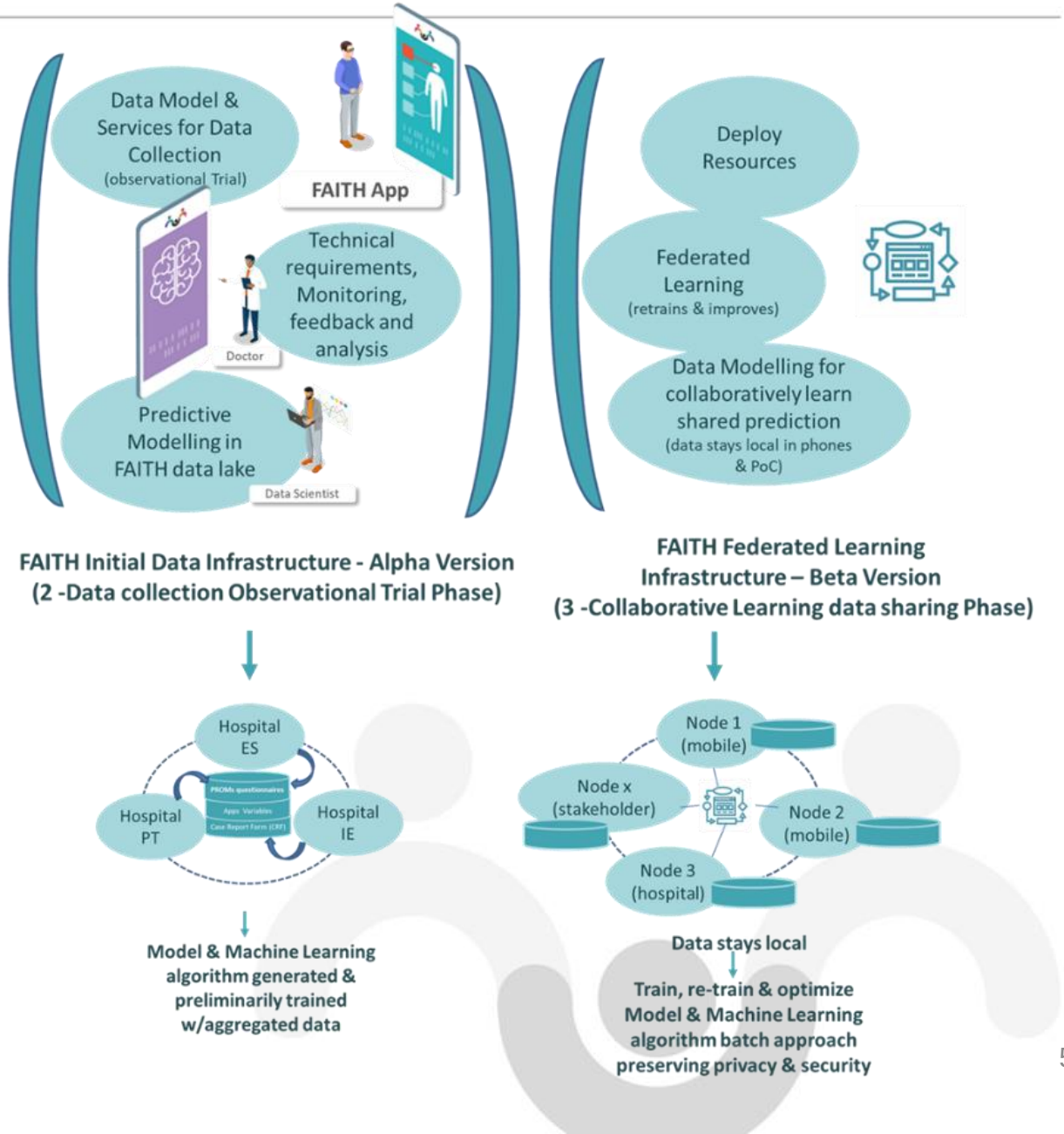
How the FAITH dataspace is being prepared

FAITH has a 2-step approach:

1. **Data collection through observational trials using a prototype app** → get to know well data and its interpretation linking with depression markers

2. **Federated and decentralized architecture supporting dataspaces** where data resides at sources



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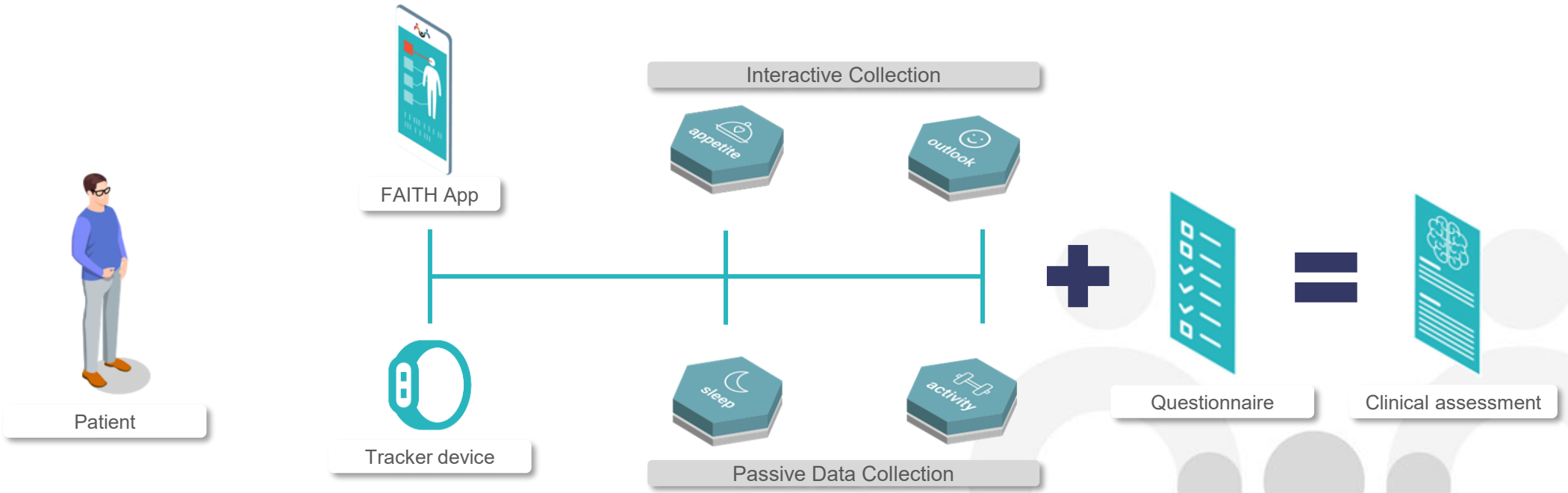
Preparing the data spaces: data collection through observational trials

Results will guide further the refinement and data for the FAITH federated solution.

During the trials, **the FAITH solution collects and monitors information** relating to a patient's activity, voice patterns, nutrition and sleep.

The data collected will be used to train the AI algorithms that will be later incorporated in the solution.

After signing the informed consent, **the patient receives 2 the prototype app and lifestyle devices**:



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Observational Trials

The FAITH trial sites are **three European hospitals** that adopt the FAITH solution. Both clinicians and patients will **adopt the FAITH solution for one year** to assess its usability, as well as to support the development of the AI algorithms.

Lisbon, Portugal

Champalimaud Foundation

(100 Lung Cancer Patients)

Madrid, Spain

Hospital G.U. Gregorio Marañón

(100 Breast Cancer Patients)

Waterford, Ireland

UPMC

(100 Breast and Lung Cancer Patients)

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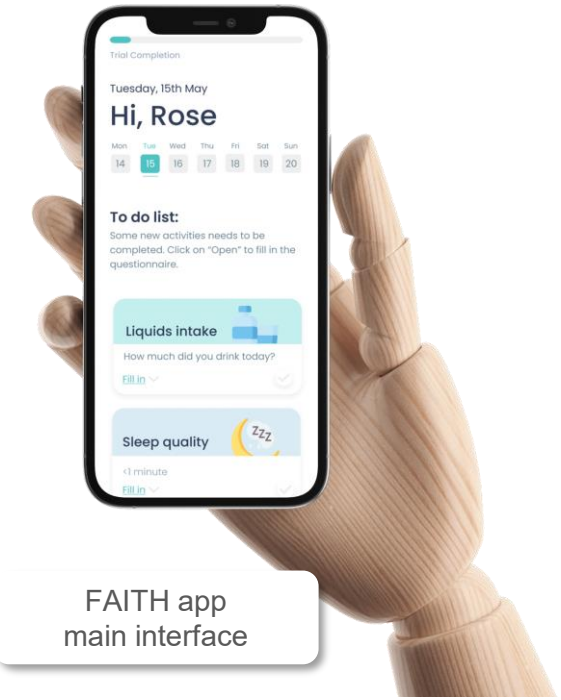
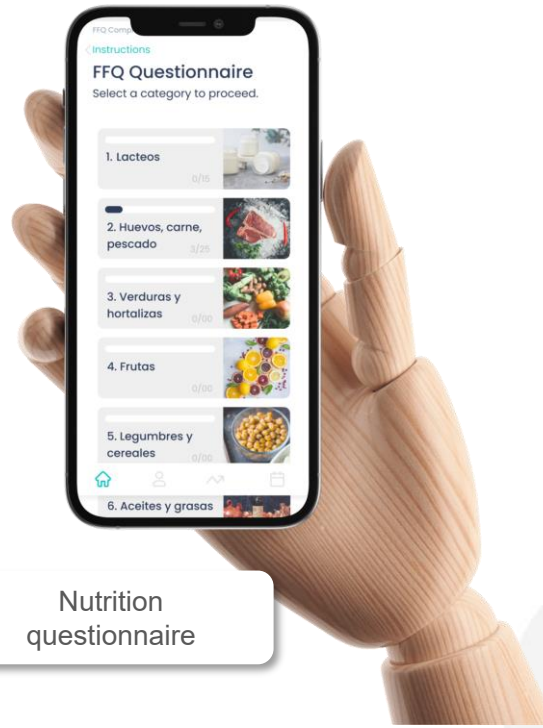
The FAITH app - Prototype

Through the FAITH app, users will proactively provide information about their habits by filling in validated clinical questionnaires. These are periodically requested according to the study design.
In addition, a smart band allows the collection of sleep and activity patterns.



FAITH app main interface



Nutrition questionnaire

Passive tracking of activity via smartband

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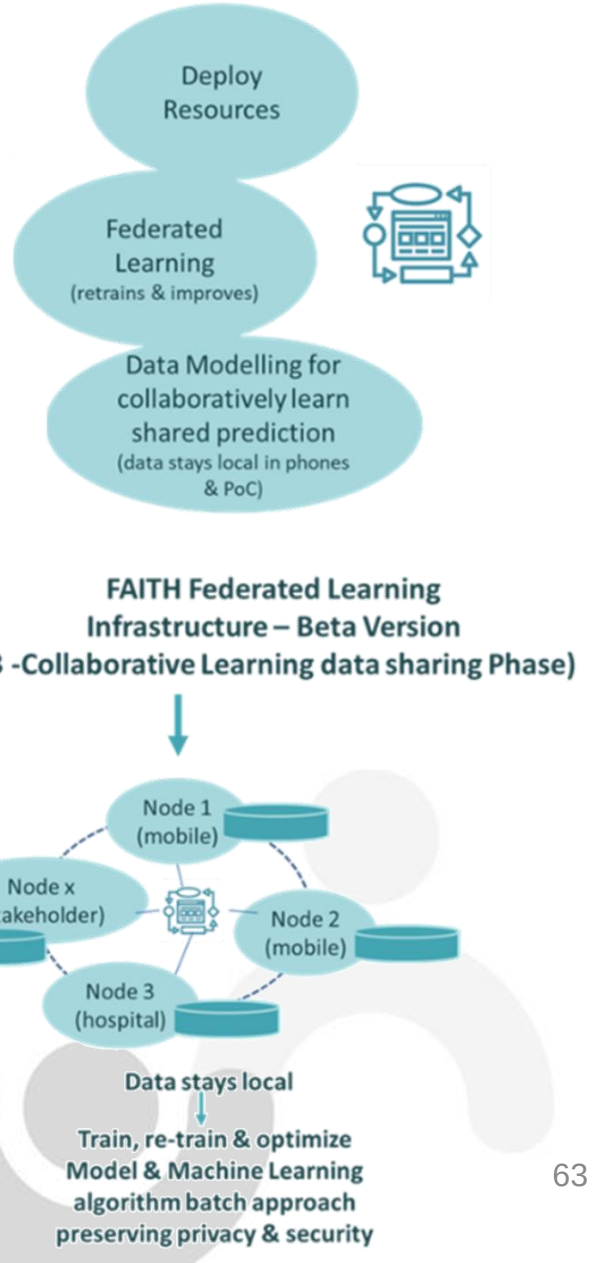
FAITH dataspace for federated learning

For the FAITH final App:

- After data is modelled through step 1 with modelling methods and processes, data models and algorithms will be prepared for the new federated context.
- Data stored at the source (e.g. patients mobile and hospitals) allowing to share and learn under sovereignity and data policies, enabling secure & trusted data sharing.
- The FAITH DataSpace will be shared by members the FAITH Ecosystem, manages and processes distributed heterogeneous collections of streams, events and/or data sources for supporting diagnostic and treatment of depression in cancer patients.



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Consortium partners

FAITH brings together a strong **multi-disciplinary team** with partners from five European countries (Ireland, Portugal, Spain, Italy and Cyprus).
Our consortium comprises **technology and data experts**, **Cancer Hospitals**, and **SMEs**.

Waterford Institute of Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

[Life Supporting Technologies] LifeSTech [Universidad Politécnica de Madrid]

UNINOVA

Fundação Champalimaud

SaludMadrid Hospital General Universitario Gregorio Marañón

UPMC LIFE CHANGING MEDICINE

deepblue consulting & research

Suite5 We Deliver Intelligence

T F C

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THANK YOU!

https://h2020-faith.eu

https://dashboard.h2020-faith.eu

FAITH
intelligent post-cancer support

Contact: Maria Eugenia BELTRAN (me.beltran@lst.tfo.upm.es)

FAITH project

H2020_Faith

H2020.FAITH

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IOTWeek

Dublin — June 20-23, 2022

Trustworthy in Artificial Intelligence in the healthcare domain

5:15 PM, Tuesday 21 Jun 2022 (1 hour 15 minutes)

Croke Park Conference Centre - Hogan Mezzanine 2

GLOBAL VISION:

IoT TODAY AND BEYOND

IOTForum