The Role & Influence of the Academy on the Development & Promotion of Digital Solutions in Medical Organizations

(including interfaces between organizations and between systems)

Dr. Refael Barkan

V.P for Innovation, Entrepreneurship and Internationalization

MDI, 19/03/24

Higher Education in Israel

Since the 1990s, the number of higher education institutions (also known as: academic colleges) and their share in the higher education system in Israel has increased considerably.

10 universities

20 funded institutions

9 non-funded institutions

22 educational institutions

מכון
טכנולוגי חולון
Holon Institute
of Technology

HIT

More than
50 YEARS
of Academic Excellence

Institutions of Applied Sciences (core)

Braude

Kinneret

Tel-Hai

Ruppin

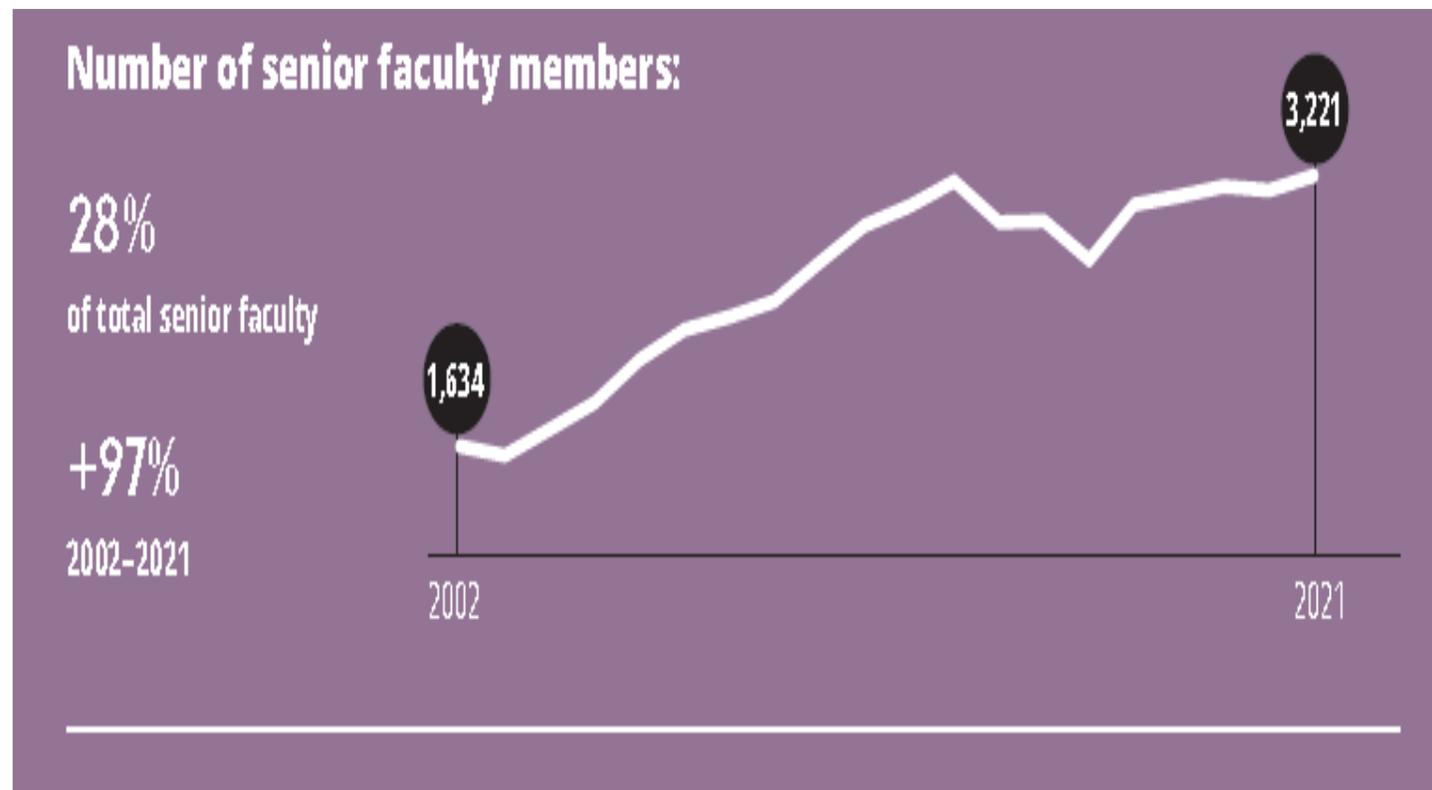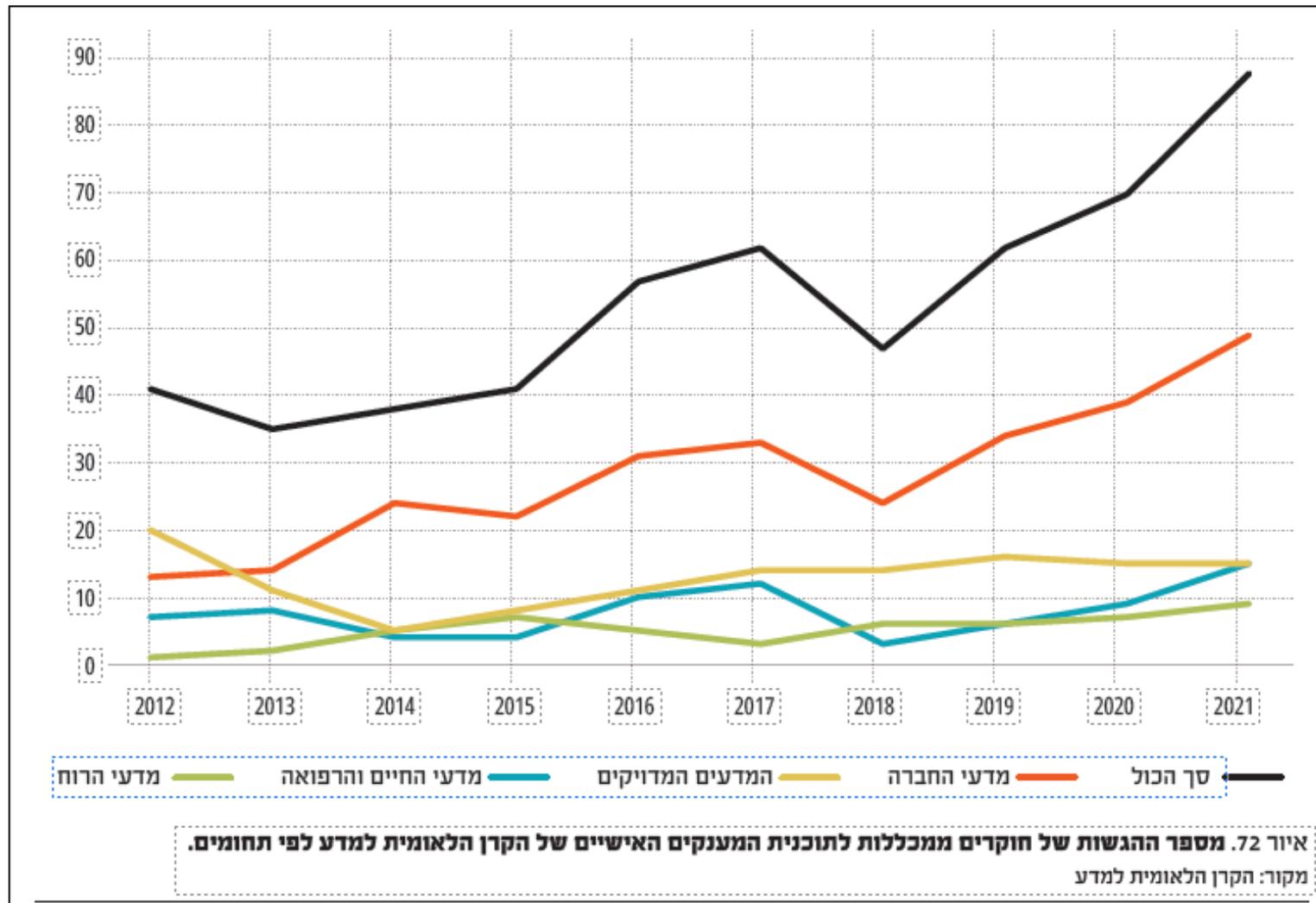HIT

Afeka

Shenkar

Lev

HAC
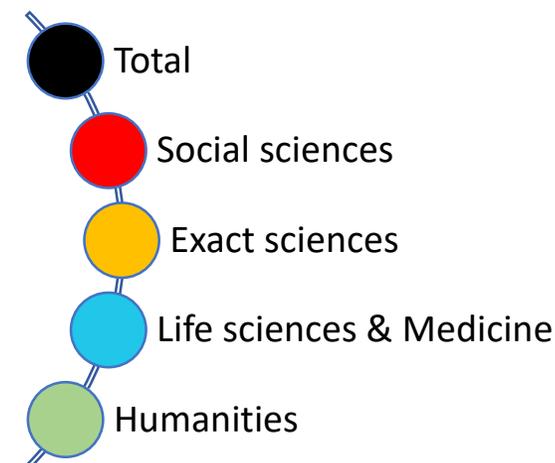
Azrieli

SCE

Research Activities within the Institutions

❖ Over the years, research activity has expanded greatly, especially with regard to applied research.

❖ But they also excel in basic research, and an increasing number of their graduates have been integrated into advanced studies at universities.

Number of senior faculty members:

28%
of total senior faculty

+97%
2002-2021

1,634

3,221

2002

2021

Research Activities within the Institutions

# of ISF submissions for personal grants

- Total
- Social sciences
- Exact sciences
- Life sciences & Medicine
- Humanities

איור 72. מספר ההגשות של חוקרים ממכללות לתוכנית המענקים האישיים של הקרן הלאומית למדע לפי תחומים.

מקור: הקרן הלאומית למדע

HIT

1969

A premiere academic institution of higher education in engineering, science, design and technology was established in Holon.

50 Dunam campus area

Founded in **1969**

8 major academic faculties

20 academic degree programs

Almost **30,000** Alumni

60 Research Centers

Almost **6,000** students

School – **Multi-Disciplinary** Studies

Over **130** International Academic Partners from **35** countries

Unique Instructional Technologies Faculty

Unique Digital Medical Technologies Department

8 Major
Academic Faculties

Sciences

Electrical & Electronics Engineering

Design

Industrial Engineering & Technology Management

Instructional Technologies
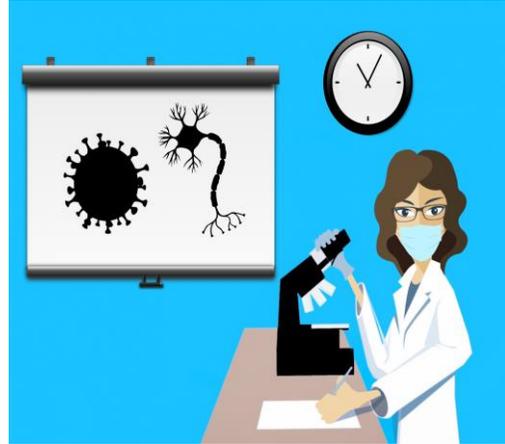
Digital Medical Technologies

Data Science

The School of Multidisciplinary Studies

MedTech at HIT – 3 Verticals

Teaching

R&D

Products

Based on **real life (unmet) needs**

Integrated teams - HIT & healthcare organizations

R&D infrastructure - HIT's research centers & labs

Full cycle: understanding needs, research, development, implementation

Key Clinical Partners

MedTech at HIT – Products Designed for Users:

Healthcare Professionals

Patients (and their close environment)

Healthcare/Welfare Organizations

Collaborative Model of R&D

Addressing healthcare needs

Staff leadership

HEALTHCARE

ACADEMIA

Partnership with clinicians

INDUSTRY

Multidisciplinary

R&D sharing platforms

Advanced infrastructure

Product oriented

Partnership with ecosystem

HIT's Advantages

- ✓ **Multidisciplinary** - HW, SW (AI), Design, Management, Edu-Tech, MedTech

- ✓ **Applied researchers** - with close relation to the industry (including professors)

- ✓ **In response to real-life unmet needs**

- ✓ **Dynamic**

- ✓ **Collaborative**

- ✓ **Agile**

- ✓ **Academic staff engagement and leadership**

Multi Modal Dysphagia Management System
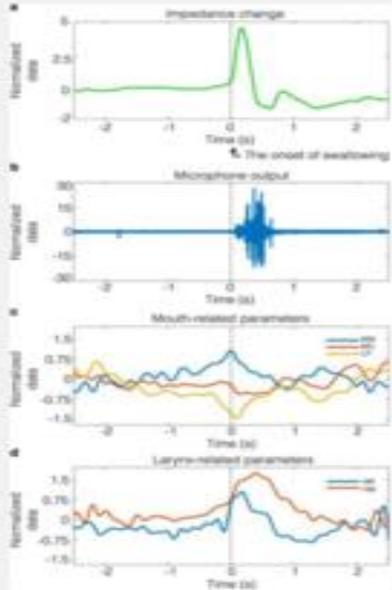
- A reliable end-to-end remote care solution providing objective measures for dysphagia assessment & intervention by clinicians
- Consists of:
  - 24/7 wearable monitoring device
  - training platform with personalized biofeedback for patients

Seamless Remote Tremor Monitoring in Essential Tremor

- Unobtrusive measuring of parameters in real life scenarios/environment

- Collecting data for AI-based treatment adjustment

PROMs++

- Patient Reported Outcome Measures
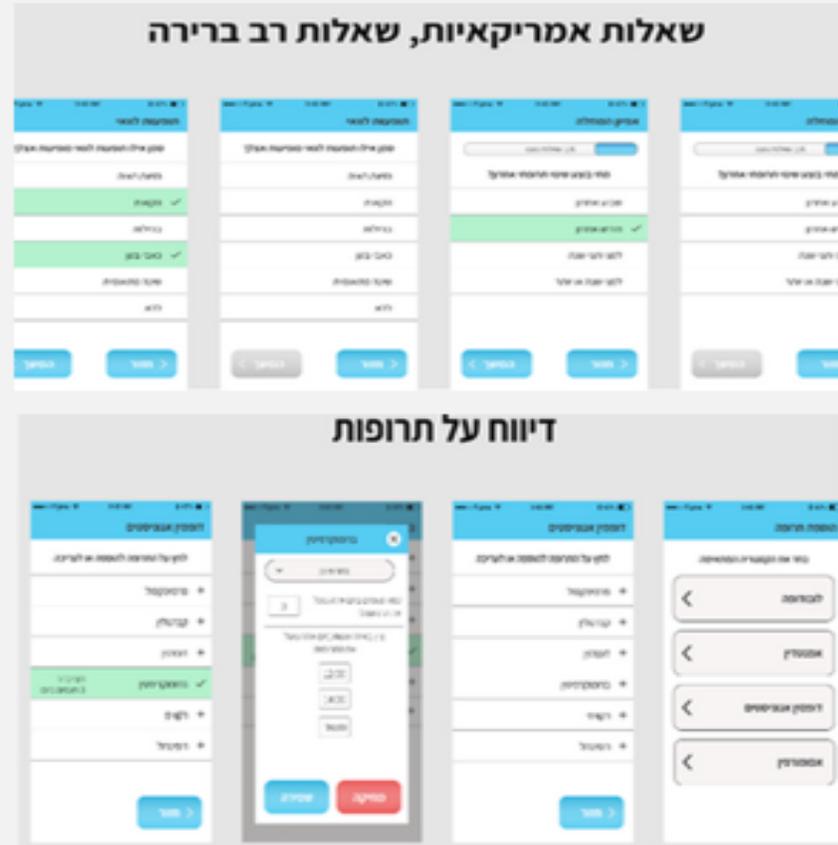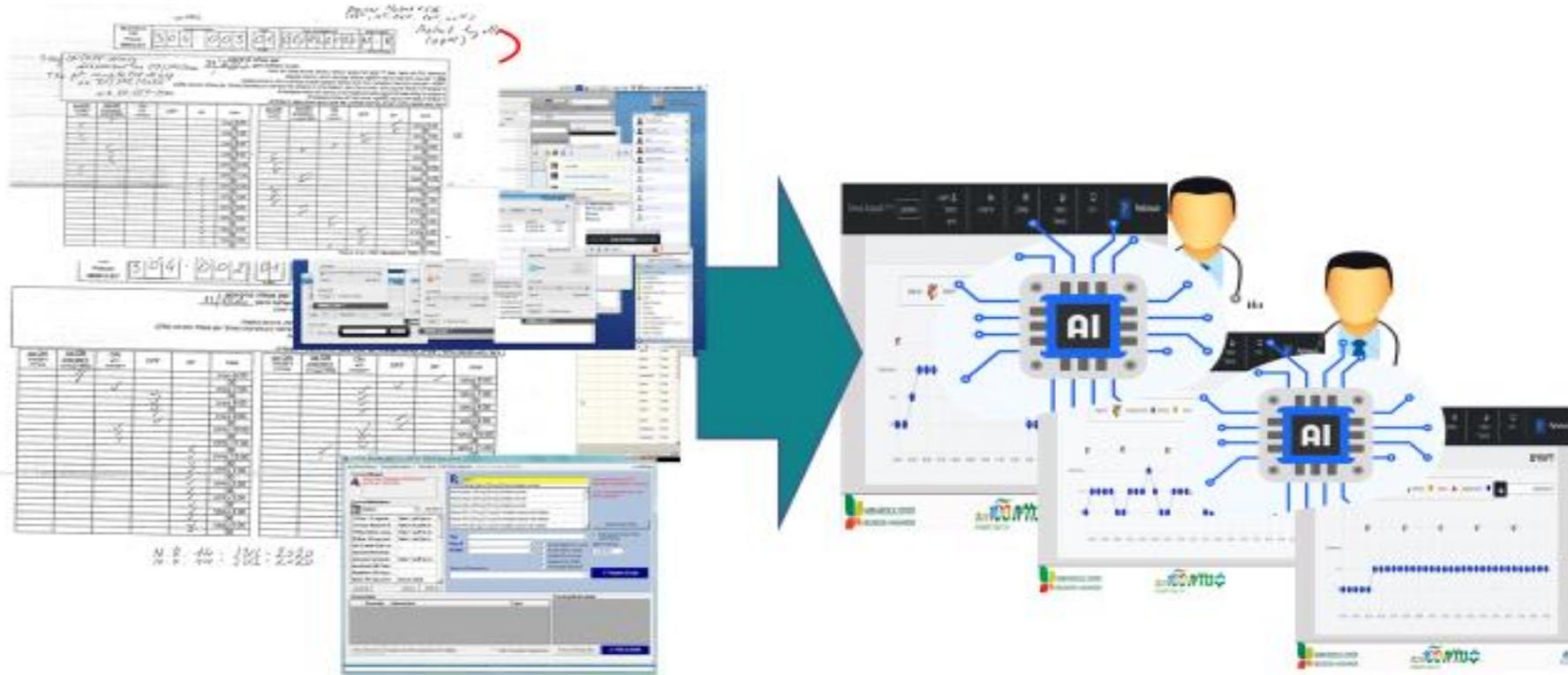- Reporting and follow-up on a regular basis
- Are used for personalized care and patient engagement
- Generic platform
- Can have a real-time module

- "+" for integrating:
  - Sensors
  - AI layer (e.g., treatment adjustment, decision support)

שאלות אמריקאיות, שאלות רב ברירה

דיווח על תרופות

PROMs++ (PROMs, Sensors, AI)

Cognitive Decline - Assessment & Intervention

- Based on the CDT

- Integrates additional evaluations

- Designed for use by the patients at their home (multi-device), as well as in clinical settings

- Preserving patient's EF, through gamification

- AI layer for decision support

MedTech at HIT – Products Designed for Users:

Research Centers & Labs

MADE – Medical & Assistive Technologies

- Multidisciplinary – bio-engineering, bio-convergence, AI, design (industrial, UI/UX)
- Wearables
- Interaction
- Bio-feedback
- Gamification

HEAL – Healthcare Analytics

- AI based prediction models (ML, DL)
- Analysis/Processing of bio-medical signals and images: EEG, EMG, X-ray, US, CT, fMRI etc.
- Personalization (personalized care)
- EMR integration

Living Lab – Homecare Technologies

- 3 pillars: functional, cognitive, mental/behavioral
- Unobtrusive multimodal monitoring
- Whole cycle: early detection/diagnosis, intervention, follow-up
- All players: patient, healthcare professional, family, healthcare organizations

MedTech at HIT – Products Designed for Users:

Research Centers & Labs

MAIA –
Medical AI-based Applications

- Client & Server
- Generic
- Decision Support
- Integrating data from Sensors & IoMT

MXR –
Medical Extended Reality

- Education & Training of Healthcare Professionals
- Clinical Assessment Tools
- Clinical Intervention Tools

Robotics

Thank you!

Dr. Refael Barkan: refaelb@hit.ac.il