Business Models breakout session

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with the contribution of Nathan Carvalho

EDITH

EDITH project has received funding from the EU H2020 Research and Innovation Programme, under Grant Agreement n. 101083771

Breakout session purposes

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Breakout session purposes

Engage in hands-on activities related to Business Models

- Context within EDITH and the overall European Virtual Human Twin (VHT)
- Projection into a market that's still taking shape
- Getting feedback with a survey about
  - Risks, hurdles & opportunities
  - Requirements
  - Perceived value of the VHT platform
  - Incentivization and partnerships

Business Models

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VHT reminder

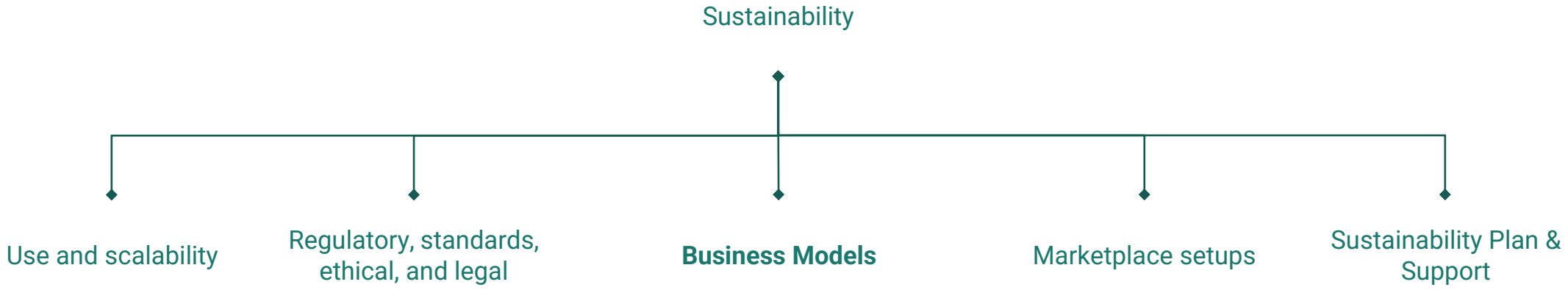
- **Virtual Human Twin (VHT)** is an integrated multiscale, multi-time, and multi-discipline representation of the quantitative human physiology and pathology

- Thanks to a **collaborative distributed knowledge and resource platform**

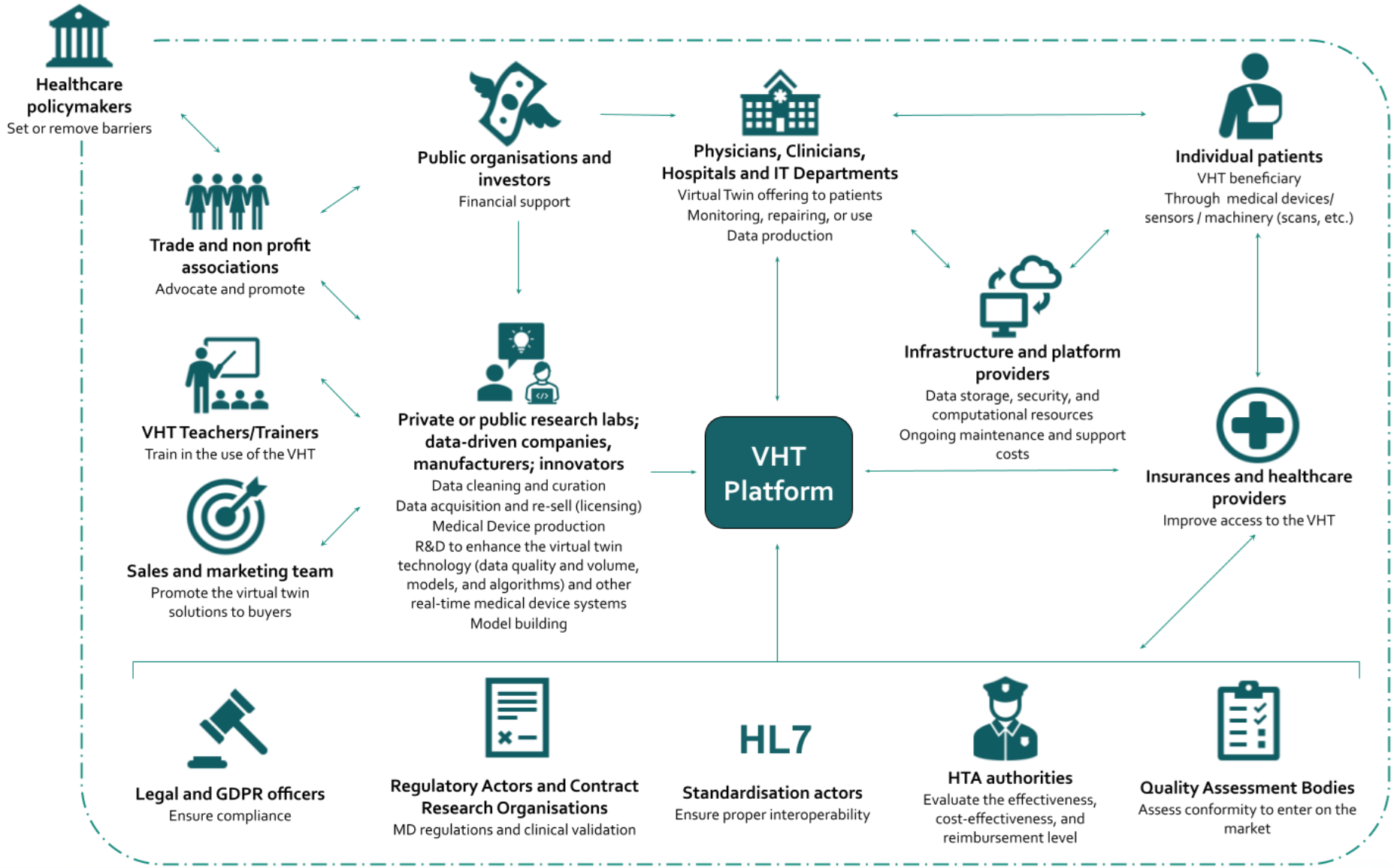
- Designed to **accelerate the development, integration, and adoption** of patient-specific predictive computer models which will be used as clinical decision support systems:
  - for **personal health forecasting**
  - as methodologies for the development and de-risking of personalised **medical products**

VHT Sustainability — Main objectives

- **Early prototype demonstrators of the simulation platform by means of the pre-selected use cases**
- **Develop recommendations on regulatory, standards, ethical and legal elements (simulation platform). Develop code-of-conduct.**
- **Ensure EDITH Sustainability through exploration of business models, marketplace options and sustainability.**

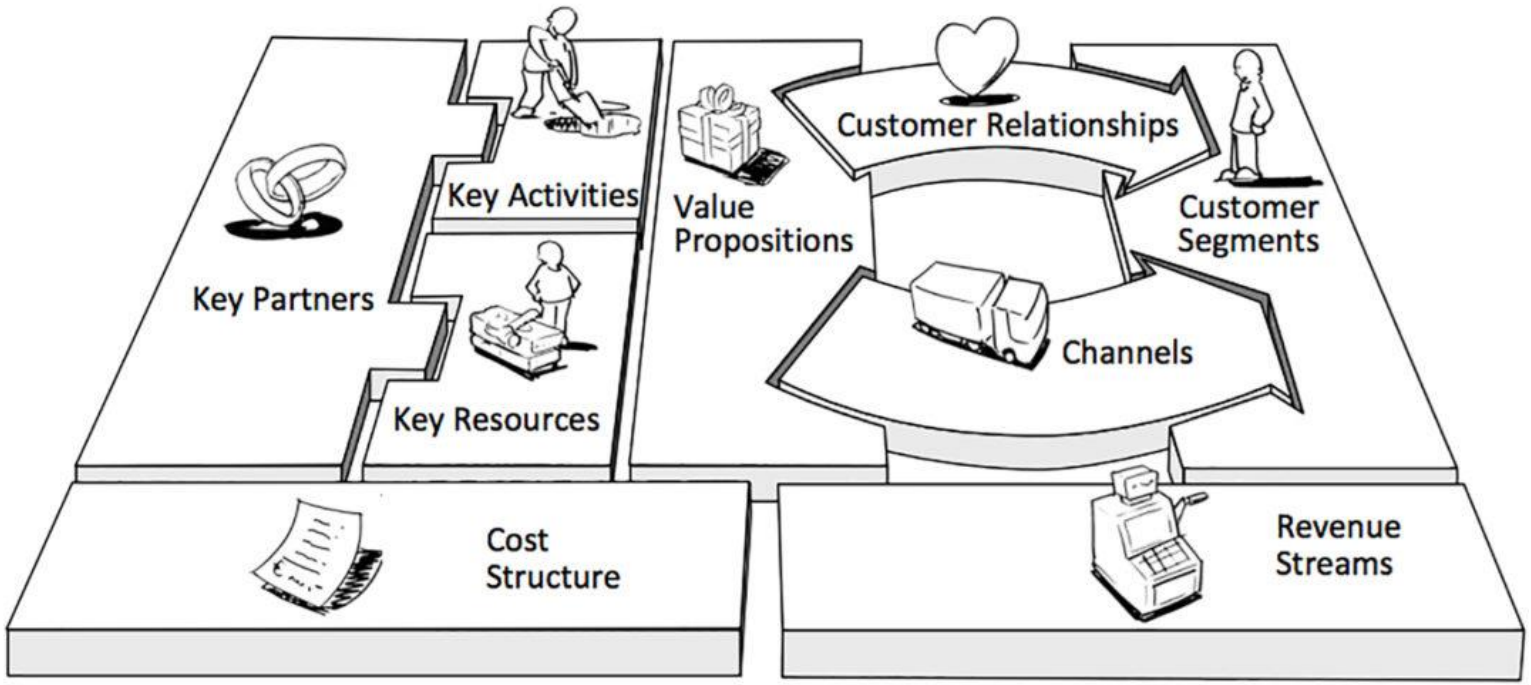


VHT Ecosystem: composition, roles and interactions



Business Model Canvas (Osterwalder & Pigneur, 2010)

- Business Model Canvas analysis: a **widely used tool** in the startup environment that provides a broad vision of
  - **incoming and outgoing cash flows,**
  - the **value proposition** provided by a company,
  - its **customers and the relationship** with them,
  - the way in which **collaborations** can be made, and
  - the **key activities and resources** that can demonstrate the added value of the company/organization involved in VHT platform.
- Our initial approach has been to interview each UC partner about their respective Digital Twins and its foreseen use at TRL8+



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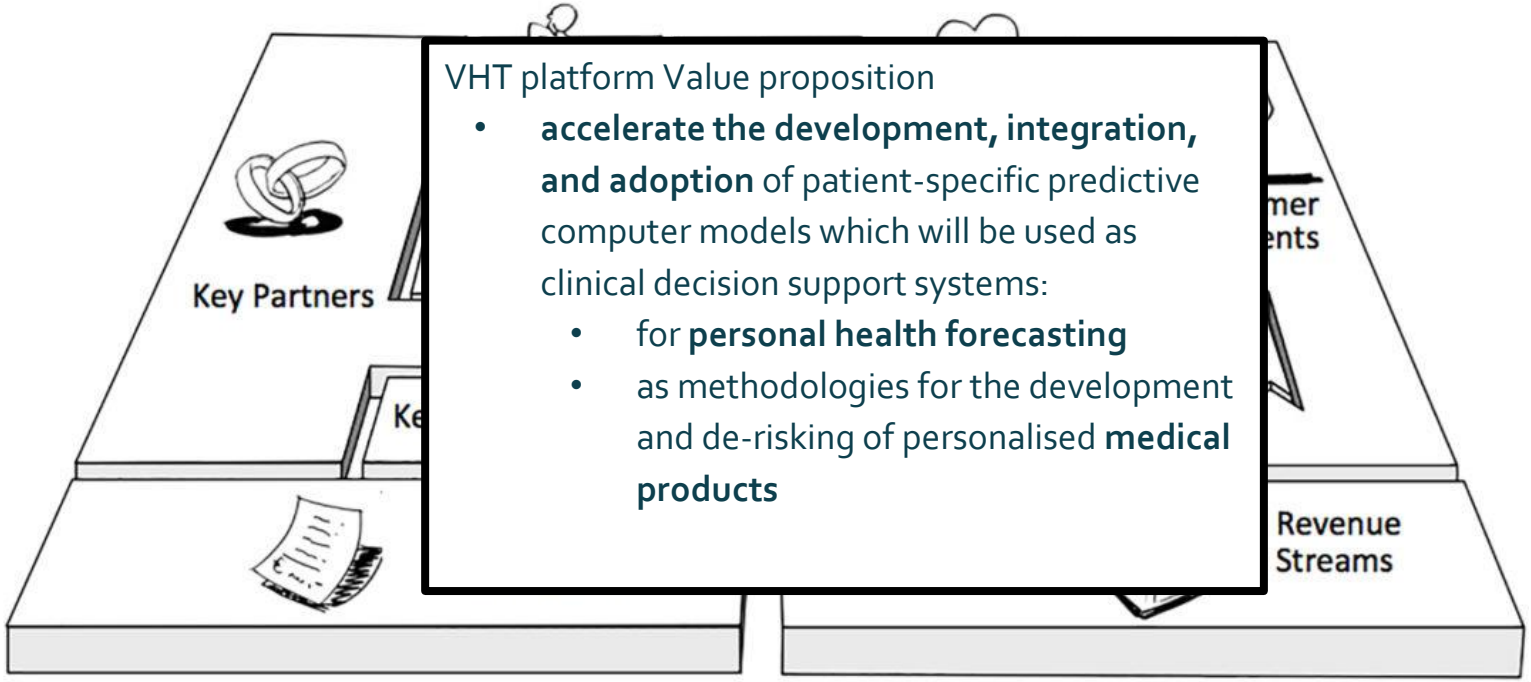

VHT platform Value proposition

- **accelerate the development, integration, and adoption** of patient-specific predictive computer models which will be used as clinical decision support systems:
  - for **personal health forecasting**
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Foreseen business model types

- A variety of business models are possible, depending on the maturity level of the specific Digital Twin and on the economic situation:
  - **Tech transfer or spinoff businesses (TTSO):** starting from university and research lab, going towards ad-hoc created spinoffs and then to mainstream big Pharma companies
  - **Specific tech tools (STT):** from private deep tech companies specialized in specific fields that provide optimization or support in the use of a particular Digital Twin
  - **Intermediary businesses (IB):** everything that brings assistance at each step of the VHT process, country and economy-dependant

Ecosystem Sustainability: key activities

Identified key activities

- Develop and maintain the VHT platform including its resources, to improve performances
- Collaborate with healthcare professionals and researchers to identify specific use cases and tailor virtual twin solutions accordingly
- Run models through local IT infrastructure or HPC centres
- Continuously optimise and update the virtual twin models to incorporate new medical knowledge and advances in technology
- Ensure data security and privacy protocols are in place to protect patient information

Ecosystem Sustainability: key metrics

Identified key metrics

- Size of potential market and quantification of the VHT benefits
- Number of target customers and user adoption rates
- Revenue generated from virtual twin platforms
- Customer and user satisfaction / feedback
- Accuracy and performance metrics of Virtual Twin models
- Return on investment for healthcare organisations utilising the VHT

Ecosystem Sustainability: key resources

Identified key resources

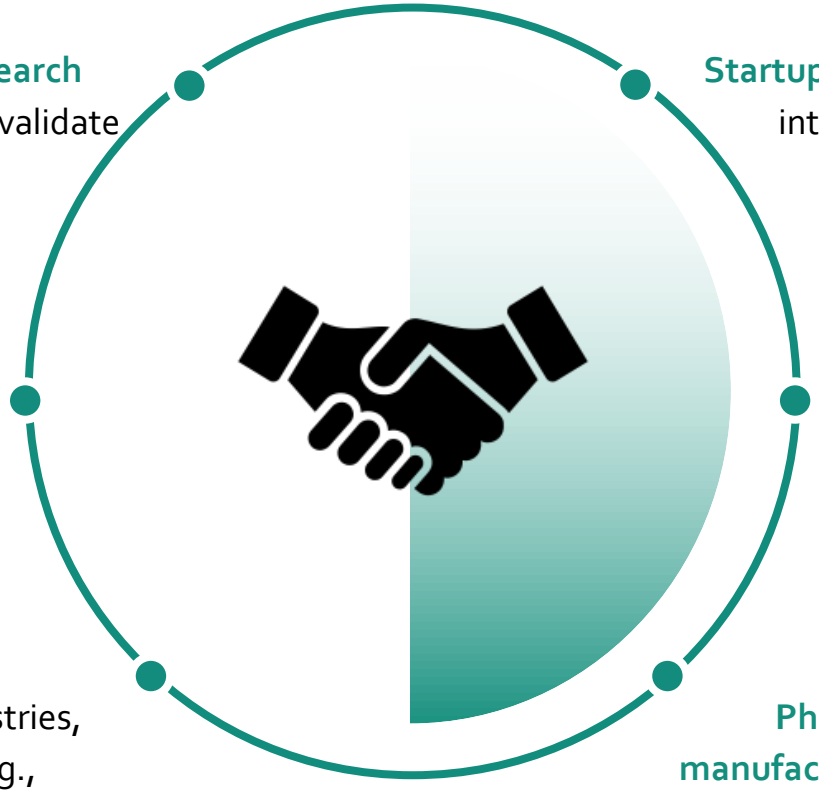
- Technology infrastructure for data collection, storage, and analysis.
- Expertise in data science, artificial intelligence (machine learning, stochastic processes, predictive algorithms).
- Regulatory compliance and adherence to healthcare industry standards.

Ecosystem Sustainability: key partnerships

Healthcare institutions, universities, and research organisations to gain access to patient data and validate the virtual twin models.

Technology providers for secure data storage, cloud computing, and data analytics.

Advisors from different fields: healthcare industries, hospitals, and clinics, engineering experts (e.g., bioengineering, computational engineering, AI)



Startups with expertise in deployment, integration, and UX/UI design

Technology Transfer and Innovation Centres: to ensure regulatory compliance and adherence to healthcare industry standards with the help of external Intellectual Property experts

Pharmaceutical companies and medical device manufacturers to integrate virtual twin technology into their research and development processes.

Users incentivisation: VHT marketplace

- **Three phases of DLT adoption in the VHT ecosystem**

Phase 1	**Honour ledger**: starting from a reputation-based honour ledger (using DLT transactions to feed reputational scoring mechanisms)
Phase 2	**Token ledger**: using digital tokens issued to VHT resource contributors
Phase 3	**Money marketplace**: where participating entities can also engage in competitive transaction in the form of B2B exchanges of monetary value.

- **A single VHT platform, Different VHT (sub)platforms are foreseen, for a single**
  - VHT for academic research and early pre-competitive developments (public funding like any other public research infrastructure)
  - for not-for-profit activities (supported by various charitable mechanisms)
  - several commercial VHT infrastructures providing B2B services to an ever-growing industry in the VHT domain

Users incentivisation: resource valuation

- **VHT data valuation can be based on the concept of Shapley value** (developed by Nobel Laureate Lloyd Shapley in the 1950s)
  - the usefulness of the resource is characterised via the Machine Learning utility function, and the value generated by the coalition is distributed based on the marginal usefulness of the resources

- **Standard model benchmarks need to be developed by the VHT community** to assess the relative performance of different models across several dimensions including, e.g.,
  - speed, memory needs, accuracy, complexity, explainability, composability, extensibility, etc.
  - model provenance tracked through the EDITH DLT

Revenue streams, added value, opportunity

- Take part in the VHT Marketplace through licensing or subscription fees (e.g., pay-per-use or annual subscription access) — healthcare industries
- Consultancy services for customising virtual twin solutions to specific healthcare use cases
- Data analysis services
- Integration with electronic health with real time record systems
- Collaboration (e.g., royalties, licensing) between healthcare industries (SMEs, bigger firms)

Major costs

- Data processing costs
- Certification (Risk-management + Technical Documentation + Clinical trials)
- Computing costs
- Personel and experts

Conclusion: Business model pillars

Collaborative Ecosystem

- Cultivate partnerships across industries, fostering innovation and co-creation for unique value propositions.

Marketplace Dynamics

- Facilitate transactions and resource sharing, nurturing revenue streams and network effects within the ecosystem.

Digital Transformation

- Harness emerging technologies like AI, IoT, and blockchain to disrupt traditional models and drive innovation.

Outcome-Centric Approach

- Shift focus to delivering value-based solutions, tying success to customer outcomes, encouraging innovation, and prioritising patient well-being.

Customisation and Innovation

- Utilise data-driven insights to tailor offerings, enhancing customer satisfaction, engagement, and differentiation from competitors

http://www.edith-csa.eu

Deliverables available under tab ‘dissemination/material’

Indication of interest via de contact form on site

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Survey

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Survey

Join at menti.com | use code 4533 8919

Mentimeter

Time to reflect

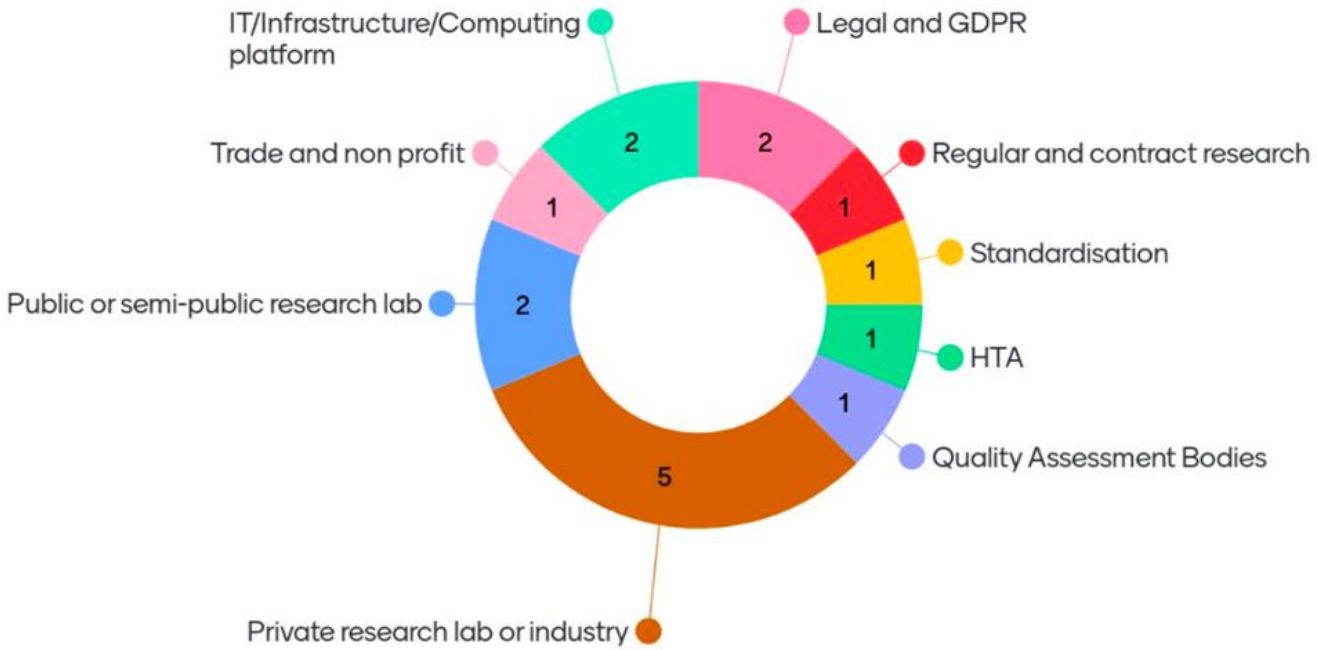
Answer this quick survey to help us improve.

Survey

Mentimeter

TODAY'S AUDIENCE

What type of stakeholder are you?



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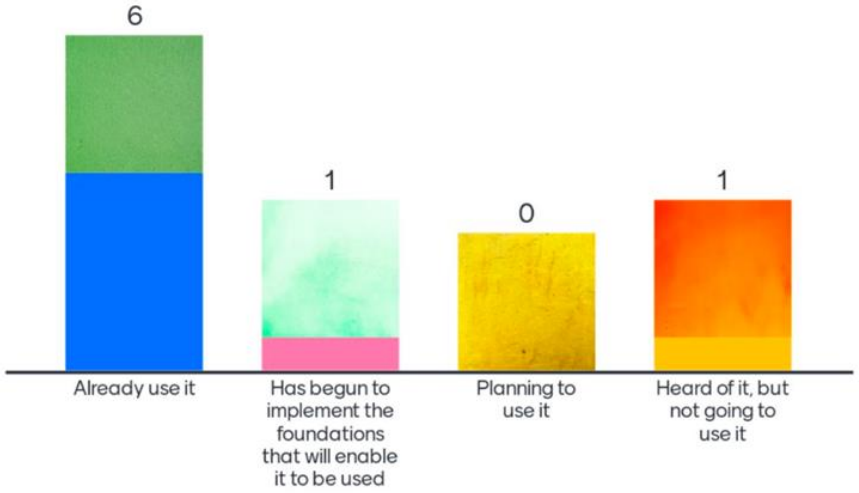
Survey

Mentimeter

To what extent are you familiar with Digital Twin and Digital twins concepts in your organisation?



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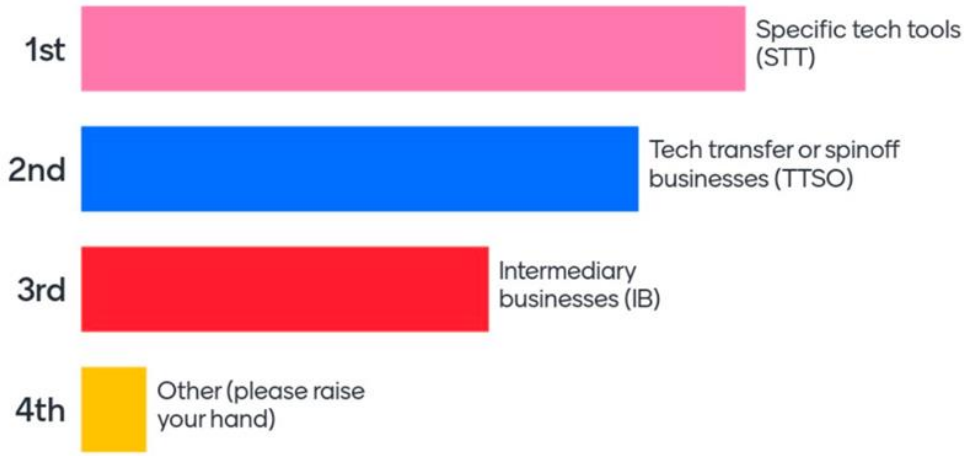
Survey

Mentimeter

What do you think will be the predominant business model among these categories?



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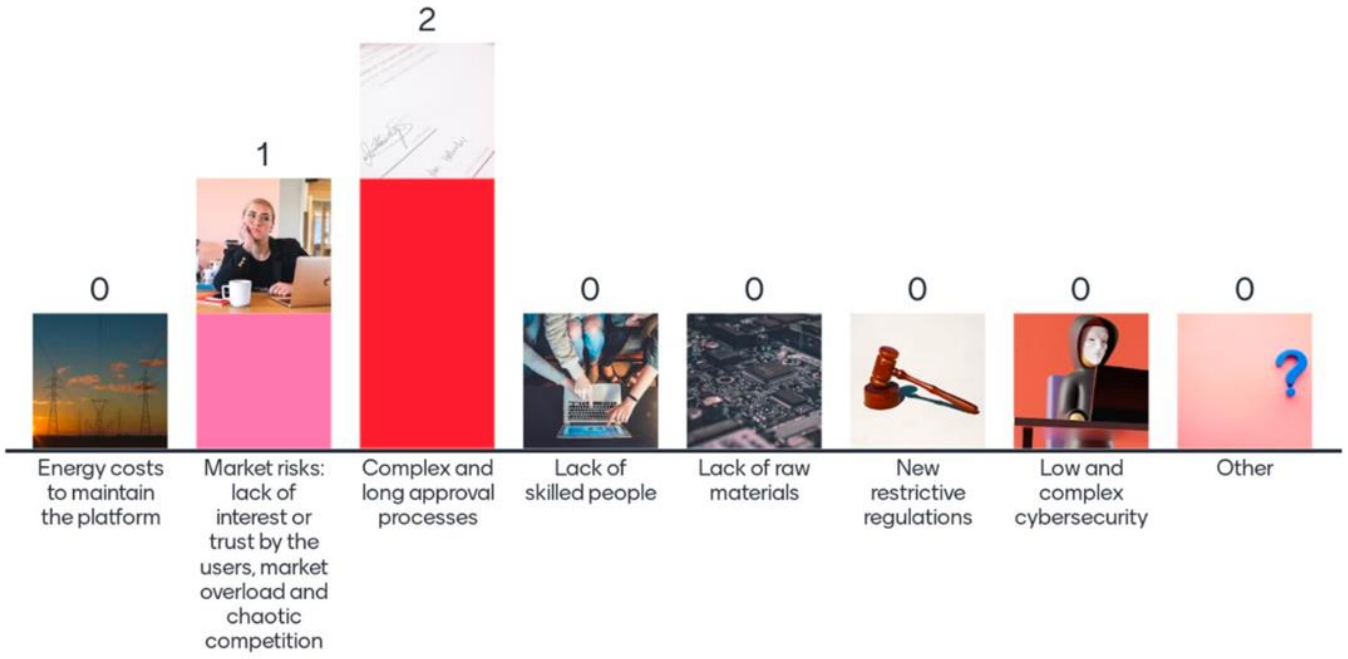
Survey

Mentimeter

Risks for the VHT market



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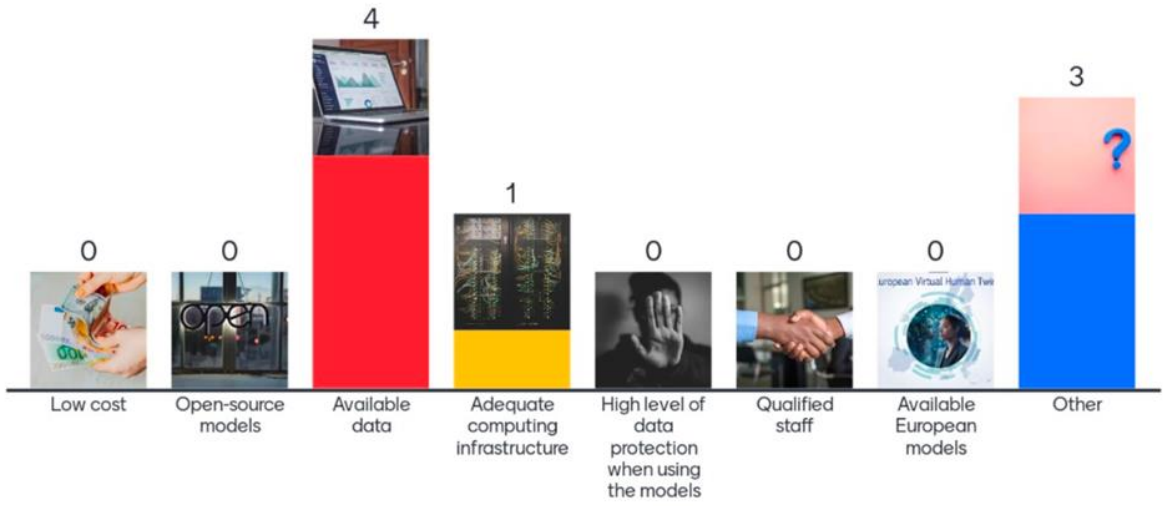
Survey

Mentimeter

What are the requirements that need to be met for you to use the VHT platform?



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Please explain further why you believe the VHT will, or will not, have a significant impact on healthcare delivery.

The VHT should make the go-to-market process for a model easier, faster and cheaper providing an ecosystem of different stakeholders helping through the various steps

Data is key. Accessing these data is a challenge, make a good use of it too !

It could make significant changes in clinical practices by allowing doctors to test otherwise procedures who could not be done in a real life.

Step towards broader uptake of precision medicine

Facilitate early access and adoption.Support lack of skill profiles

Yes by enabling synergies across Europe (skills, data access, etc).

Virtual has to become the new standard of care

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Survey

Mentimeter

Could you elaborate on how you perceive the value of the virtual human twin in transforming healthcare practices and medical research?

Huge transformation potential if able to give value to all levels of stakeholder involved in VHT adoption (patients, healthcare professionals, healthcare provider, health system

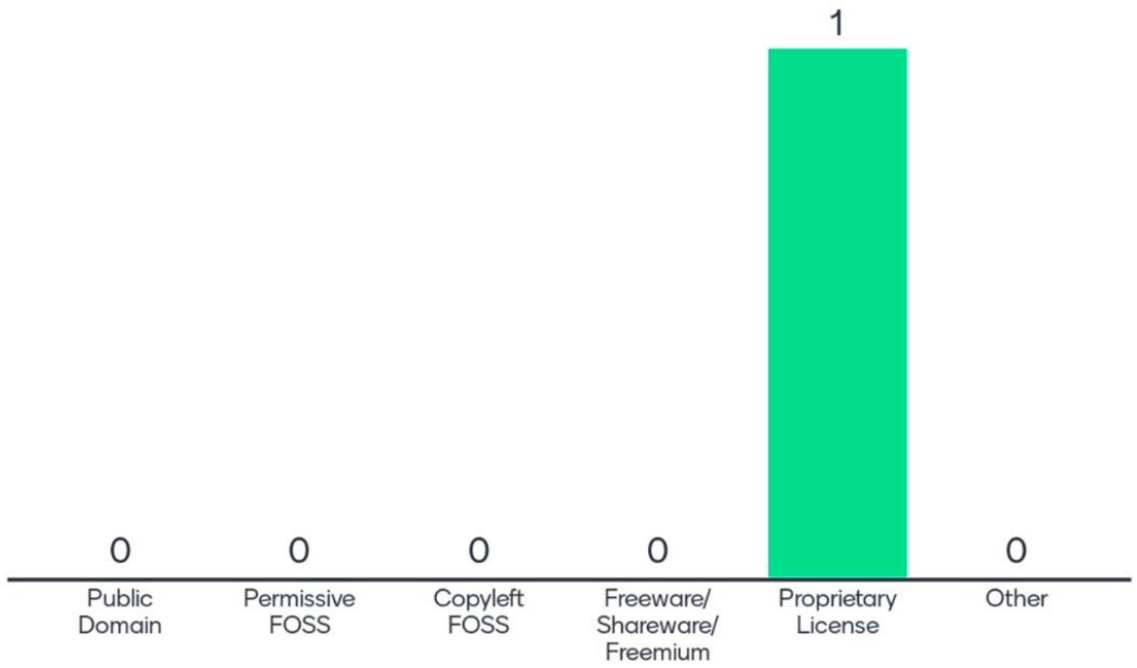
Clinical choices or decisions are made on cohorts of already treated patientsHCP are doing their best to treat on a personnalized way but don't have mean to anticipate or predicit

Increase uptake in precision medicine.

Survey

Mentimeter

Licensing: How can we ensure fair collaborations through the VHT platform, fostering innovation?



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