

AI Humanoid Healthcare

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*Concept: Home Humanoid + AR Agent + Medical Data/Care Team
Healthcare & Wellness Ecosystem by 2035*

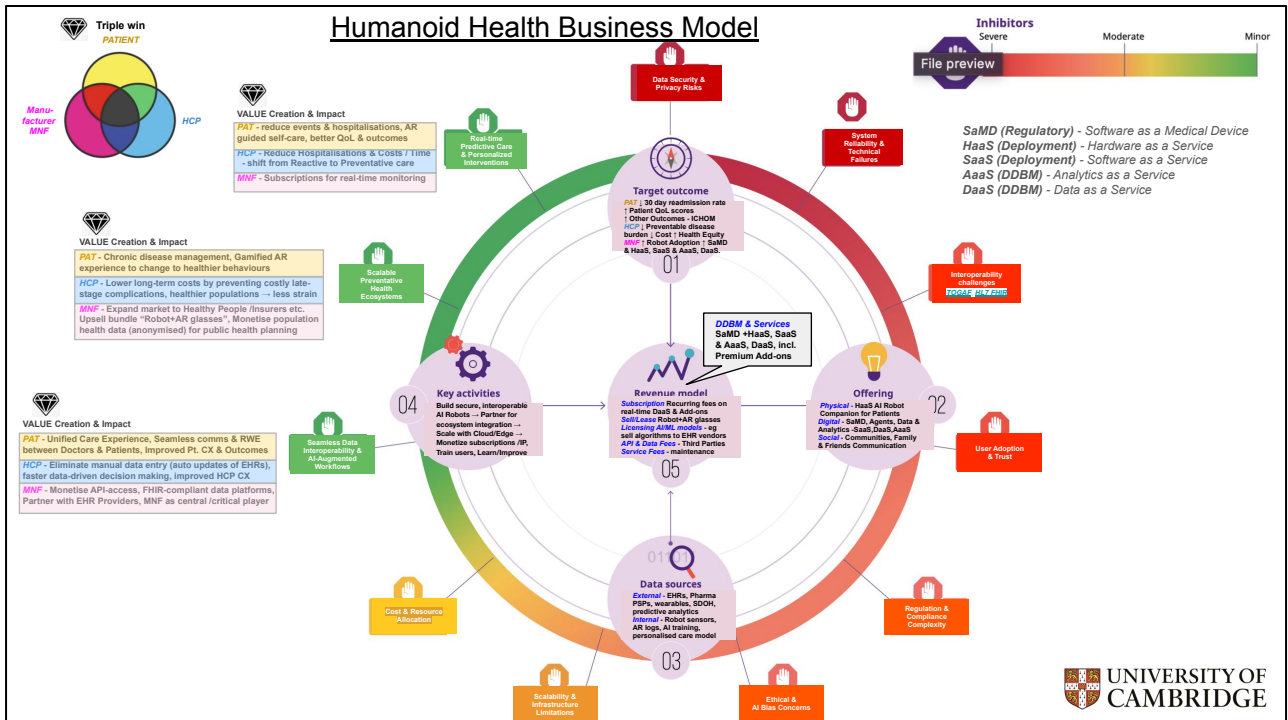
These slides give an overview of a near future Humanoid Healthcare ecosystem, with seamless integration with Augmented Reality Agents (via patient's AR glasses) & EHR data and care team interactions.

Slide 2 is the Data-driven Business Model Framework & triple win value.

Slide 3 high-level Business Architecture

Slide 4 high-level IT Architecture

These components have the goal to bring a compliant Product & Services that benefit Patients (including Predictive Alerts), their families, HCP care teams / Society and the Robotics Manufacturers.

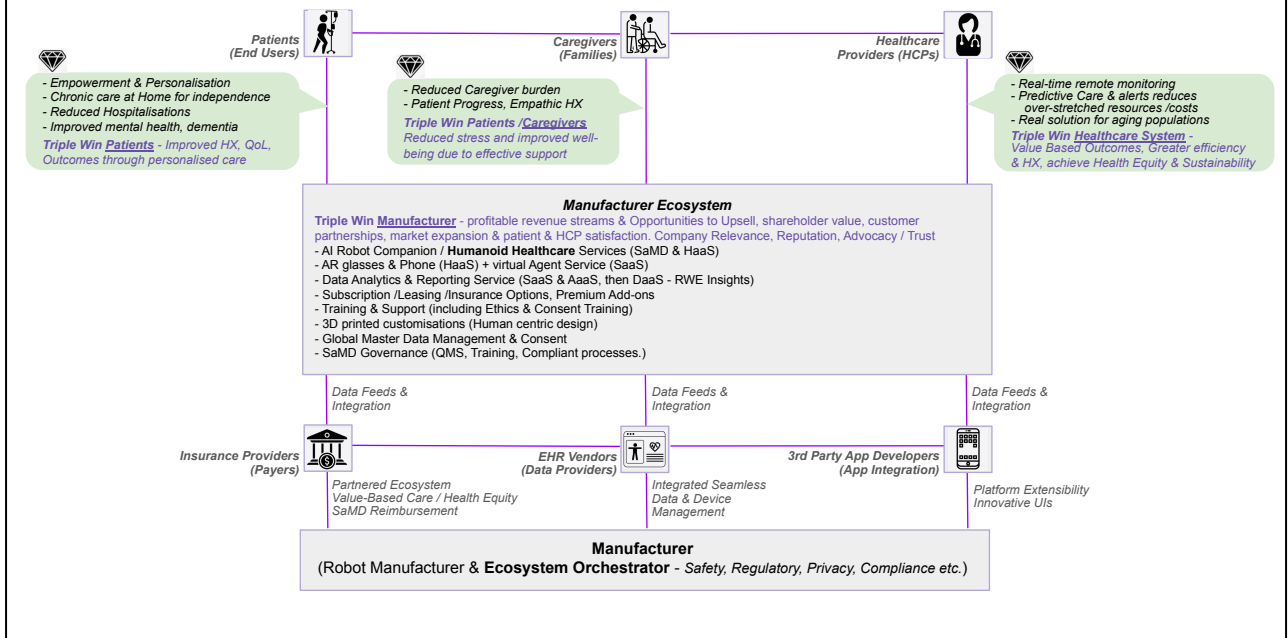


Page 2 - Humanoid Health Business Model - Speaker Notes

"This slide represents the core business model of our AI Humanoid Healthcare ecosystem. This is a Data-driven Business Model template, CX Management Framework from the University of Cambridge, UK. The main components of the DDBM are in the centre. The Revenue model has many options for monetization, starting with Sale / lease of hardware Robot, then Premium Add-ons for extra functionality eg real-time sensor home monitoring with Predictive care alerts. We try to coordinate the Ecosystem seamlessly across the Digital-Physical-Social realms.

The Inhibitors that the Manufacturer needs to solve start from 12 o'clock with the reddest, biggest barrier (Data Security & Privacy Risks) and gradually reduce their negative Impact on a continuum as the reader goes clockwise. These items could help prioritise activities in the Sprint Backlog. By 9 o'clock you can see that the main focus areas have flipped to overall positive impact (green) - The "Triple Win" shows the balanced value creation - denoted by the black diamond, We try to find overlapping value creation for the patient, for HCPs & Society and for the Robotics Manufacturer. Shared value in the middle will be the optimal fit - delightful, useful & profitable customer centricity / HX.

High-level Business Architecture - Health & Wellness Ecosystem (AI Humanoid +AR Agents +EHR Data)



Overall Goal: This diagram illustrates the key stakeholders and their relationship to the MNF Health & Wellness Ecosystem, showing how it creates value for everyone involved and integrates across the IT infrastructure.

Stakeholders & Value Propositions:

1. Patients (End Users): Individuals benefiting from improved care, support, and quality of life through the MNF ecosystem.

- [Note: Improved wellness, higher quality of life. With AI to deliver more personalized, and preventative treatment]
- **Empowerment & Personalisation:** The system empowers patients to take control of their health.
- **Chronic care at Home for independence:**
- **Reduced Hospitalisations:** The system strives to minimize hospital visits through preventative strategies.
- **Improved mental health, dementia:**
- **Triple Win Patients** Improved HX, QoL, Outcomes through personalized care

2. Caregivers (Families): Family members or professional caregivers who benefit from reduced burden and improved support in caring for their loved ones.

*With AI supporting 24/7

- Reduced Caregiver burden: The system aims to reduce caregiver responsibility
- Patient Progress, Empathic HX
- **Triple Win Patients /Caregivers**- Reduced stress and improved well-being due to effective support

3. Healthcare Providers (HCPs): Doctors, nurses, and other healthcare professionals who can deliver more efficient and effective care through the ecosystem.

*Leveraging tech to provide the most value.

- Compliant SaMD, risk managmt.
- Real-time remote monitoring
- Predictive Care & alerts reduces over-stretched resources/costs
- Real solution for aging populations
- **Triple Win Healthcare System** Value Based Outcomes, Greater efficiency & CX, achieve Health Equity & Sustainability outcomes.

4. Insurance Providers (Payers): Organizations that pay for healthcare services, benefiting from reduced costs and improved patient outcomes.

*Lower care burden long term

- Partnered Ecosystem, Value-Based Care, SaMD Reimbursement

5. EHR Vendors (Data Providers): Companies providing EHR systems, partnering with MNF to integrate data & enhance their services. *Seamless and Integrated data

- Integrated, Seamless, Device Management

6. Third Party App Developers (App Integration): Independent developers creating applications that integrate with the MNF platform, expanding its functionality and value.

*Open Innovation to scale the system

- Integrated, Innovative UIs

MNF Ecosystem Services:

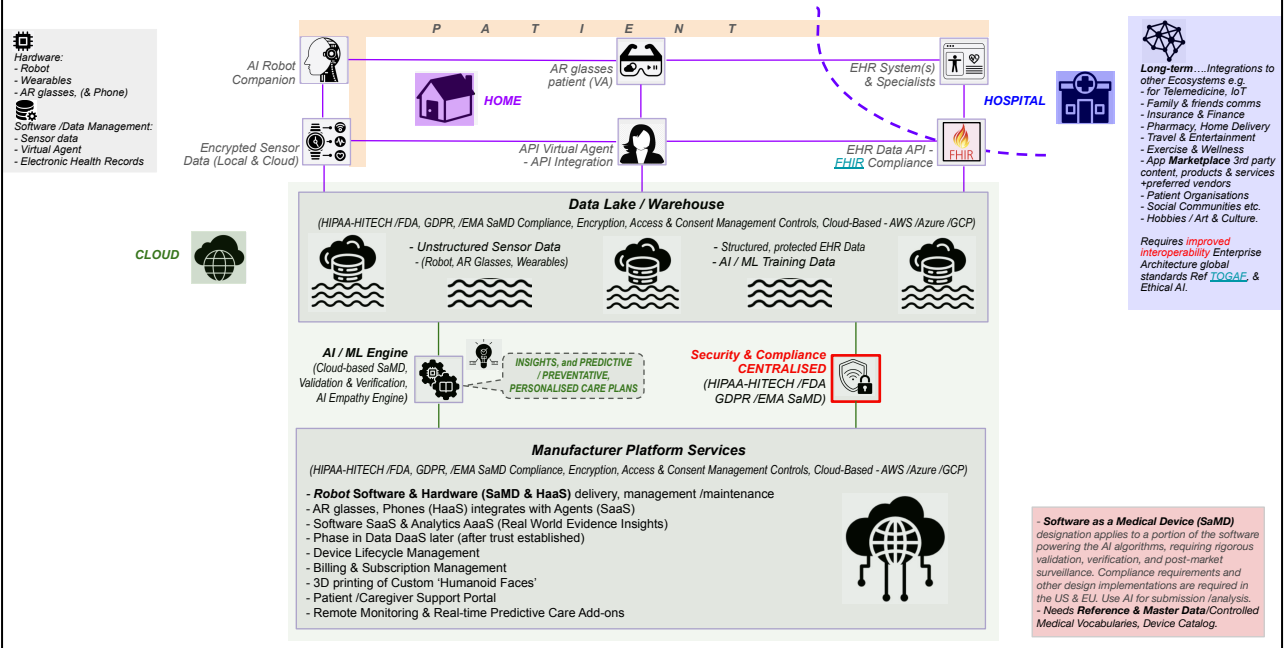
This section outlines the core services and functionalities provided by the MNF ecosystem. These functions combine Data Mgmt, Ethical, and Security. *The below aspects can scale with open innovation to scale long term*

- AI Robot Companion Services (SaMD & HaaS):
- AR glasses & Phone (HaaS) + virtual Agent Service (SaaS):
- Data Analytics & Reporting Service (SaaS & AaaS, then DaaS Real World Evidence Insights):
- Subscription /Leasing /Insurance Options, Premium Add-ons:
- Training & Support (including Ethics & Consent Training):
- 3D printed customisations (Human centric design)
- SaMD Governance (QMS, Training, Compliant processes):

Manufacturer (Robot Manufacturer & Ecosystem Orchestrator):

* [Note: The MNF takes the central role driving the overall ecosystem and takes responsibility for all success]

High-level IT Architecture - Healthcare & Wellness Ecosystem (AI Robot + AR Agents + EHR Data)



Components & Key Annotations:

1. AI Robot Companion: The AI-powered humanoid robot serves as the patient's primary interface, providing 24/7 support, collecting sensor data, and communicating with other components.

[Note: The robot leverages onboard sensors (e.g., cameras, microphones, environmental sensors) to gather data and interacts with the patient through voice, touch, and visual cues.]

2. AR Glasses (Patient VA): Augmented Reality glasses provide a visual interface for patients, overlaying helpful information and guidance via a Virtual Agent.

[Note: The VA (Virtual Agent) assists with self-care, medication reminders, and communication with caregivers and HCPs.]

3. EHR System(s) & Specialists: The patient's Electronic Health Records are securely accessed via standardized APIs to personalize care plans and facilitate data sharing with healthcare providers.

[Note: This integration is typically achieved via FHIR (Fast Healthcare Interoperability Resources) standard APIs.]

4. Encrypted Sensor Data (Local & Cloud): Data collected by the robot and AR glasses (e.g., activity levels, vital signs, environmental conditions) is encrypted both locally (on the device) and in transit to the cloud.

[Note: Encryption ensures patient privacy and data security, aligning with HIPAA and GDPR requirements.]

5. API Virtual Agent Integration: API integration helps the VA manage communication between users.

[Note: FHIR (Fast Healthcare Interoperability Resources) standard APIs is normally adopted for the integration.]

6. Data Lake / Warehouse (HIPAA-HITECH/FDA, GDPR/EMA SaMD Compliance, Encryption, Identity & Access Management Controls, Cloud-Based - AWS/Azure/GCP): This is the central repository for all patient data, ensuring security, compliance, and scalability.

[Note: The Data Lake is designed to handle both structured (EHR data) and unstructured data (sensor data, voice recordings). It leverages cloud-based services (AWS/Azure/GCP) for scalability & reliability. Strict access control mechanisms, encryption, and audit logging are implemented to maintain compliance.]

7. AI / ML Engine (Cloud-based SaMD, Validation & Verification): Algorithms are applied to the data within the Data Lake to identify patterns, predict risks, and personalize care plans.

[Note: The AI/ML Engine leverages machine learning models to provide predictive analytics, and personalized recommendations. SaMD, is built to comply with FDA and EMA regulations.]

8. Call out (Insights and Preventative Care Plan): Highlights what drives and influences the Machine Learning Engine to make predictive and personalized outputs.

[Note: Connects insights that provide data to the Platform for the best user experience.]

9. Security & Compliance (HIPAA-HITECH/FDA, GDPR/EMA SaMD): Security features are built-in to comply with many regulatory standards in various continents.

[Note: Highlights how strict adherence to security regulations and data is used to mitigate any potential risks.]

10. Manufacturer Platform Services (HIPAA-HITECH/FDA, GDPR/EMA SaMD Compliance, Encryption, Identity & Access Management Controls, Cloud-Based - AWS/Azure/GCP): This encompasses all the services that enable the functioning of the ecosystem, including robot control, data analytics, billing, and support. Device Lifecycle Management guarantees maintenance and security upgrades.

[Note: The Platform Services layer provides a unified interface for managing the entire ecosystem. It ensures scalability, reliability, and security. It's used for the development of AI models and other SaaS.]