SDA Bocconi
SCHOOL OF MANAGEMENT

KNOWLEDGE PLATFORMS
AND RESEARCH LABS

RESEARCH REPORT 2023

THE FUTURE MUST ALWAYS BE IMAGINED AND SOUGHT

The research activity and its continuous dissemination are the destiny and duty of a School of Management. It may seem like a strong statement but this phrase expresses in the most appropriate way the sense of the challenges and times we are experiencing and that allows us to guide to the future with the strength and passion that distinguishes SDA Bocconi.

Higher-education, applied research and the growth of people are closely linked and forward-looking. There is no growth in people's lives if the gaze is not turned to the future and when the gaze is no longer able to grasp the future, growth stops, it no longer affects and it no longer has an impact on the surrounding society. Growth is not a solitary act but a path, which becomes more exciting if done with good travel companions. In this sense, growth, training, applied research, relationships and sharing are closely linked. We must therefore have the desire and ambition to talk about the future every day. This is the ambition of every School of Management, this is definitely the hallmark of our School of Management, SDA Bocconi School of Management.

To understand what it means to speak and plan the future every day, we need to reflect on the two simple words - so simple to seem obvious - that are found immediately after SDA Bocconi, that is "School" and "Management".

The concept of "School" is a concept of community and continuous construction. In a world where research, knowledge and education are seen as an act of consumption, which materializes - and is likely to run out - in the very short moment of a download, the concept of "School" is exactly the opposite in that it is not confused with the learning tool - physical or digital, synchronous or asynchronous - but is clearly above the available tools and offers a meditated synthesis, at the service of the community, and built with the support of diverse interlocutors who interact with each other, from faculty, staff, students, alumni, companies and institutions that meet every day on our campus. The quality and intensity of relations become the quality of the School and the energy to continue on its way.

The concept of "Management" is at its root a concept of responsibility. Management means guiding men and women, resources and organizations. It's an act of responsibility by definition. It is devoid of sectorial affiliation, as it crosses institutions and organizations with profoundly different characteristics: from listed companies to private ones, from small to large, from public to non-profit sector. If responsibility is the deepest nature of management, its attitude today must be that of transversality. Knowledge and therefore management can no longer be placed in predefined areas, in vertical silos that define their own rules and aspire to perfection, which becomes self-referentiality and closure. The marketing silos, the finance silos, the technology silos and so on. Vertical perfection becomes complacency and then only leads to dryness and inability to think about the future every day.

The task of a School of Management is to ensure the highest level of vertical understanding, knowing well that "teaching" or "doing" management actually means destroying vertical silos with the force of creativity, with the courage to always get out of your comfort zone, with the will to always advance those vertical knowledge that are then questioned. But it also means identifying and welcoming new vertical silos, new disciplinary areas that were not even imaginable: from artificial intelligence, to cybersecurity, to the space economy and to what is to come, that today we cannot imagine but that we are certain that it will come. SDA Bocconi in management has always seen the transversality that passes from companies, to public administrations and financial intermediaries. This transversality today is leading the SDA to have a broader spectrum ranging from geopolitcs themes to data sciences and AI, because businesses, institutions and financial intermediaries demand this to understand the world and face their challenges.

The knowledge platforms that the School has created go exactly in this direction and are the inexhaustible force that continuously links the drive for innovation, the drive for vertical understanding within the disciplinary field, the push to transversality that is the necessary condition in order to understand the complexity of the scenarios that every business decision-maker must observe. But above all, without research the ability to affect with the activity of higher-education dries up and becomes a ritual. The nature of being a School is to continually strengthen the bridge between the needs of companies and institutions and the ability to always look to the future.

The challenges of the School become the collective challenges, the knowledge that is produced through research is a collective and community act, which then brings initiative, enthusiasm and benefit to individuals but remains a strongly collective act. This is why our School has the task of helping individuals and organizations to think about the future every day. Not to deny the present but to live it more intensely and with greater responsibility. This is the responsibility of the manager and is the hallmark of the leaders, who are formed in our classrooms. It is the perfect link between the School and its community, between the programs that we develop every day with passion and the participants, between the content of our training and the task of the manager. This is why the School does not offer a solution but builds the possible solutions through the extraordinary experience of many colleagues who direct our programs and live every day with those who have or have the ambition to have the responsibility of guiding men and women, resources and organizations.

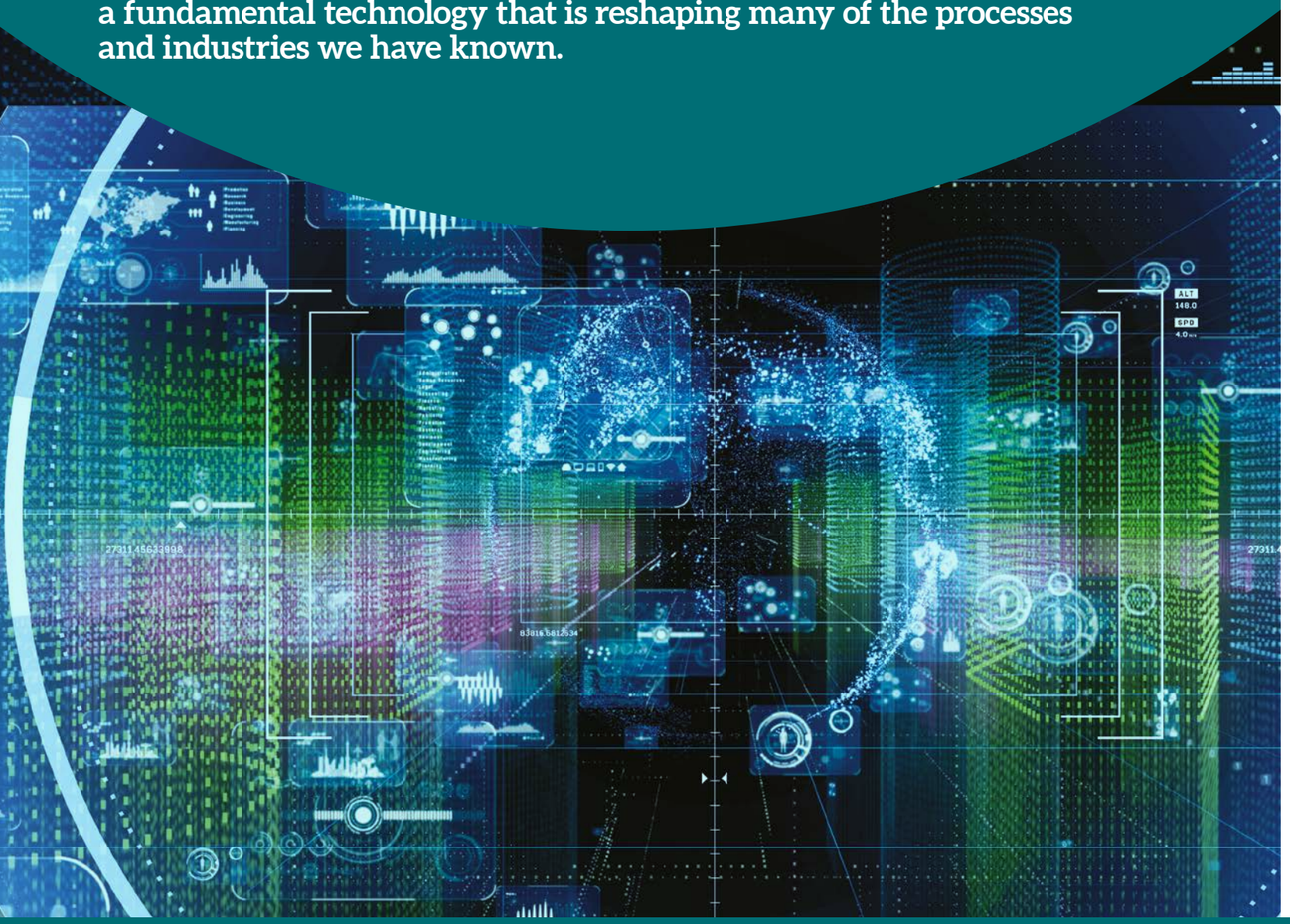
The space to build the future is vast, and the School is always there whenever there is courage and a desire to design innovative solutions. That's where we have to start if we want to give answers to the people and organizations that choose the SDA. History therefore continues and always evolves, with determination and impact.

STEFANO CASELLI
Dean SDA Bocconi School of Management

Milan, 30 October 2023

TECHNOLOGY, INNOVATION AND TRANSITION KNOWLEDGE PLATFORM

Technology has always represented the key driver of change for firms, industries, and society at large. Yet, the pace of change we have been facing in the past few years is unprecedented. The digitization and development of Internet of Things, together with a shift in consumer behavior, have favored the production of a huge amount of data. Data are the oil of AI and machine learning, a fundamental technology that is reshaping many of the processes and industries we have known.



Communication, transportation of people and objects, manufacturing, and commercial activities just to mention a few have experienced a deep transformation caused by the changes in technology and in particular by the potential use of data that technology has unleashed.

The Technology, Innovation and Transition Platform of SDA Bocconi aims to provide a common and open ground to study the changing nature of managerial and operational processes in organizations in the light of the above-mentioned opportunities and challenges. By blending theory and practice, cross-sectional and panel data analysis with interviews and observation in companies and institutions, and by integrating the experiences of organizations operating in different industries, both private and public, this platform aims to provide data-based evidence and actionable insights for companies facing relevant challenges brought by the accelerated path of technological change encompassing a diverse set of processes and decisions within firms.

This platform addresses, among others, topics such as:

- Assessing current technologies and estimating their value potential for processes and activities in organizations;
- Investigating and measuring the impact on performance of the adoption of digital tools in the development of new commercial channels;
- Evaluating the impact of specific technologies on the development of sustainable practices across firm in different contexts;
- Understanding the value and organizational impact of machine learning applications on operational activities;
- Identifying the evolutionary trajectories of specific consume needs, such as mobility, housing, and health to name a few, disrupted by digital technology;
- Understanding the economics of space and other alternative resources in shaping the industries of the future.

In order to tackle these relevant issues with a broad perspective and refined analytical keys, the Innovation and Transition Knowledge Platform adopts an interdisciplinary approach, leveraging on the knowledge of top experts in the field of technology and innovation, the evolution of ecosystems, channel/retail and salesforce to commercialize innovation, as well as procurement. The functional expertise is blended with top level competences applied to the world of space economy, mobility, agribusiness, real estate, and to many other contexts, both private and public, where technology is a major driver of change. Through extended collaborations with partners from public and private institutions, by means of open discussions and workshops, and through projects co-designed by academics and research users, we aim to address pressing issues stemming from real-world problems, as well as to advance the current understanding of a complex and interconnected world, like the one we live in.

Paola Cillo
Scientific Director of the Technology, Innovation and Transition Knowledge Platform, Associate Professor of Management & Technology at Bocconi University, and Director of the Claudio Dematté Research Division for Corporate and Financial Institutions, SDA Bocconi.

LIFT Lab

Business Innovation Driven By Life Sciences & Digital Technologies

The LIFT Lab identifies frontier technologies emerging from life sciences and their convergence with digital technologies and assesses their readiness, transferability and transformational impact on business and society, as well as requirements to success.

1. LIFT Lab mission

The convergence between Digital Technologies and Life Sciences is transforming the traditional idea of business competition, not only in Med-Pharma industry, but also in all other industries (e.g., agriculture, energy, manufacturing). Sectors' boundaries are overlapping or fading away, and a real opportunity of cross-fertilization between industries and competences has born.

The LIFT Lab identifies frontier technologies emerging from life sciences and their convergence with digital technologies and assesses their readiness, transferability and transformational impact on business and society, as well as requirements to success. The LIFT Lab also collaborates with SDA Bocconi' research centers CERGAS and DEVO Lab to advance knowledge in the domains of digital health, digital evolution based on life sciences.

The LIFT Lab provides economic and managerial assessments useful for the adoption and diffusion process of new technological applications, for instance, artificial intelligence applications in health and healthcare (e.g., drug discovery and development), mobile health, digital therapeutics, digital twins applications in healthcare, DNA storage and other digital applications based on or derived/inspired by life sciences. Hereby, the LIFT Lab merges its ideas, insights and research outputs thanks to the contributions of a broad and multidisciplinary community of professionals and researchers.

The goals of the LIFT Lab are:

- to bring together diversified perspectives, experiences and backgrounds to consistently assess the transformational impact of life science technologies on business models and the value generation they can enable;
- to evaluate the readiness of emerging life science technologies, in order to highlight barriers and complementarities for their adoption and diffusion;
- to facilitate the creation of cultural elements for a wider, faster and more informed adoption and diffusion of innovation driven by life science technologies and their convergence with digital technologies;
- to identify the conditions under which life science technologies could become widely used;
- to drive potential transferability of life science technologies across applications.

1.1
LIFT Lab in numbers

The LIFT Lab was founded in **2021** by **6** founding members. Since then, the LIFT Lab is increasing its number of members and expanding the team to generate high-quality research results. The LIFT Lab organizes **5** Think Tank meetings, **2** Fireside meetings and **1** LIFT Lab Annual Event each year.

2. Membership model

The LIFT Lab delivers to its members on a yearly basis:

- LIFT Lab Radar, detailed research reports and LIFT Lab Radar Tool
- In-depth yearly research
- Seats in LIFT meetings and LIFT Annual Events for members and their guests.

Detailed benefits for the LIFT Lab members are presented in the table below:

Category	Benefits	Description
LIFT Lab Research	**Research Reports and Materials**	The LIFT Lab provides full access to final research reports and the materials used during the research process (e.g., articles, case studies, reports). These materials are available through a private platform, which is accessible with LIFT Lab membership.
	LIFT Yearly Research Topic	The LIFT Yearly Research Topic is selected based on Members' votes. The research outputs are published in academic journals.
	LIFT Lab Radar Tool	The LIFT Lab provides an online interactive assessment tool based on the LIFT Radar methodology. Through the online LIFT Radar, every Member can customize its own radar based on interests and company-specific factors.
Meetings and Events	**LIFT Lab Annual Event**	LIFT Lab offers 15 seats to its members where they can invite external guests (e.g., their board members, executives, clients or partners)
	LIFT Fireside Meetings and LIFT Lab Talks	LIFT Lab gives access to LIFT Fireside Meetings and LIFT Lab Talks to only its member companies
Custom Services	**Custom Research Projects**	Members can submit specific research topics they are eager to explore, either focused on a specific technology/application or with a broader cross-technology perspective, and fund a dedicated research stream, additional to the continuous research activities of LIFT Lab. A preliminary list of custom services includes: • Initiatives (vertical researches on specific topics) • Case Studies • Decision frameworks • Economic impact analysis • Case based validated research • Design of converged value propositions

3. LIFT Lab activities

The LIFT Lab acts as a Think Tank to steer the different streams of activities and generate research proposals.

3.1 LIFT Lab Research

- **LIFT Lab Radar:** LIFT Lab Radar helps executive boards to assess the short- and medium-term impact of key life sciences technologies on their industry and enterprise (details are provided in section 4.1).
- **Yearly Research:** In-depth research initiative selected within a research catalogue comprising the most impactful tech trends (details are provided in section 4.2).
- **Sponsored Research:** Vertical drill-down researches on specific technologies or cross-domain initiatives funded by one or a set of committed Members.

3.2 LIFT Lab Meetings

- **LIFT Lab Fireside Meetings:** Opportunity-based presentations and discussions proposed by Founding Members within the LIFT Lab network.

The five Fireside Meetings organized from 2021 to July 2023 are presented below:

- **LIFT Fireside Meeting 2021-1:** A talk with Alberto Salleo, Professor of Materials Science and Engineering, Stanford University
- **LIFT Fireside Meeting 2021-2:** Plan vs Reality: Crisis Management in the Life Science, a talk with Susan Silbermann, Director, Board of Directors, HilleVax

- **LIFT Fireside Meeting 2022-1:** Hot Topics and Challenges on the Regulatory and Legal Aspects of Mobile Health, a talk with Vincenzo Salvatore, Focus Team Leader Healthcare and Life sciences, Bonelli Erede
- **LIFT Fireside Meeting 2022-2:** From materials science to virology, a talk with Francesco Stellacci, Full Professor at the Institute of Materials, EPFL
- **LIFT Fireside Meeting 2023-1:** Innovation in life sciences: where Silicon Valley is investing, LIFT Lab Fireside Chat with Liliana Nordbakk, the Chair of Band of Angel's Life Science and MedTech Investment Group

3.3
LIFT Lab Annual Events

Every year, the LIFT Lab organizes an exclusive event to share the achievements and research evidences of the past year and to promote knowledge sharing between its members. The event is by invitation only with exclusive access to the LIFT Lab Founding Members and their limited invitees.

The first edition of LIFT Lab Annual Events was held in November 2021 with the following theme and speakers.

Fake It Until You Make It: Is This Working To Foster Innovation In Life Sciences? (2021)

- **Lesson Learned from Theranos Case Study:** Mario Plebani, Director of Laboratory Medicine Department, University of Padova
- **The Investor Perspective:** Davide Turco, Co-founder and Managing Director, Indaco Venture Partners
- **The Corporate Perspective:** Gail Maderis, President and CEO, Antiva Biosciences

The second edition of LIFT Lab Annual Events was held in December 2022 with the following theme and speakers.

The next dimension of therapies: are we ready for digital therapeutics?

- **Saluti Istituzionali:** Stefano Caselli, Dean SDA Bocconi and Franco Lucente, Componente III Commissione Sanità Regione Lombardia
- **Introduzione di Scenario:** Carlo Tomassini, Direzione Scientific di Motore Sanità
- **La Sanità Digitale come Collante delle Missioni del PNRR:** Francesco Gabbrielli, Direttore Centro Nazionale per la Telemedicina e le Nuove Tecnologie Assistenziali, Istituto Superiore di Sanità
- **Digital Therapeutics:** A Path Forward: Patrizio Armeni, Associate Professor of Practice, SDA Bocconi CERGAS and Anna Gatti, Associate Professor of Practice SDA Bocconi
- **Tavola Rotonda:** Prospettive ed Applicazioni delle Digital Therapeutics a Livello Nazionale e Regionale Modera: Carlo Tomassini, Direzione Scientific di Motore Sanità

Andrea Belardinelli, Responsabile Settore Sanità Digitale e Innovazione Regione Toscana

Giovanni Delgrossi, Dirigente UO Sistemi Informativi e Sanità Digitale Regione Lombardia

Lorenzo Latella, Segretario Regionale Cittadinanzattiva Campania

Antonio Postiglione, DG Tutela della salute e coordinamento sistema sanitario regionale, Regione Campania

Franco Ripa, Dirigente Responsabile Programmazione Sanitaria e Socio-sanitaria. Vicario Direzione Sanità e Welfare Regione Piemonte

Eugenio Santoro, Responsabile del laboratorio di informatica medica, Dipartimento di Salute Pubblica, Istituto di ricerche farmacologiche Mario Negri "IRCCS"

4. Research report, papers, business cases

4.1.
LIFT Lab Radar

The LIFT Lab Radar is a tool to evaluate the impact, ecosystem and dynamics of applications on the convergence between life sciences and digital technologies for mid- to large-size enterprises and is aimed at supporting top executives in the company's decision-making processes.

LIFT Lab Radar is the final output of a 3-phase methodological process, structured to ensure:

- Full awareness of the state of the art of technology trends for the national economic context.
- Updated view of emerging technologies across all industries.
- Clear taxonomy of the technological landscape.
- Objective and scientific approach to application assessment.

In 2021, the LIFT Lab leveraged a partnership with the MIT Design Lab to scout emerging technological solutions in the field of life sciences and bring a frontier perspective to its research. The MIT Report on recent technological advancements is a key component of the LIFT Radar process to identify new focus areas.

Starting from 2022, LIFT Radar releases occur every two years. In the first year, the research team utilizes the LIFT Radar methodology to identify emerging applications from scouting efforts and places them on the LIFT Radar based on the assessment variables. In the second year, instead of introducing a new radar, the research team conducts a comprehensive analysis of all the applications identified in the previous year. This in-depth analysis includes investment analysis, examination of policy and regulations, and expert interviews.

4.2. Annual Research Projects

LIFT Yearly Research is an in-depth research initiative selected within a research catalogue comprising the most impactful trends emerging from life sciences and their convergence with digital technologies. The LIFT Lab together with its members create research proposals each year. Based on the members' votes, yearly research topic is selected, and the research is developed and presented. Each year, the research team aims to publish academic papers based on this research.

In 2021, LIFT Yearly Research topic was:

Digital Twins in Healthcare: Is It the Beginning of a New Era of Evidence-Based Medicine? A Critical Review

Digital Twins (DTs) are used in many different industries (e.g., manufacturing, construction, automotive, and aerospace), and there is an initial trend of applications in healthcare, mainly focusing on precision medicine. If their potential is fully unfolded, DTs will facilitate the as-yet unrealized potential of connected care and alter the way lifestyle, health, wellness, and chronic disease will be managed in the future. To date, however, due to technical, regulatory and ethical roadblocks, there is no consensus on to what extent DTs in healthcare can introduce revolutionary applications in the next decade.

In this research, we present the current applications of DTs covering multiple areas of healthcare (precision medicine, clinical trials design and hospital operations) to identify the opportunities and the barriers that foster or hinder their larger and faster diffusion. Finally, we discuss the current findings, opportunities and barriers, and provide recommendations aiming to facilitate the continuous development of DTs application in healthcare.

Our research paper was published in the peer-reviewed Journal of Personalized Medicine. This paper received high interest from academy world, international consortiums and working groups.

Link to the paper: https://www.mdpi.com/2075-4426/12/8/1255

Our book chapter titled "Digital Twins for Health: opportunities, barriers and a path forward" will be published in the second half of 2023 in "Digital Twin Technology - Fundamentals and Applications" book by IntechOpen.

In 2022, LIFT Yearly Research topic was:

Digital Therapeutics: Will It Change the Future of Medication Treatments?

The Digital Therapeutics Alliance (DTA) formally defines Tx as "evidence-based, clinically evaluated software to treat, manage, and prevent a broad spectrum of diseases and disorders". These therapies can be delivered through a variety of technologies, including smartphones, tablets, computers, virtual reality headsets and videogame platforms powered by software algorithms. In order to be classified as Tx, regulatory bodies have to review and approve both clinical evidence and evidence from real-world outcomes to ensure efficacy and adherence to standards of safety and risk.

In this research, we present an overview of the value of DTx products for patients and clinicians, the maturity of DTx applications enabled by digital technologies, and the challenges that developers and regulators face during the go-to-market process. Specifically, we aimed to address the following points: (1) Why are DTx new, and what value DTx hold for the healthcare industry in the future? (2) What are the technologies involved in DTx interventions? (3) What are the challenges faced by manufacturers, healthcare providers (HCPs), patients and regulators? (4) How ready is the current regulatory landscape in different countries to allow DTx's diffusion? (5) How do investment trends in the domain of DTx vary depending on the therapeutic field, the year and different regions or countries?

The paper produced will be published in the second half of 2023.

4.3 SDA Bocconi Research Division Research Grant Proposal Application

In 2023, the LIFT Lab and CERGAS together received a "SDA Bocconi Research Division Research Grant" with the project titled "Advancing the landscape of digital therapeutics: market, regulation, access and value." The project starts in September 2023 and continue for 2 years. Researchers from LIFT Lab and CERGAS will work on this project with the scientific supervision of Patrizio Armeni and Oriana Ciani. The project advisors are Rosanna Tarricone (Associate Dean for GHNP), Anna Gatti (Director, LIFT Lab) and Severino Meregalli (LIFT Lab).

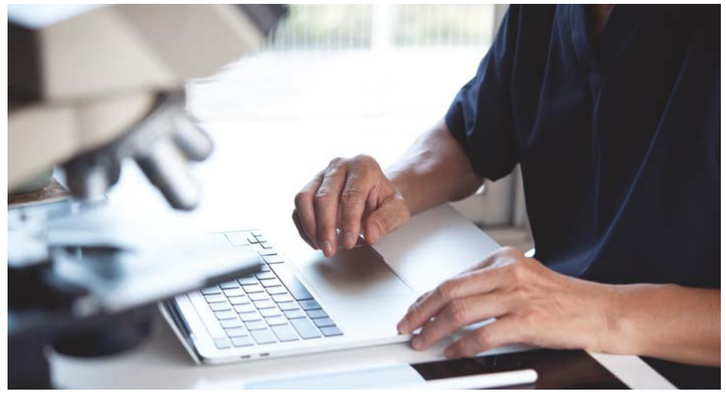
The project's objectives are:

1. unpacking the complex ontological identity of DTx,
2. examining financial investment dynamics in the sector over the last five years,
3. identifying current regulatory and reimbursement challenges,
4. discussing access disparities and inequalities, and
5. assessing the relevance of select DTx in relation to the most urgent unmet needs in their targeted disease areas.

The project aims to provide an in-depth exploration of the DTx landscape, enlightening stakeholders (firms, public institutions, healthcare providers, etc.) and contributing to academic discourse.

Università Bocconi
CERGAS
Centre for Research on Health and Social Care Management

SDA Bocconi
SCHOOL OF MANAGEMENT
LIFT LAB
LIFE SCIENCES & BIOTECH



4.4 LIFT Lab European Call Applications

In 2022, the LIFT Lab started the process to participate European projects and calls on the convergence between life sciences and digital technologies. The applications and participations aimed at growing the LIFT Lab network, expanding the research fields and generating high-quality research outputs.

LIFT Lab together with its partners applied for the following European Call in February 2022:

- **Topic ID:** HORIZON-HLTH-2022-STAYHLTH-01-04-two-stage
- **Call name:** Trustworthy artificial intelligence (AI) tools to predict the risk of chronic non-communicable diseases and/or their progression
- **Type of project:** Research and Innovation Action (RIA)
- **Title of the Proposal:** Artificial INTelligence in Pancreatic Cancer (AINT-PC)

This project, unfortunately, was not selected. The LIFT Lab team continues to explore potential calls and collaborations in the European research field.

Cutting edge scientific partners.