

## Design of Healthcare 4.0 Platform

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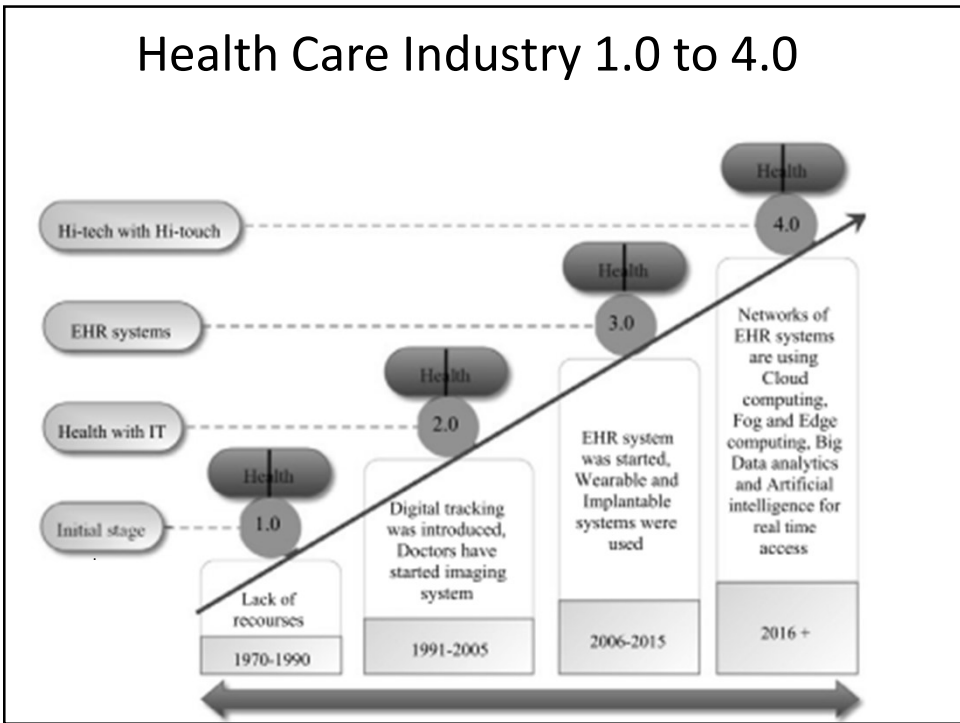
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# Health Care 4.0

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## Health Care Industry 1.0 to 4.0

- **Healthcare 1.0:** Doctors used visit patients; Home Baby deliveries; Home made medicine. Hospitals with few doctors.
- **Healthcare 2.0** Hospitals and nursing homes had a limited number of medical practitioners
- **Healthcare 3.0:** Medical imaging and Tracking technologies; Growth of private and corporate hospitals. Internet transfer of data and medical Images etc. Health records for Local use.
- **Healthcare 4.0.** Electronic medical records, digitation of patient data, Cloud, Mobile Internet, IOMTs and connected patients (Home care), Big data health (predictive, prescriptive) analytics and AI ,ML & Block chain. Innovation in diagnosis and medical treatment and developing personalized medicine

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## Health is More than Healthcare



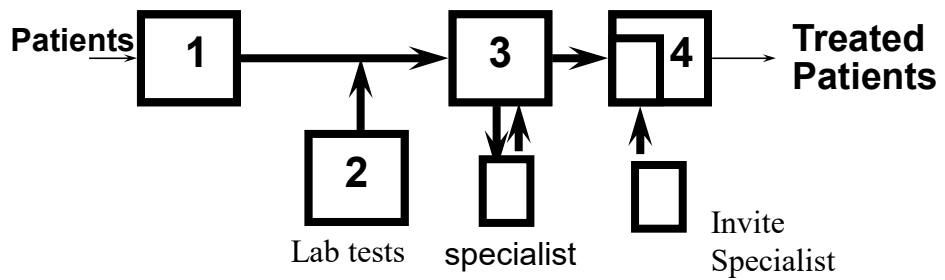
- **Current Focus** is on Disease treatment and building capital intensive high-end physical infrastructure.
- **Future Health focus** is on promoting healthy lifestyles, vitality, and wellness; primary and secondary prevention; & early diagnosis. It also includes its spiritual, mental, and emotional components
- Digital health care ecosystem based Platform that includes both incumbents and nontraditional health care players is the future business model.
- Future: Digital medical platforms, online medical consultations, smart hospitals, health management using big data analytics

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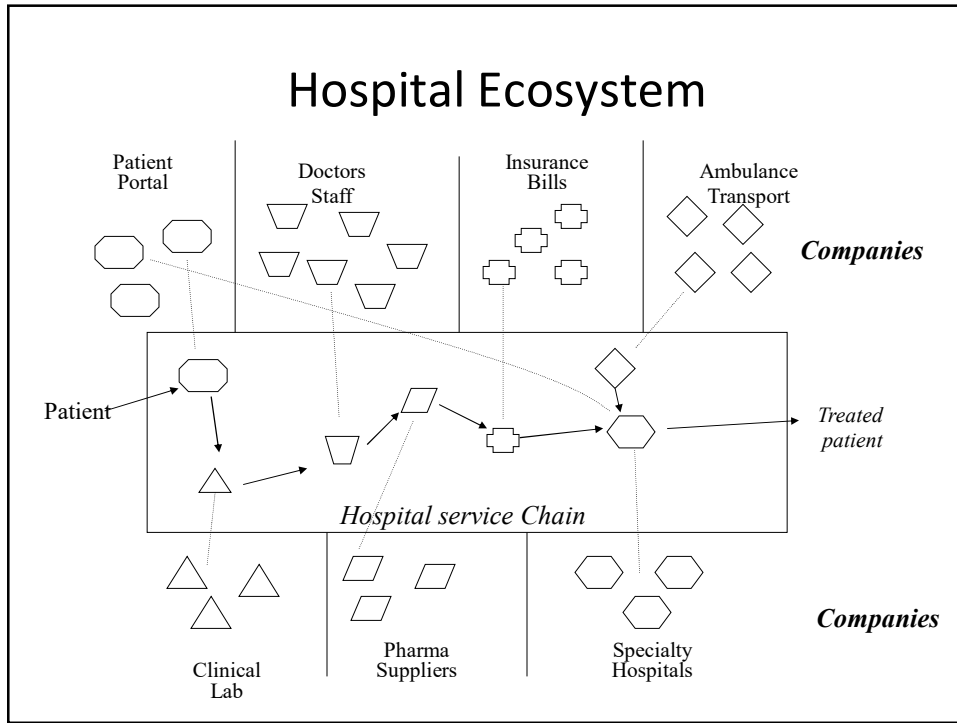
## Current Health Infrastructure in India

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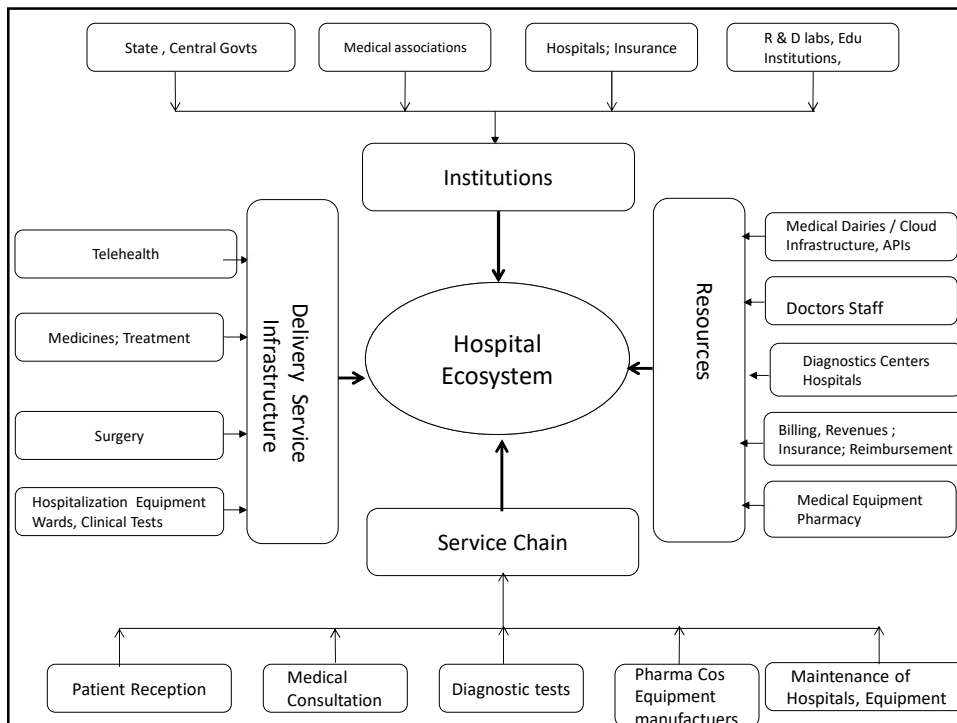
## Hospital Service Chain



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## New Innovations Changing Healthcare Industry

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## New Technologies

- Mobile Internet: connecting with patients
- **Electronic pill** contains sensors that collect information as it travels through gastrointestinal tract
- Cloud: Healthcare Data storage
- **3D printing** : Customized medical equipment. Bones are getting healed 40-80 % faster
- Blockchain: Secure storage of patient & health info
- **Drones** deliver medicine, blood, even organs
- **Robot assisted surgeries** are done in private hospitals. They are more precise, less painful

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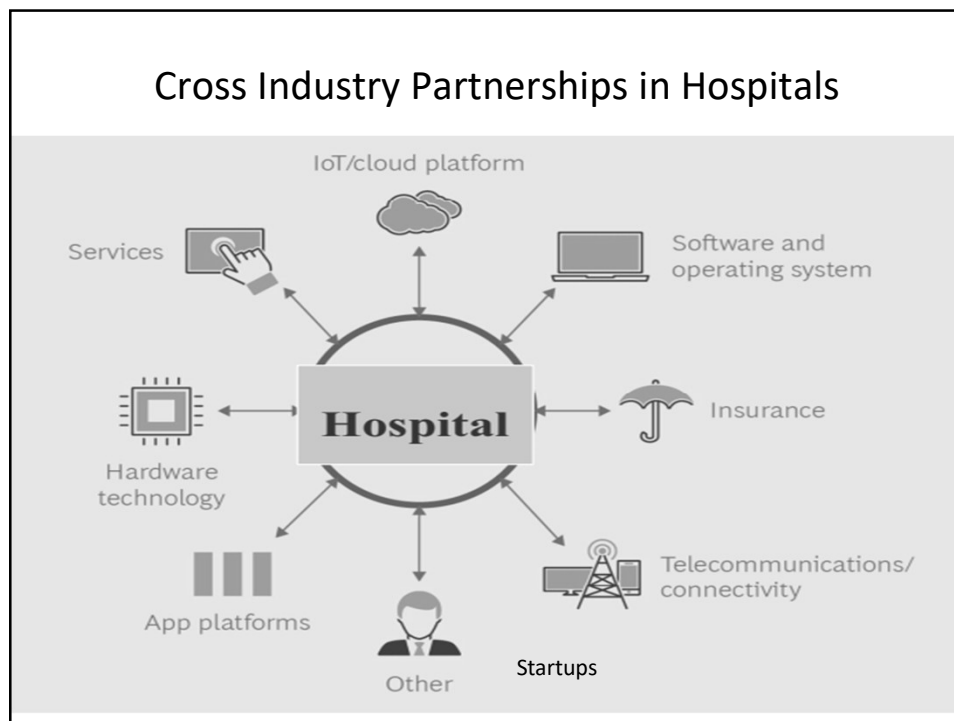
## IoMT and AI



- Internet-of-Medical-Things (IoMT) is a network of medical devices that feed vital data in real time to healthcare IT systems.
  - Connecting medical devices, such as Ultrasound, Thermometers, Glucose Monitors and ECGs for tracking patients' overall health;
  - SMART BEDS in hospitals with no nurses;
- AI helps precise diagnosis using large sets of clinical data and images for cancer and chronic conditions such as diabetes, cholesterol, cardiac health treatment
- NLP & AI help processing Invoices, Bills & other documents
- Big data collected through IOMT and analytics using AI and ML will transform clinical research, treatment protocols increasing virtual care capabilities of health providers

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## Cross Industry Partnerships in Hospitals

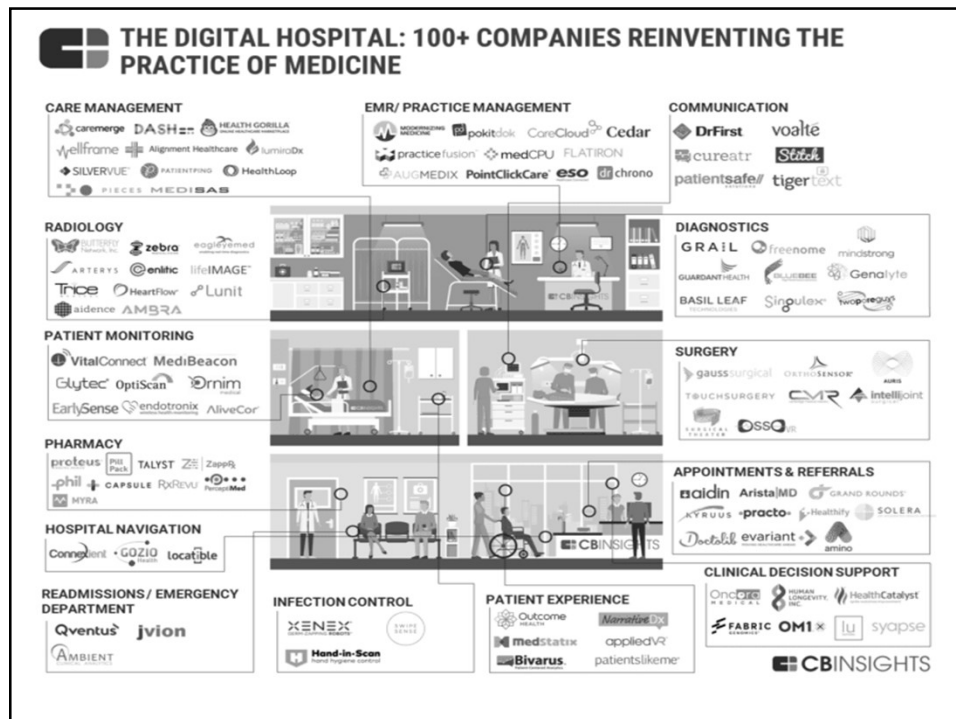


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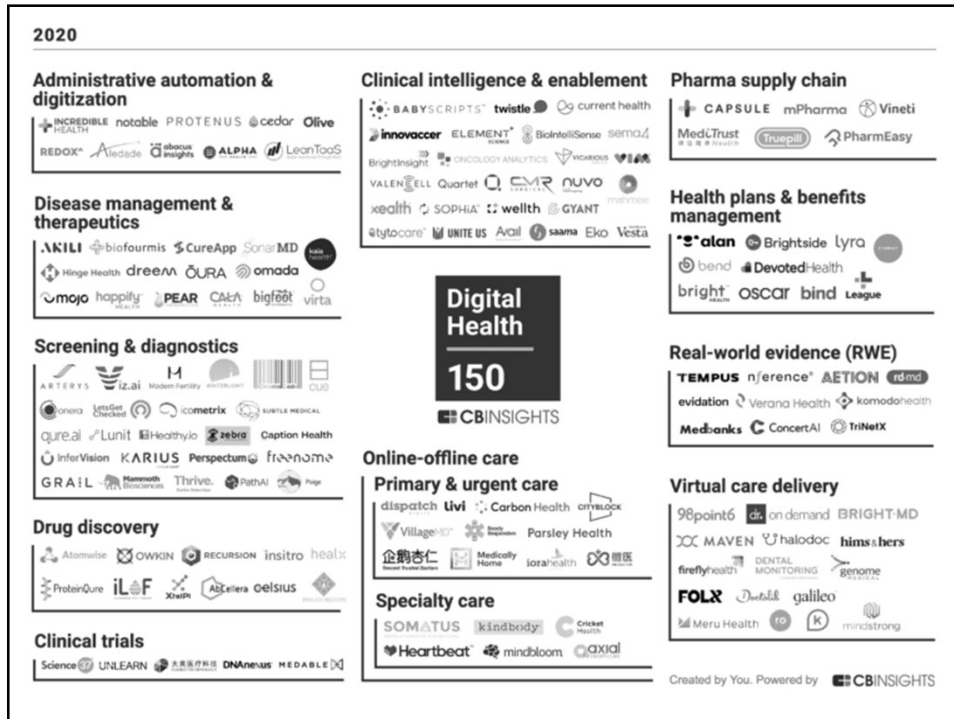
## Big Data Analytics to make Decisions

- Medical Data Decisioning involves, inferencing from large volumes of medical imaging data, genomic data, patient's behavioural data, etc.
- **Descriptive analytics** enables organizations to learn from their past and understand the relationship between variables and how it can influence future outcomes.
- **Predictive analytics** examines past data trends using statistical, programming and simulation techniques to answer the question of what will happen or likely to happen in the future.
- **Prescriptive analytics** deals with the question of what should happen and how to influence it.

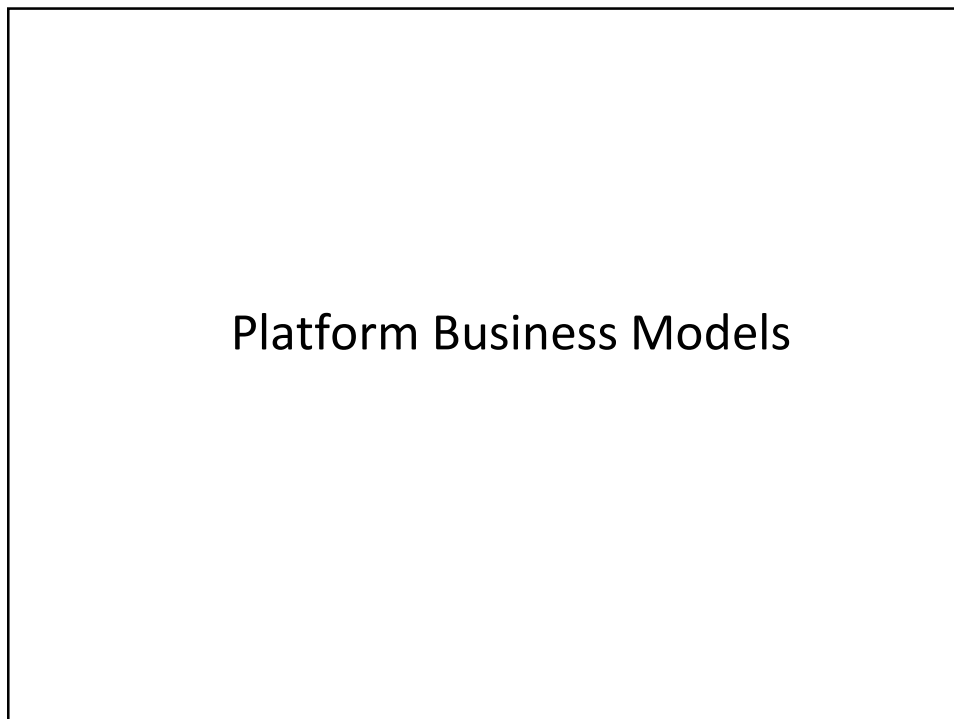
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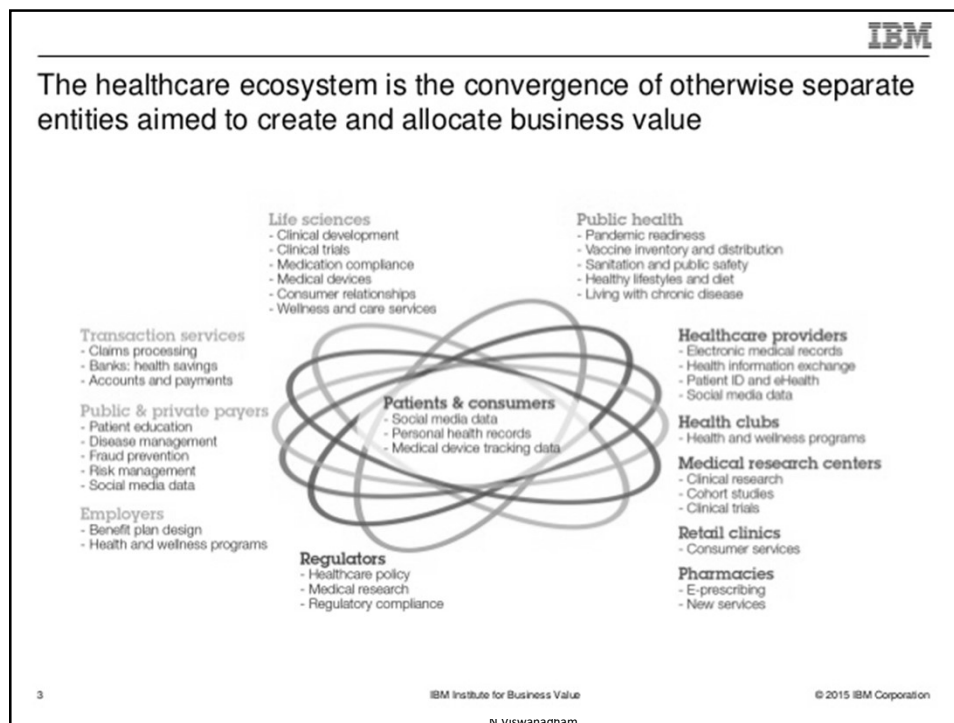


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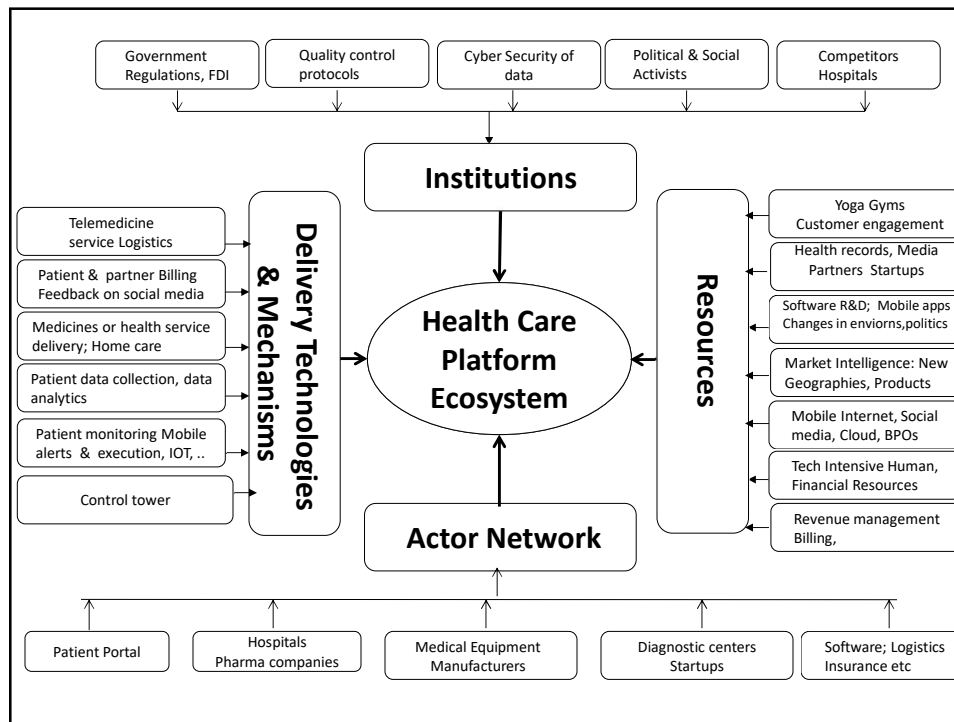
## Business Ecosystem

- **Business ecosystem** is a network of independent companies working together to gain comparative advantages through symbiotic relationships benefiting all parties.
- **Network organization:** Core providers (Hospitals, Pharma manufacturers), Complementors (Diagnostic labs, Pharmacies, Startups), Homecare providers, Social media, R&D labs, Medical schools, Yoga and Gym centers, Government agencies, Patients etc., **delivers Healthcare products or services** through both competition and cooperation.
- Ecosystem thrives when the participants streamline the flow of ideas, talent, and capital throughout the system

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## Platform Assets and Services

- The Products the Platform offers to the clients are Network, Relationships & Knowledge. Its competitive advantage lies in the Domain knowledge & the number and depth of its relationships with its members including the Govt
- The platform assets that are hard to copy are the community (partner **network & patients**) ;Resources its members own and contribute, be the Hospitals or Data analytics or Innovations.
- Because members of the partner network are mutually dependent, good performance by one boosts success of others.
- Platform should provide a definitive asset for its partners to build their presence, to grow their practice, and to engage the patients in a way that was never possible before.

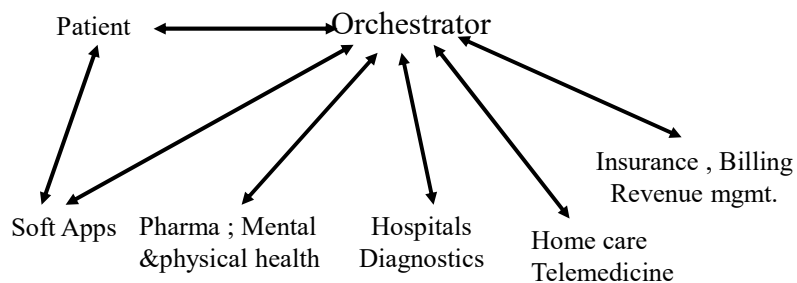
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## Governance: Partner Selection, Coordination & Control

- A separate healthcare service chain is formed for each patient
- **The chain Partner selection** based on
  - Structural features (asset specificity, capabilities)
  - Relational ties ( Staff; Govt., Telehealth, diagnostics, home care etc.)
- **Coordination** : Determining who does what and when and communicating to everyone (Scheduling)
- **Execution**: Monitor order status so that processes work as per plan & control exceptional events

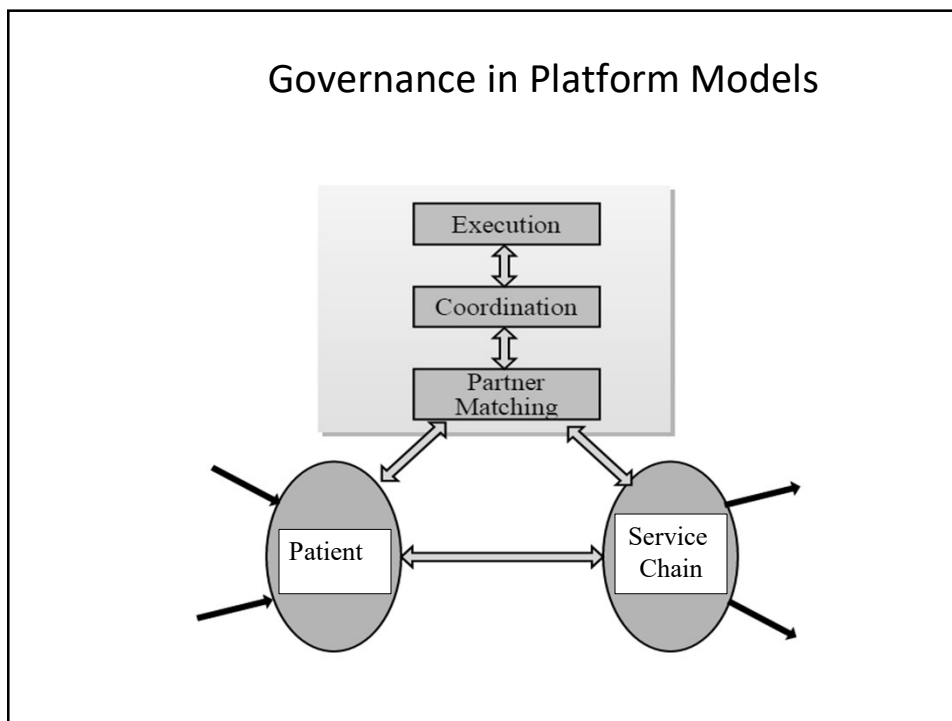
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## Platform Orchestration



For every patient, Platform orchestrator selects the partners, allocates the tasks and responsibilities, forms the network and monitors the execution

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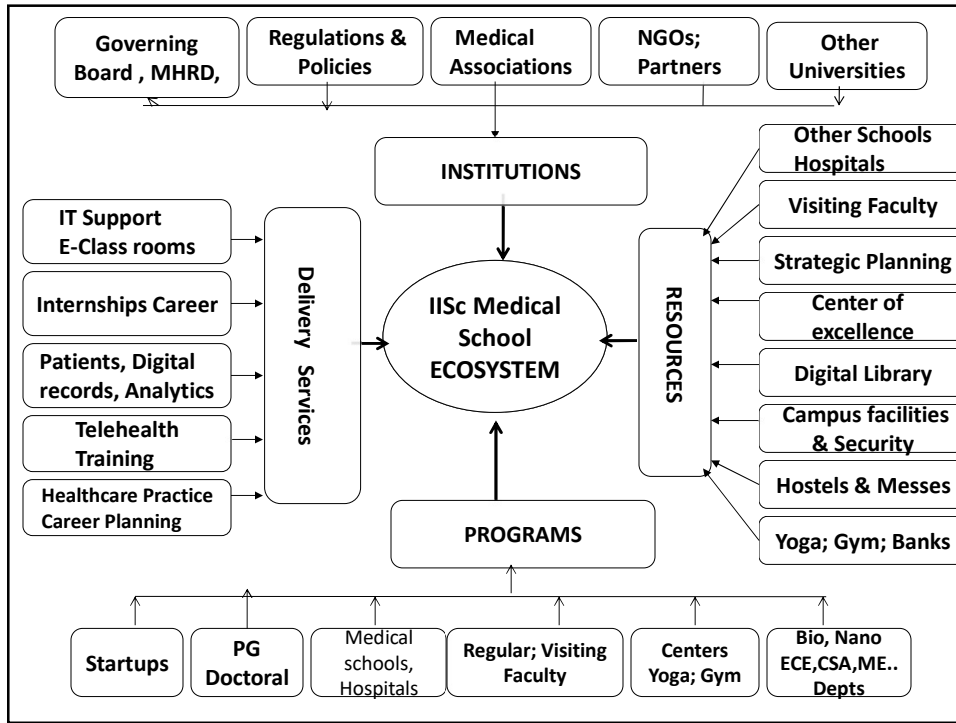
### India needs Healthcare Service Revolution

- Streamline & Technologically transform Health Care services to Algorithm assisted Digital health based on real time patient data
- Initiate education, research and entrepreneurial programs in health care sector; **Produce Healthcare Practitioners** not Medical
- Re-innovate Pharma manufacturing and Smart Food sectors
- Improve the Investment Climate for startups & Foreign cos.
- Plan and Build Integrated Service Systems: Smart Medi Cities, Smart Healthcare Villages; Startup Ecosystems, etc.

**IISc Hospital Initiative should be at the Center of this Revolution**

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