FROST & SULLIVAN

Opportunities for New Market Participants

Team
FINLAND MARKET OPPORTUNITIES
Future Watch

September 17, 2019

Focus Points - Agenda

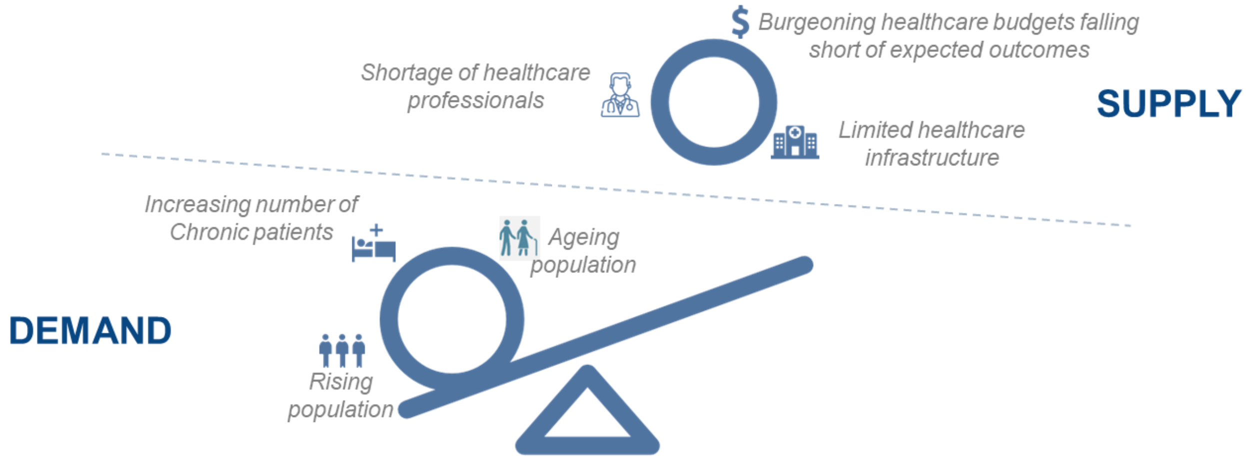
1. **Healthcare Industry at a Crucial Juncture – The Status Today**
2. Decentralization of Care Delivery Models – Future Alternate Care Locations
3. Opportunities for New Technologies and Service Bundles
4. Key Takeaways

The Healthcare Industry is at a Crucial Juncture

If nothing is done, these challenges are strong enough to cripple economies.

- On one hand, **rising population, aging population and more patients with chronic and multiple co-morbidities** are putting immense pressure on current healthcare systems, which is expected to rise by 2025.
- On the other hand, **governments are struggling to balance healthcare budgets** with other expenses. This is resulting in an overburdened infrastructure and healthcare workforce, which has little scope for expansion. This **imbalance in demand and supply** is expected to balloon further by 2025, presenting serious challenges for global healthcare systems.

System-wide Challenges Unbalancing Healthcare Demand & Supply



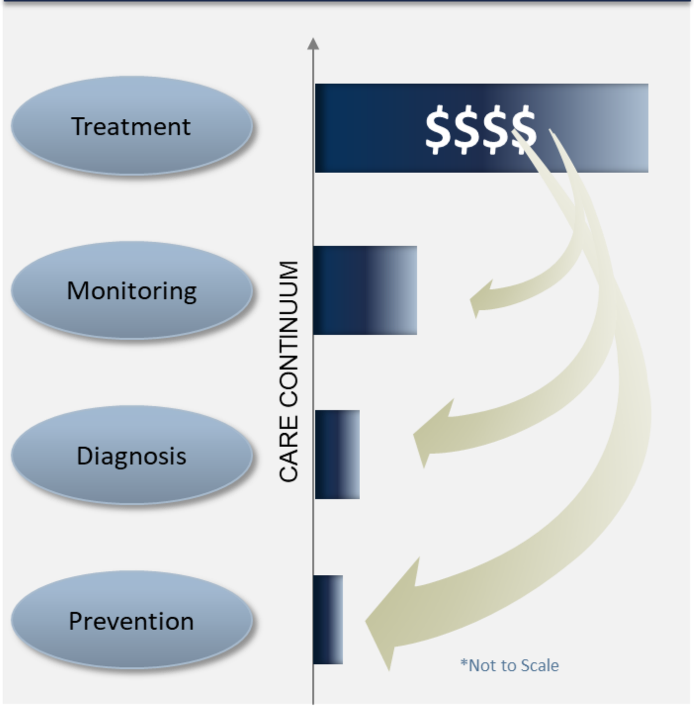
Source: United Nations, World Health Organization

Source: OECD; WHO; Frost & Sullivan

Wellness Management – Prescriptive or Ownership Based

Healthcare industry shifting ownership on patients - focusing on prevention and wellness

Healthcare Market: Shifting Healthcare Spend* Across Care Continuum, Global



Source: Frost & Sullivan

- Providers **continue to encourage patient engagement** and ensure that efforts are sustainable to positively impact health outcomes. Fortunately, a variety of new strategies have been developed that **encourage and motivate patients** to take **ownership** and become more involved in decisions about their care.
- These strategies **include increased deployment of a range of consumer-facing digital solutions**, including digital educational content, wearable sensors, mobile apps, and other tools.
- The future healthcare expenditure spend will evolve to **focus less on treating diseases and more on prevention, diagnosis, and monitoring**.

Top Predictions for the Healthcare Industry

Across the globe, modernization and reform measures are being employed by public and private sector organizations to meet the growing need for healthcare. New technologies are being created that offer enormous promise to improve care delivery across the entire healthcare continuum.

Value-based Care Progresses as Outcomes Focus Globalizes

AI explodes across the Healthcare & Life Sciences post Flagship Use Cases yield Positive Results

Digital Health will come of Age with an Increased Focus on Individual Care

Asia become the New Local Innovation focus for Global Drug and Device OEMs

Healthcare Data Analytics shifts from Big Data to Meaningful Small Data by Hospital Specialty

Healthcare will be a Dominant Vertical in Voice Applications

Blockchain moves from Hype to Reality with further Commercial Implementations

Innovative Private Insurance Models Shake up Healthcare Payer Industry

Prediction#1: Value-based Care Progresses as Outcomes Focus Globalizes

By end of 2019, up to **15%** of global healthcare spending will be tied in some form with **Value/Outcome based care concepts.**

WHAT'S DRIVING IT?

More sophisticated outcome-based models will get deployed in developed markets

Emerging nations will start following the best practices suited for their local needs.

WHAT DOES IT MEAN FOR YOU?

Healthcare Payers
Pursue more risk-based reimbursement arrangements

Health Systems
Impetus for shift will be exigent for countries spending ≥10% GDP on Healthcare (e.g. US, FRA, GER, JAP, NL, CAN)

Drug/Device OEMs
Increased pricing pressure will trigger maturation of risk-sharing contracting, driving business value for providers

Prediction #2: AI explodes across Healthcare & Life Sciences post Flagship use cases yield Positive Results

AI for Healthcare IT application market to cross **1.7 billion** by end of 2019.

WHAT'S DRIVING IT?

AI-based Healthcare Workflow optimization; Digital Assistance; Risk Predictions

Machine Learning become pervasive across clinical and operational outcomes

AI-powered IT tools that manage payers' and providers' business risks (clinical, operational, financial and regulatory) continue to be important for the industry.

WHAT DOES IT MEAN FOR YOU?

Medical Imaging
Operationalizing AI platforms would result 15–20% gain in productivity for Radiologist in 12-18 months

Digital Pathology
AI will make its way into pathology as far as clinical diagnostic spectrum is concerned

Drug Discovery
For pharma AI and real-time analytics will make 'adaptive clinical trial' a reality than a concept.

Prediction #3: Digital health will come of age with an increased focus on Individual Care

During 2019, digital health technologies catering to **out-of-hospital settings** will grow by **30%** to cross **$25bn** market globally.

WHAT'S DRIVING IT?

Exponential growth for Digital health solutions catering to Aged care and chronic conditions management.

Favourable Reimbursement rules for digital health solutions such as; RPM devices, Telehealth platforms, PERS, and mHealth applications.

WHAT DOES IT MEAN FOR YOU?

MORE FOCUSED SOLUTIONS

Increased spending on targeted digital health solutions with proven outcomes for care coordinated and population health

BUSINESS MODELS

As the lines between retail, IT and healthcare industries continue to blur, GAFA in the West and BAT in East will start to dominate the Individual Care space.

INVESTMENT FOCUS

Turning data into actionable outcomes will be new sources of innovation and service-oriented future revenue streams

Healthcare Industry's Transition and its Impact on Stakeholders

Quadruple Aim

- Reduced Costs
- Improved Clinician Experience
- Better Patient Experience
- Improved Health Outcomes

INDUSTRY

MEDTECH

Medtech Considerations

- Reduce cost of devices – impacts margins
- Help hospitals improve their efficiency, and therefore bottom lines

- Support providers engage and manage patients
- Improve experience of using medical devices

Empower patients for self-care with tools

- Focus on preventive care, disease management
- Enable personalized medicine

Source: Frost & Sullivan

Focus Points - Agenda

1. Healthcare Industry at a Crucial Juncture – The Status Today
2. **Decentralization of Care Delivery Models – Future Alternate Care Locations**
3. Opportunities for New Technologies and Service Bundles
4. Key Takeaways

Decentralization of Care Delivery Model

Traditional Model

Baby Boomers & Tech-savvy Millennials

Emerging Model

Patient Searches…

Doctor / Hospital / Pharmacy

Calls payer / friends / doctor (referral)

[In-network, affordable co-pays]

Patient Searches…

Doctor / Hospital / Pharmacy

Online

[In-network, affordable co-pays]

Care Delivery Moving to the Home Environment

Patient Visits…

- Clinic
- Path Lab
- Pharmacy
- Health &

Products and Services Visit Patient

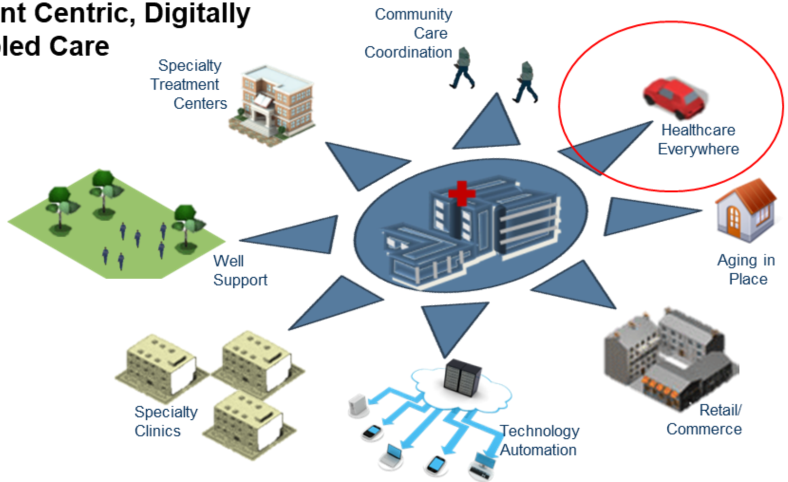
- House Call
- Telemedicine
- Home Testing / Collection
- E-pharmacy / 3rd party delivery
- Online stores

Source: Frost & Sullivan Analysis

Future Alternate Care Locations

Technology & data driven paradigm shift for future care delivery innovation

Patient Centric, Digitally Enabled Care



Key change drivers:

- Use of biometrics for current functions e.g. door access
- Entry of health providers into connected car value chain e.g. Apple, Google
- Concept of vehicle as a 'problem solver'(safety, ergonomics)
- Continued rise of delivery at the point of the consumer e.g. tv media, finance, retail

Theme	Detail	Implication
Instant Healthcare	Depending on location, wait times to a see a clinician can range from days to weeks, or even months. Through virtualization, the majority of routine care can happen within seconds or minutes.	Use of time spent in vehicles
Error Free Healthcare	Errors resulting from to misdiagnosis of issue, procedural errors, and errors in medication administration are all easily avoidable with IT and sensor based tools to provide guidance and support.	Autonomous – real time prognostics
Continuous Healthcare	As opposed to discrete interactions, the provision of healthcare is moving to a model where information is being transmitted and shared in real time between individuals and caregivers.	Car as a device
Cost Effective Healthcare	The most innovative companies in healthcare are improving quality of treatment while simultaneously collapsing extraneous tasks and costs tied to legacy processes.	Lower barriers to entry

Focus Points - Agenda

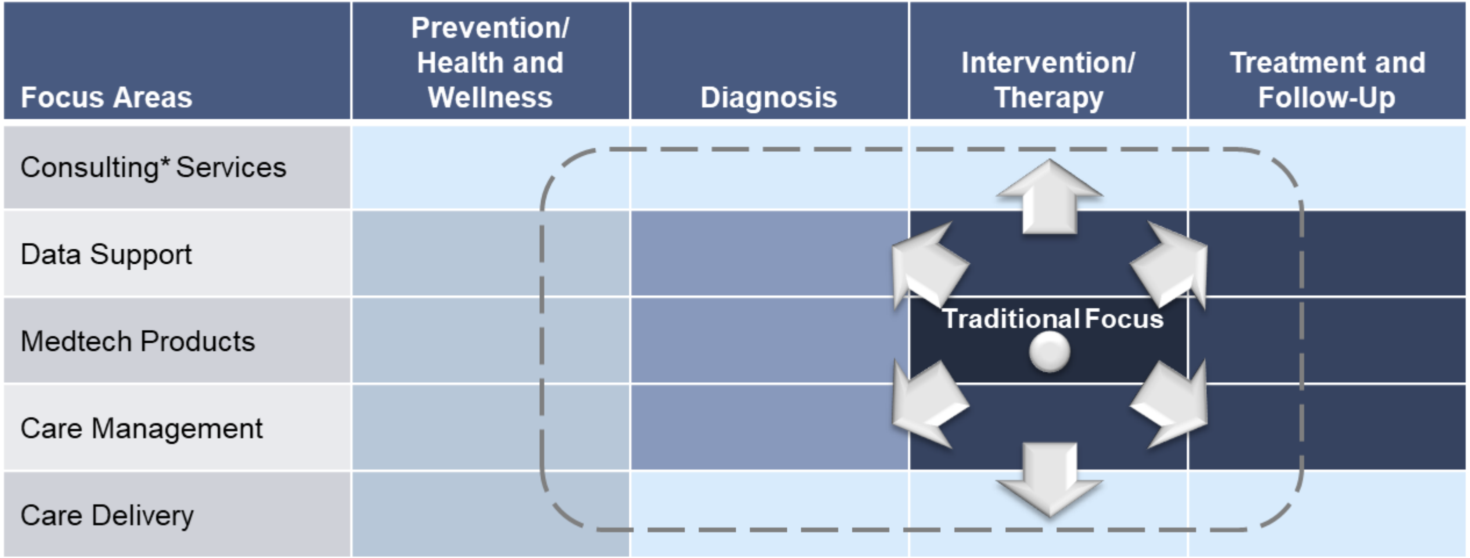
1. Healthcare Industry Global Crisis –
   Call for Care Delivery Transformation

2. Decentralization of Care Delivery Models –
   Future Alternate Care Locations

3. **Opportunities for New Technologies and Service Bundles**

4. Key Takeaways

Shifting Role of Stakeholders



Low | 1 | 2 | 3 | 4 | 5 | High

*Current focus is on hospital workflow efficiencies, and not on patient care continuum
Source: Medtronic (World Health Organization Conference Proceedings); Frost & Sullivan

Key Areas of Healthcare Innovation Driving Market Opportunities for New Technology and Service Bundles

Changing Healthcare Ecosystem Gives Rise to New Care Paradigms

Accountable and Value-based Care

- **Trends**
  - Care coordination for better cost and outcomes
  - Provider consolidation
  - Increasing consumer transparency, choice
- **Resulting Need**
  - Data sharing
  - Risk stratification and care delivery
  - Viable risk sharing and payment

Digitalization of Healthcare

- **Trends**
  - Virtual visits
  - Telemedicine. including rural care specialty consult
  - Mobile platform utilization
- **Resulting Need**
  - Service delivery platforms
  - Integration with mobile platforms and devices
  - Meaningful info to right people (diagnosis, treatment, outcomes)

Smart and Intelligent Devices and Apps

- **Trends**
  - Care closer to home
  - Services anywhere/time
  - Information technology and artificial intelligence for risk mitigation
- **Resulting Need**
  - Technology for portable devices, RPM, mHealth
  - Diagnostics, point-of-care instruments for routine and unique conditions
  - High-cost resource optimization models

Personalized Medicine And Prevention

- **Trends**
  - Innovations in lowering cost
  - Focus on chronic/specialty care (high cost)
  - Focus on prevention
- **Resulting Need**
  - Targeted treatments with lower cost and improved outcomes
  - Early detection and prevention

Opportunities for New Technology and Service Bundles

Smart Health and Wellness Framework

Smart Home Healthcare Market: Essential Healthcare Components, Global, 2019

Devices & Sensors

- Vitals, sleep & activity tracking devices
- Occupancy/location sensors
- Motion sensors
- Medication adherence devices
- Virtual voice assistants
- Virtual/augmented reality devices
- Robots
- Smart displays and screens
- Point-of-care diagnostic devices

Software & Digital Tools

- Smartphone apps
- Cloud
- Data analytics
- Artificial Intelligence
- Cybersecurity
- Patient portals

Stakeholders

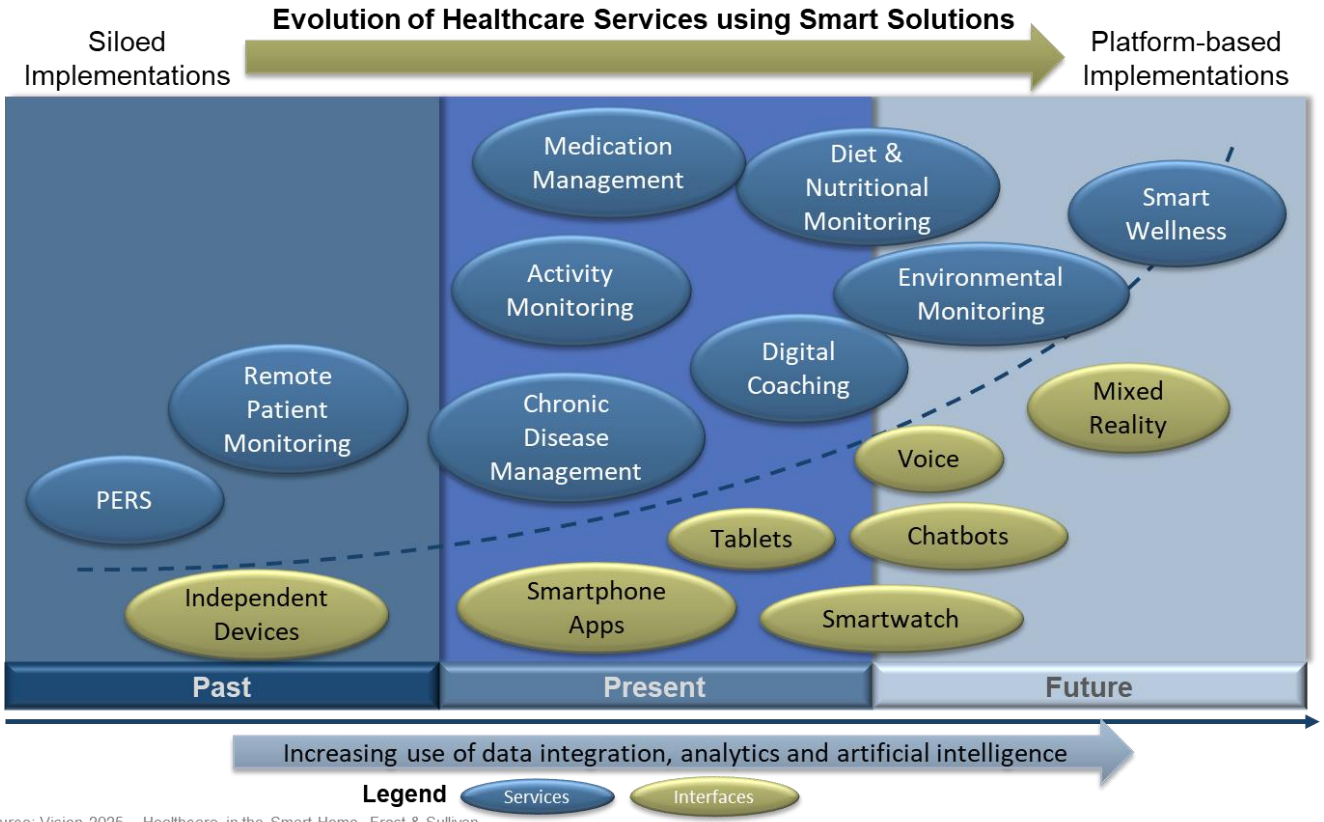
- Health insurance companies
- Health systems and providers
- Digital health companies
- Medical device OEMs
- Pharmaceutical companies
- Pharmacies
- Network service providers
- Communication service providers

Services

- Telehealth & mHealth
- Virtual care
- Physical and mental health monitoring
- Care coordination and management
- Health education
- Health engagement

Source: Frost & Sullivan

Evolution of Healthcare Services using Smart Solutions



Source: Vision 2025 – Healthcare in the Smart Home, Frost & Sullivan

The Opportunities will Continue to Attract Digital Health Products and Services

Focus Points - Agenda

1 Healthcare Industry Global Crisis –
Call for Care Delivery Transformation

2 Decentralization of Care Delivery Models –
Future Alternate Care Locations

3 Opportunities for New Technologies and Service Bundles

4 **Key Takeaways**

Strategic Imperatives

Strategic Imperatives

Forge Right Partnerships
With tech giants entering healthcare, the right medtech-tech company partnerships can help build on the best of both worlds, to derive novel insights and opportunities for growth of the industry.

Invest in New Solution Elements
In the transition from device maker to an active participant in patient care, digital health tech becomes the critical tool for medtech companies to provide cost-effective solutions that enable patient-centric care models and platforms that can help engage with patients effectively.

Seize the Opportunity to Innovate
Customers such as hospitals or patients may not truly understand their needs, and a digital transformation solution can actually not just benefit them significantly improving brand loyalty, but it will also serve as a competitive edge – not easily replicable by peers.

Treat Data as an Asset, but as a Part of the Puzzle
Digitization offers a wealth of real-world data that can be leveraged as an asset for multiple use cases. From product development or enhancement to novel approaches for providers to better manage their patients, data is the new healthcare currency. However, it is a part of the puzzle – and other sources are necessary to get a holistic picture of patients' true health and therefore true needs.

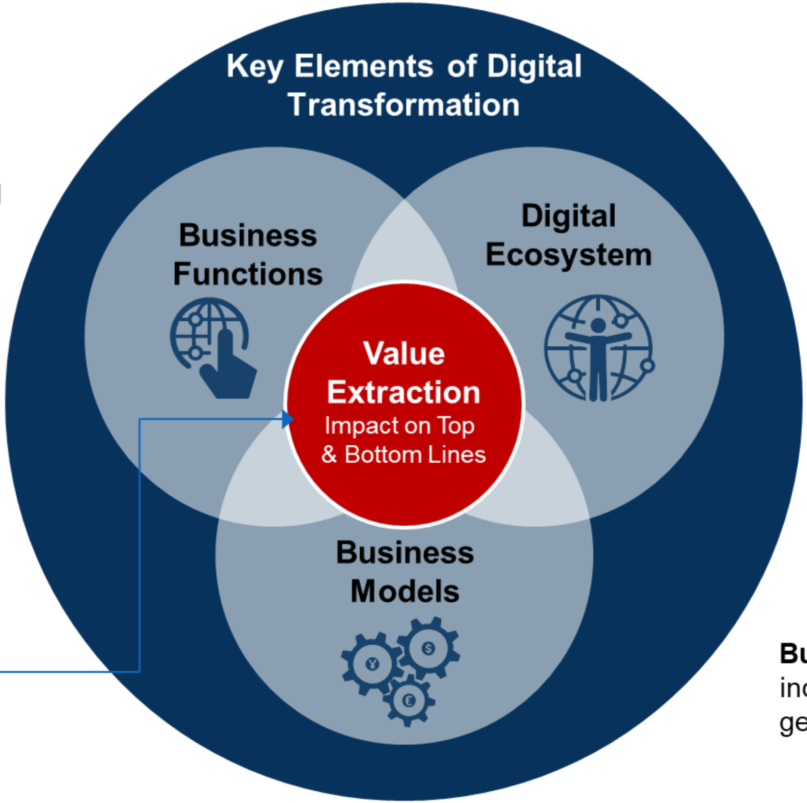
Transform Revenue Models
The medtech industry can transform its revenue models from one-time device sales to a more predictable subscription type revenue streams, also addressing the need to move away from capital, lump-sum costs to smaller ongoing costs for hospitals.

Source: Frost & Sullivan

Healthcare Digital Transformation Framework

Business functions include People, Operations, Product, Information Management, Customer Journey, and Leadership. Digital transformation improves the ability of each function to achieve their key objectives.

The **convergence** of business functions, the digital ecosystem, and new business models creates innovative ways to impact top-line growth and bottom-line efficiency of companies.



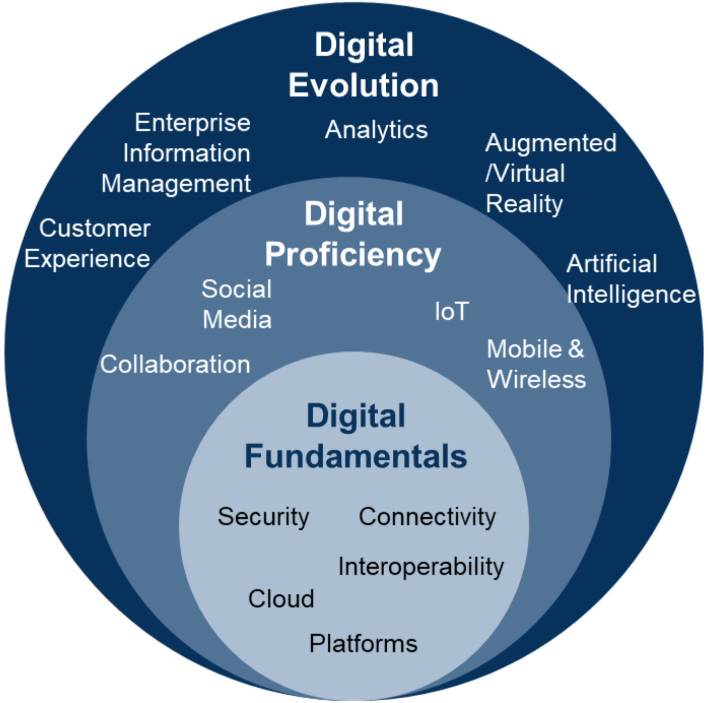
The **digital ecosystem** includes technologies that need to work together seamlessly for digital transformation to be effective. Partnerships are critical for all elements of the ecosystem, and IT must seamlessly work with existing industry technologies.

Business models include new ways to generate revenue.

Source: Frost & Sullivan

Healthcare Digital Transformation Framework – Digital Ecosystem

There are 3 phases of digital transformation: Digital fundamentals, digital proficiency, and digital evolution. Most organizations are likely to have a few investments in each phase, some more entrenched than others.



Connectivity and interoperability are needed far beyond IT solutions – partnerships must be sought throughout the value chain for digital transformation to work effectively.

Source: Frost & Sullivan

Regional Readiness Assessment

Key Takeaway: While the ranking of regions on digital transformation readiness (reflective of efforts) does not surprise in any way, it is noteworthy to state that some innovative developments in Middle East and Africa are transformative in their own right. The second pillar, Connected Devices, leads globally in terms of readiness, followed closely by digitization of care delivery.

Medtech Market: Regional Digital Transformation Readiness Assessment by Pillar, Global, 2018

Relative Among Regions
Low ○ → ● High

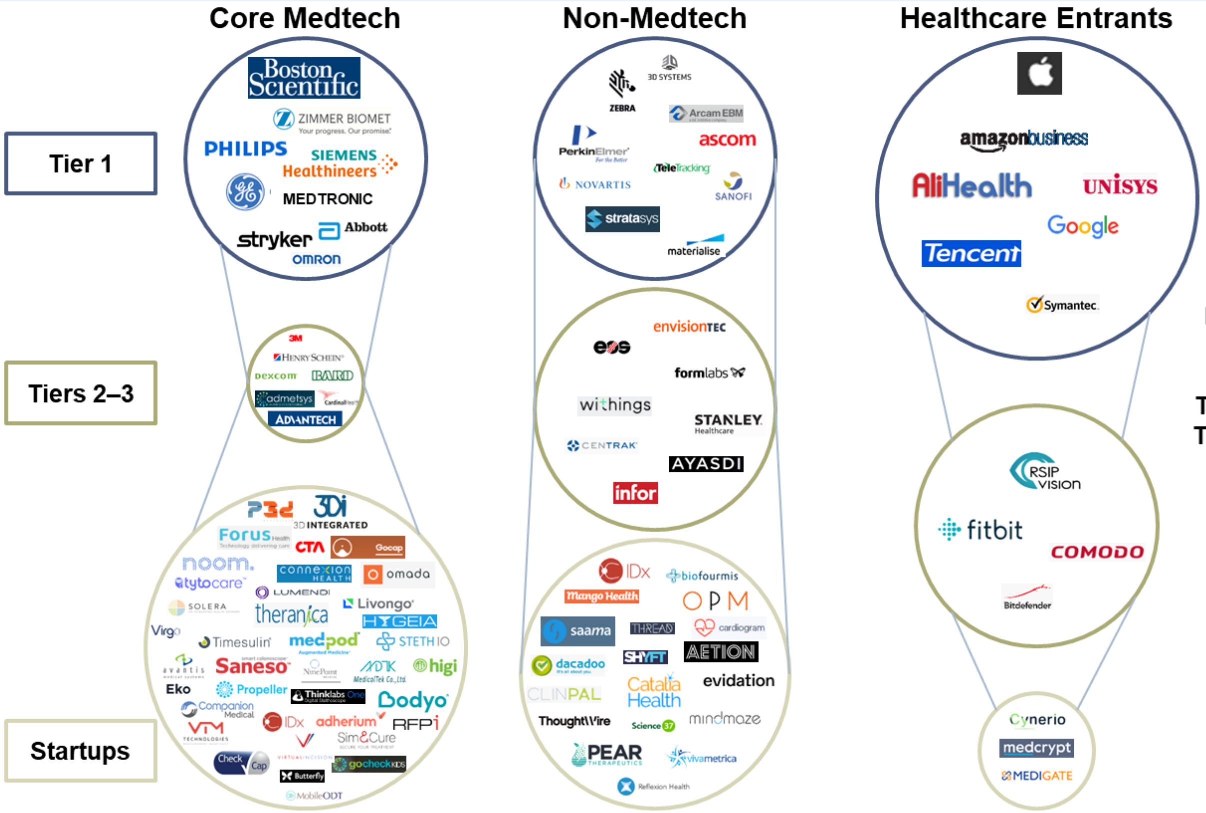
PARAMETER **PILLAR:** 1 – Medtech Internal Operations, 2 – Care Delivery Digitization, 3 – Connected Devices, 4- Connected Patients

*Rank** →		1 North America	2 Europe	3 Asia-Pacific	4 Latin America	5 Middle East and Africa
Technology Sophistication	1	◐	◐	○	○	○
	2	●	●	◐	◐	○
	3	●	●	◐	◐	◐
	4	◐	◐	○	○	○
Regulatory Support	1	NA	NA	NA	NA	NA
	2	●	●	○	○	○
	3	●	●	○	○	○
	4	◐	◐	○	○	◐
Affordability & Willingness to Invest	1	◐	◐	○	○	○
	2	◐	◐	○	○	◐
	3	●	●	○	○	○
	4	◐	◐	○	○	○

*(incorporates size of market)

Source: Frost & Sullivan

Industry Participants



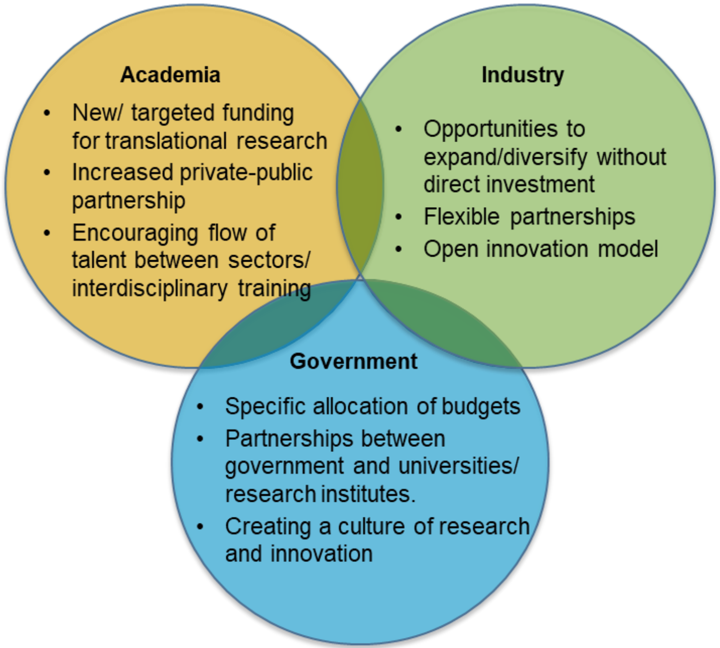
Medtech Market: Industry Efforts for Digital Transformation by Tiers, Global, 2018

Key: Size of the bubbles approximate the number of companies undertaking digital transformation initiatives; but not comparable across the three verticals

Source: Frost & Sullivan

Role of Academic hubs – Clusters / Innovation Centres

Triple Helix Model of Academia-Industry-Government Collaboration



Source: Global Digital Health Outlook, 2018, Frost & Sullivan

- Research and development of digital health devices faces several challenges such as **financial constraints, long lead times** to bring the product to market, and even a **lack of viable business models.**
- This has motivated several stakeholders in the industry to reconsider collaborative approaches to technology innovation.
- Best examples for medical device innovation are seen where collaborators each uses their core competence. For instance, the **clinical community provides end user input and professional opinion, academia powers innovation with its research, and industry participants with their manufacturing prowess.** This is also supported by governments and regional authorities through a favourable business environment and through research support.

Q&A

Contact Details

Siddharth Saha

Vice President, Transformational Health
Frost and Sullivan
+ 44 (0)208 996 8555
ssaha@frost.com
www.frost.com