

INTEGRATED REPORT 2023

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TABLE OF CONTENT

Letter to Stakeholders	4
Methodology note	6
01 WHO WE ARE	16
1.1 Mission, vision and values	18
1.2 Research Centres and Scientific Facilities	22
1.3 Key Information	34
1.4 Governance and organisation	38
02 OUR APPROACH TO VALUE CREATION	50
2.1 Stakeholder engagement and materiality matrix	52
2.2 Value creation model	71
2.2.1 Financial capital	74
2.2.2 Human capital	88
2.2.3 Infrastructural capital	110
2.2.4 Relational capital	118
2.2.5 Intellectual capital	126
2.3 Strategy	152
2.3.1 Innovation and quality of research in the areas of genomics, neurogenomics, computational biology, structural biology, health data science	156
2.3.2 Development and provision of infrastructure and innovative research tools	162
2.3.3 Talent attraction and training, and research output sharing	164
2.3.4 Scientific reputation and dissemination	168
2.3.5 Innovation through research (technology transfer)	172
2.3.6 Environmental, social and economic sustainability	176
2.3.7 Partnerships, networking and stakeholder engagement	178
2.3.8 Effectiveness and efficiency of operational processes	180
2.4 Responsible and sustainable approach	188
2.4.1 Development of scientific research programmes of excellence	189
2.4.2 Development of partnerships and collaborations with universities and research institutes on scientific research projects	192
2.4.3 Support for work-life balance and parenthood	193
2.4.4 Education and training programmes developed for scientists, including by promoting initiatives for the exchange of scientific knowledge, researcher mobility and the organisation of scientific events	194

2.4.5 Effective waste management	195
2.4.6 Activities and programmes for the development of the 'centre for innovation and technology transfer'	203
2.4.7 Development and sharing of sustainable and innovative buildings and infrastructures (national facilities)	204
2.4.8 Development of job opportunities for researchers and administrative staff	206
2.4.9 Achievement of gender balance in senior, leadership and decision-making positions	208
2.4.10 Responsible supply chain management	211
2.4.11 Sustainable consumption management and development of energy efficiency programmes	213

03 OUR EXPECTATIONS FOR THE FUTURE 218

3.1 Risks and opportunities	220
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04 PERFORMANCE REVIEW 228

4.1 Key performance indicators	230
4.2 GRI Tables	238
GRI Content Index	256

05 FINANCIAL STATEMENTS 268

Management report	271
Balance sheet and income statement	286
Cash flow statement	292
Explanatory Notes	300
Part A - introduction	300
Part B - information on balance sheet assets	308
Part C - information on the income statement	329
Part D - other information	336
Independent Auditors' Report on the Integrated Report	344



Letter to Stakeholders

Dear Stakeholders,

2023 was the year of transition from the start-up to the scale-up phase of the Human Technopole Foundation.

The start-up phase, related to the first four years of our institute's life (2019-2022), was crucial in building the first laboratories and introducing the scientific and administrative skills to run our activities, thus laying the foundation for scientific excellence in the life science research field. With the scale-up phase, an even more complex and fascinating path now begins: the evolution of the Foundation and its opening to the scientific and industrial world so as to become a hub where open innovation for life sciences is nurtured and spread.

In order to achieve this important mission, the Foundation's bodies have been working hard in a dedicated and continuous manner in their respective roles laid down in the Articles of Association.

In particular, during 2023, the Supervisory Board finalised the appointment of its new Director and laid the foundations for the construction of the strategic plan, as well as exercising the necessary evaluation and control activities of the institute with the help of the Scientific Committee and other bodies. The Management Committee ensured that scientific and management activities were carried out with the usual improvement objectives that corporate best practices require to be applied to everyday work. Particularly noteworthy in the year in question were the scientific achievements of our scientists and our numerous collaborations that led to further important funding and international awards, as described in the appropriate section of this document.

Both bodies paid special attention to the finalisation of the Agreement with the supervising Ministries for the launch of the National Facilities project. In fact, after a complex consultation phase, the Implemen-

tation Plan for the National Facilities - namely the scientific and technical infrastructure that will allow researchers from the national scientific community to carry out their research projects at Human Technopole, exploiting its cutting-edge technological power and human capital - was approved. The Independent Permanent Evaluation Commission (CIVP), comprising scientists of international standing and expertise in the technological areas of the National Facilities, was appointed to select research projects. The last four months of 2023 thus gave light to the 2024-2028 Strategic Plan, which was approved by our governance bodies at the end of the calendar year.

The Facilities will represent the quintessence of the open innovation model adopted by Human Technopole, which finds fertile ground in the MIND District of Milan, the scientific and economic ecosystem in which our Foundation's Campus is located. As regards sustainability, Human Technopole is committed to pursuing improvement policies covering both environmental, social and governance impacts.

Our commitments and projects include efficiency actions in the use of energy resources and waste management, the development of the Gender Equality Plan, and corporate welfare and wellbeing policies. In the context of the MIND District, we also helped to launch the 'Sustainability Roundtable' with the aim of consolidating MINDers' commitment to the promotion of ESG values and to propose the District as a reference centre for the community. These actions and the results achieved were made possible by the commitment of our governance bodies, in particular through the steering and monitoring function of the Sustainability Committee established within the Supervisory Board.

As already highlighted in the recent past, the Foundation is particularly sensitive to the relationship

with its stakeholders, also through the progressive improvement of sustainability reporting. In this regard, this 2023 edition of our Integrated Report incorporates some innovative elements. First, a more precise definition of the relationships between ESG risks, strategic objectives and the types of capital used.

The in-depth study of these sequences is crucial to explaining the Foundation's recent history, but above all to understanding the mechanisms for improvement in the near future. In addition, our key performance indicators have been enriched, both with regard to GRI (Global Reporting Initiative) standards and to the more specific and representative ones of our scientific research activities. These indicators help us to systematically check our actual ability to meet ESG standards.

At the same time, we already have our sights set on

new initiatives that will further improve our strategic and operational processes as well as raise the level of engagement with our stakeholders. Indeed, we are aware that our daily commitment is part of a cultural and managerial growth path, which increasingly prioritises the role and contribution of ESG factors in the value creation process and thus in the achievement of long-term objectives. We hope that the document produced, in addition to giving a picture of the state of the art, represents what is summarised in this foreword.

We wish you a pleasant reading.

Prof. Gianmario Verona

President

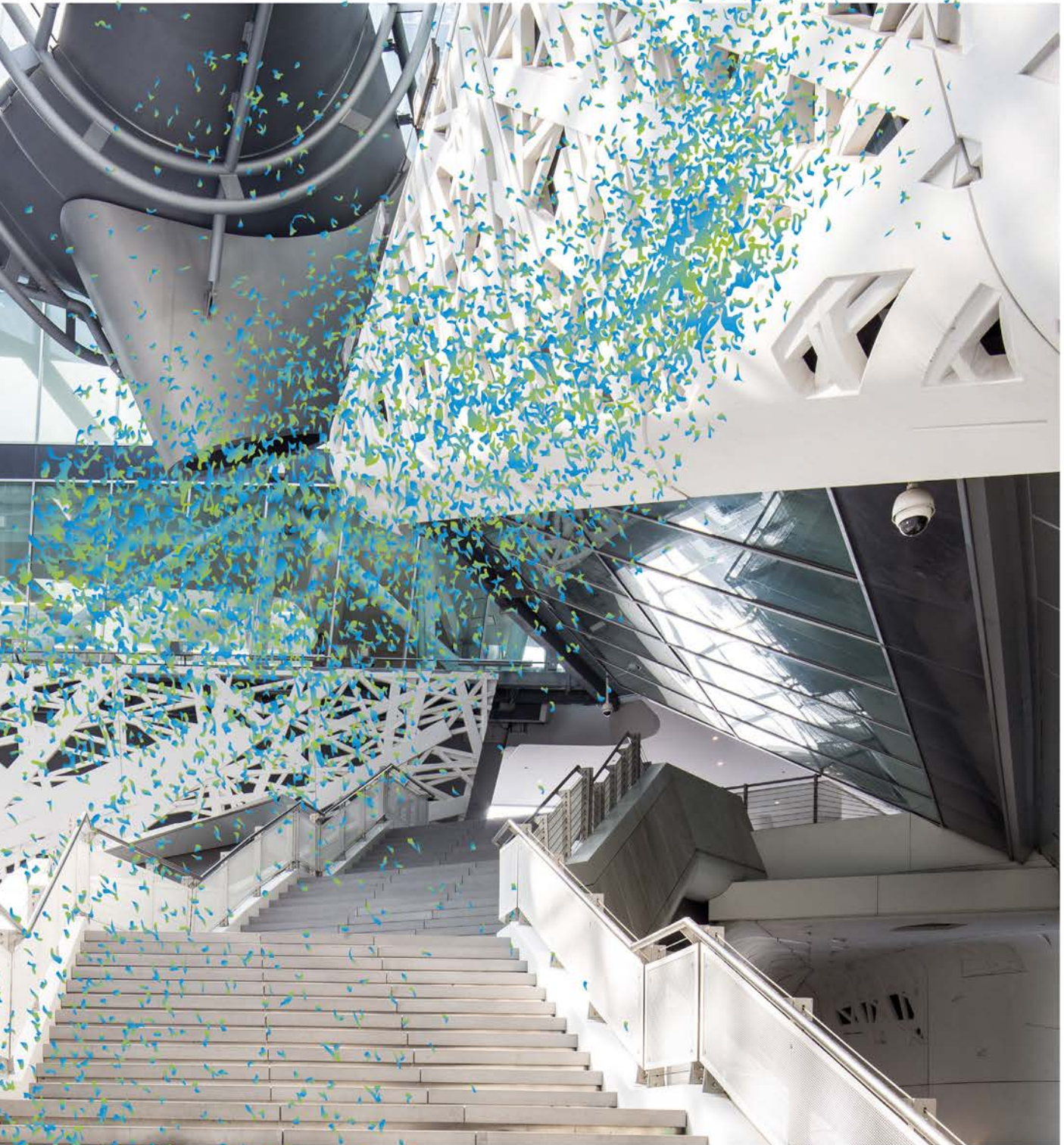
Prof. Marino Zerial

Director





Methodology note



The Integrated Report is the information tool aimed at describing how the Human Technopole Foundation (hereinafter also 'HT') creates short- and long-term sustainable value.

This document is intended to represent, analyse and assess the resources used by HT to achieve its strategic goals. In addition to being the result of an organisational and cultural process aimed at extending traditional financial reporting, the Integrated Report is also a means of facilitating the coordination of internal departments in collecting and organising the information needed for decision-making purposes.

Furthermore, the document clearly explains how economic, social and environmental sustainability is integrated into our decision-making processes, strategy and governance, also by engaging and interacting with our direct and indirect stakeholders.

Lastly, the Integrated Report addresses the need to make the Human Technopole Foundation's responsible and sustainable growth path transparent in terms of organisational behaviour, strategic and operating practices.

The Human Technopole Foundation is publishing its fourth Integrated Report and since 2022, incorporating the indications of the new GRI 3¹, it has begun to define the material topics that, based on the most significant impacts of its activities on the environment, people and the economy, underlie its 8 strategic objectives, a detailed analysis of which is provided in sub-chapter 2.3 'Strategy'.

In December 2023, HT approved a new Strategic Plan for the period 2024-2028, which is discussed in sub-section 2.3 'Strategy'. However, it should be noted that this Integrated Report is linked to the previous Strategic Plan, in force throughout 2023, in

the declination of the strategic objectives, the value creation model and the performance indicators.

Moreover, taking into account the recent approval of the new 2024-2028 Strategic Plan, it was deemed appropriate, with reference to the year 2023 covered by this Integrated Report, to keep unaltered from the previous year both the materiality matrix for strategic objectives and the ESG materiality assessment conducted last year.

It should be noted that with a view to the continuous improvement of the Report, HT carried out a benchmark analysis, selecting a number of competitors from the national and international scientific research sector to analyse the main practices and trends regarding the incorporation of ESG factors into corporate decisions and reporting. This analysis was also aimed at classifying the indicators discussed in the financial statements with reference to both GRI standards and any specific KPIs used by the research institute.

Looking to the future, in 2023 HT also started a development project related to materiality assessment. This is designed to shift from a single impact materiality approach (inside-out perspective) to a double-materiality approach that takes into account the combination of both impact materiality and financial materiality² (outside-in perspective).

¹ Information and guidelines on material topics for the organisation (GRI Sustainability Reporting Standards).

² Specifically, a sustainability matter is material from a financial perspective if it triggers or may trigger significant financial effects on the organisation. In determining financial materiality, the organisation must consider all risks and opportunities that may influence (positively or negatively) its economic-financial performance in the short, medium and long term and thus create or destroy the value generated.



REPORTING GUIDELINES AND PROCESS

The Integrated Report is in accordance with the provisions of the IIRC (International Integrated Reporting Council - **Integrated Reporting**) Framework and with GRI Standards: 'in accordance' option (**GRI - Home** (globalreporting.org)).

As in previous editions of the document, a number of performance indicators not mentioned in GRI Standards have been used for the dual purpose of (i) effectively representing their connection with the eight strategic objectives laid down by the Human Technopole Foundation and (ii) monitoring the extent to which they have been achieved.

Although not amongst the obligations laid down by Legislative Decree 254/2016, HT's Integrated Report pays special attention to the issues and areas covered by the aforementioned decree: such issues are broadly represented in the reporting of accurate information and the numerous projects implemented through specific corporate policies and processes aimed at monitoring non-financial performance and improving the efficiency of operational processes.

HT pays special attention to 'sustainability' issues; in particular, as early as 2022, a committee was established within the Supervisory Board, called the 'Sustainability Committee', whose advisory functions cover ESG issues.

With reference to the 'Sustainability' strategic objective, early in 2022 the Human Technopole Foundation approved the Gender Equality Plan (GEP), i.e. a policy document outlining a series of actions and measures that confirm HT's commitment to gender equality issues. The plan responds to the guidelines of the European Institute for Gender Equality (EIGE) aimed at identifying and implementing innovative strategies to promote cultural change and equal opportunities in universities and research centres. The GEP is implemented by the Gender Equality Team (GET), i.e. a coordination group that monitors and supports the implementation of the measures laid down in the plan.

For a detailed description of the activities carried out by GET, please refer to sub-chapter 2.2.2 'Value Creation Model' in the section '*Human Capital*'.

Special attention is also paid to environmental and social issues through the adoption of regulations aimed at environmental protection, compliance with the principles of legality and transparency, promotion of equality, inclusion and combating any form of discrimination.

In order to produce the Integrated Report, an engagement process was implemented with the active participation of both organisational administrative and research support areas, as well as scientific groups. In particular, the reporting process was ba-

sed on the information systems in place at the Human Technopole Foundation, which were integrated with specific data collection and analysis tools. The data were processed mainly by extraction from management software and careful calculations, and estimates were used for the reporting of specific information received. Research Centre and Facility staff were directly involved with regard to some content of the Integrated Report, such as information on research areas or facilities.

As regards the construction process for the Integrated Report, HT's goal remains to further strengthen and structure the information system by integrating the management systems currently used by the various scientific and administrative departments with an integrated system equipped with business intelligence applications to ensure transparent and fully digitised management of financial, documentary and operating records.

As mentioned earlier, following on from the document structure used in previous years, the Integrated Report is in accordance with the IIRC framework.

Adequate information is given concerning HT's governance structure, strategy, practices and key policies in place along the entire value creation chain, as well as details of stakeholder engagement performed by the Human Technopole Foundation.

The capitals (Financial, Infrastructural, Intellectual, Human and Relational) forming the resources available to HT and used to achieve its strategic objectives are described in detail. In addition, special attention is paid to HT's value creation model by illustrating the main activities carried out and their connection with the above-mentioned strategic objectives.

Furthermore, extensive coverage is given to the links between HT's strategic goals and UN Agenda 2030 sustainable development goals. In particular, with reference to sustainable development goals, in accordance with the new **Standard GRI 3: Material Topics**, HT has launched the process of determining the material topics representing its most significant impacts on the economy, environment and people. For details of this process, please refer to sub-chapter 2.1 'Stakeholder engagement and materiality matrix'.

With an eye to the future, the risks and opportunities arising from both the internal and external context are analysed and highlighted in a specific section under sub-chapter 3.1 'Risks and opportunities' of this document.

Finally, a section of the document is dedicated to HT's financial performance as appropriately reported in the financial statements for the year ending 31 December 2023 and approved on 22 April 2024.



With reference to the reporting principles used, the following information is given for the sake of completeness:

PRINCIPLES FOR DEFINING THE CONTENTS OF THE INTEGRATED REPORT	APPLICATION METHODS
ACCURACY	HT reports qualitative information that is consistent with available evidence, indicating and describing data measurements and bases for calculations. In addition, HT ensures that the margin of error for data measurements does not affect the assessment of stakeholders and indicates which data have been estimated.
BALANCE	HT reports information in an unbiased way, giving a fair representation of its negative and positive impacts, not omitting relevant information about its negative impacts and not over-emphasising positive news or impacts.
CLARITY	HT reports information in a comprehensible manner, using graphs and tables to make it accessible to all. HT presents information in such a way that it can be understood by users who have reasonable knowledge of HT and its activities.
COMPARABILITY	HT reports information in a consistent manner to enable an analysis of changes in its impacts over time and an analysis of these impacts compared with those of other organisations. Where available, HT presents information also from the previous period and maintains consistency both in the methods used to measure and calculate data and in explaining the methods and assumptions used.
COMPLETENESS	HT reports all material aspects arising from the materiality assessment and evaluates them on the basis of their impact boundaries. ESG impacts are reported on the basis of previously determined materiality levels, details of which can be found in sub-section 2.1 of this document.
SUSTAINABILITY CONTEXT	HT reports corporate non-financial and sustainability performance considering the context in which it operates and the applicable standards and regulatory references such as SDGs, GRI Standards: 'in accordance' option. HT performs an annual materiality assessment aimed at identifying the most impactful topics for both HT and its stakeholders (through engagement activities). In accordance with the new GRI 3, impact assessment has been extended to ESG issues.
TIMELINESS	HT indicates the time period covered by the reported information, ensuring consistency in the length of reporting periods. HT regularly publishes information after the reporting period has ended.
VERIFIABILITY	HT collects, records and analyses data in such a way that the information can be verified to establish its quality. The Integrated Report undergoes external assurance conducted by independent auditors.

There have been no significant changes in the reporting scope compared to previous issues of the Integrated Report. In addition to confirming the performance indicators of previous editions, other KPIs that are representative of the activities carried out by the Human Technopole Foundation have been added.

The Integrated Report 2023 has been verified by specially appointed independent auditors. The

reference standard used to certify the document is the International Standard on Assurance Engagements 3000 (Revised) - Assurance Engagements Other than Audits or Reviews of Historical Financial Information (hereinafter also 'ISAE 3000 Revised'), issued by the International Auditing and Assurance Standards Board (IAASB).

STRUCTURE AND CONTENT

The Integrated Report 2023 is structured according to the IIRC framework and contains the following sections:

ABOUT US

OUR APPROACH TO VALUE CREATION

OUR EXPECTATIONS FOR THE FUTURE

PERFORMANCE ANALYSIS

GRI CONTENT INDEX

FINANCIAL STATEMENTS



REPORTING PERIOD

The information contained in this Integrated Report refers to the period 01/01/2023 - 31/12/2023. However, the document also mentions information referring to activities that took place in early 2024. In addition, the reported data are compared with the previous period.

GRI STANDARDS

Where possible, sustainability information is reported in accordance with GRI Standards: 'in accordance' option, and duly identified with the relevant reference number. With regard to *Foundations, General Disclosures and Material Topics*, the provisions of GRI 1, GRI 2 and GRI 3, effective for reports published on or after 1 January 2023, are taken into account.

CAPITALS

As previously mentioned, HT creates value over time using the resources represented by the following five 'capitals':



Financial, i.e. the financial resources, secured by public and private funds, made available to HT to carry out its activities;



Infrastructural, i.e. owned or leased real estate, facilities, structures, infrastructures, machinery and equipment;



Intellectual, i.e., the scientific know-how, operational processes and procedures designed to ensure the quality of activities;



Human, i.e. the intangible asset represented by the skills, abilities and experience of scientific and administrative staff;



Relational, i.e. the relationships with key stakeholders and partnerships with other scientific institutes or universities.

STRATEGIC OBJECTIVES

The table below shows the eight pillars of the HT strategy identified by a specific set of symbols:



Generate **innovation and quality of research**



Develop and provide **infrastructure and innovative research tools**



Attract and train **talents** and share **research outputs**



Obtain **scientific reputation** and promote **dissemination**



Promote **innovation through research**



Contribute to **sustainability (environmental, social and economic)**



Build **partnership, networking** and promote **stakeholder engagement**



Achieve **effectiveness and efficiency of operational processes**

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

HT's strategy is also inspired by the sustainable development goals of UN Agenda 2030.

The UN goals considered most relevant to HT activities have been matched with its strategic objectives to highlight their specific relationships and interconnections. In addition, the actual and

potential impacts of HT's strategic activities on the environment, the economy and people have been identified and analysed. These impacts, summarised into 6 ESG material topics, have been assessed according to their level of materiality, determined also through stakeholder engagement to establish their priority.

The table below shows the 10 SDGs to which HT can or does make the greatest contribution:



Good health and well-being



Quality education



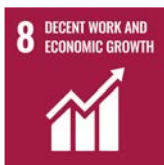
Gender equality



Clean water and sanitation



Affordable and clean energy



Decent work and economic growth



Industry, innovation and infrastructure



Sustainable cities and communities



Responsible consumption and production



Peace, justice and strong institutions

The table below shows the 6 material ESG topics summarising the actual and potential impacts on the environment, people and the economy:

GOVERNANCE AND ETHICS

SOCIAL ISSUES AND PEOPLE

ENVIRONMENTAL PROTECTION

HEALTH AND SAFETY AT WORK

GENDER EQUALITY

RESEARCH AND INNOVATION

REFERENCES

For comments, requests, opinions and suggestions for improvement on HT's sustainability activities and the information contained herein, please contact HT's Finance team by sending an email to the following address: ht-dept-finance@fht.org.



01

WHO WE ARE

**Human Technopole is the research institute
for life sciences located in the heart
of MIND - Milan Innovation District**

1.1 Mission, vision and values	18
1.2 Research Centre sand Scientific Facilities	22
1.3 Key Information	34
1.4 Governance and organisation	38



1.1 Mission, vision and values

The Human Technopole Foundation is an Italian research institute for life sciences that, using an interdisciplinary approach, promotes innovation in the health sector and aims to improve people's well-being.

After representing and celebrating Italian excellence for millions of visitors during EXPO 2015, the Italian Government wanted to take up the legacy of the universal exhibition by creating an open research centre so as to stimulate collaboration and bring added value to the Italian and international scientific research ecosystem. 'Palazzo Italia', the former Italian pavilion at EXPO 2015, was entirely renovated and redesigned to become HT's institutional headquarters.

HT is a foundation established under Law No. 232 of 11 December 2016, set up by the Government to implement a project based on the creation of a multidisciplinary, nationally significant, integrated scientific and research centre in the fields of healthcare, genomics and data and decision sciences. The founding partners of HT are the **Ministry of Economy and Finance, the Ministry of Health and the Ministry of University and Research**, which are also the entities responsible for supervising the Human Technopole Foundation.

In 2019, HT's mission was further supplemented by Article 1, paragraphs 275-277 of Law No. 160 of 27 December 2019, which also assigned HT the specific function of being an infrastructural scientific hub supporting national scientific research using a multidisciplinary and integrated approach, in compliance with the principles of full accessibility to the national scientific community, transparency and

publicity of its activity, and verifiability of scientific results, in accordance with international best practices.

In order to implement such regulatory addition, HT signed a Convention with the Founding Ministries on 30 December 2020 for the realisation, management and enhancement of the so-called '*National Facilities*'. National Facilities take the shape of high-tech facilities where the national scientific community can conduct high quality research.

In 2020, HT was also entrusted by the Government (Law 77 of 17 July 2020) with a further mission, namely that of establishing a '*Centre for Innovation and Technology Transfer in Life Sciences*' in order to foster innovative processes proposed by public and private entities from the research and innovation system.

Finally, with Official Journal No. 234 of 30 September 2021, HT was recognised as an institutional unit of the public administrations included in the consolidated economic account (ISTAT list) identified pursuant to Article 1, paragraph 3, of Law No. 196 of 31 December 2009, as amended. (Accounting and Public Finance Act).

MISSION

HT's mission
is to improve the health and
well-being of people

This mission takes the shape of:

- ▶ **Conducting** frontier research in life sciences, aimed at developing innovative approaches for personalised and preventive medicine;
- ▶ **Creating and managing** scientific services and facilities to be made available to external scientists, meeting the needs of national and international life sciences research communities;
- ▶ **Organising and providing** development and career opportunities for the next generation of scientists;
- ▶ **Disseminating** scientific activities and results to reinforce the message that science is a public good;
- ▶ **Driving innovation and progress** by promoting technology transfer and engaging in relationships with the industrial world to foster the transformation of scientific discoveries into tangible applications benefiting patients and society.

VISION

HT thus aims to enrich and contribute to the improvement of the national system, positioning itself as a reference point for life sciences

Scientific excellence is the guiding principle of all HT's activities. HT's vision is that of an internationally competitive research institute that applies the highest biomedical research standards.

HT's research vision is based on the combination of basic and applied research. In fact, HT has extensive expertise in basic research, in areas relevant to the understanding of human biology and physiology. Applied research, which is more medicine-oriented, is mostly conducted in collaboration with external organisations and industrial and clinical-hospital partners.

HT's vision is complemented by its strong characterisation towards 'open innovation', which is embodied in the opening of its scientific laboratories to projects pursued by the rest of the national scientific community.

VALUES

The values shown in the figure below are embodied in the principles of conduct set out in HT's Code of Ethics:



HT's general ethical principles are the core values of its operational procedures, designed to achieve its institutional purpose. They are shown in the figure below:



1.2 Research Centres and Scientific Facilities

THE SCIENTIFIC CONTEXT

The ultimate goal of research in biomedical sciences is to improve people's health and well-being. This is particularly important today given that our society is ageing rapidly due to increased life expectancy, declining fertility rates and rapid social and economic development. Many people are living longer, though not all of them are living well or in good health, and therefore tremendous efforts are needed to prevent and manage diseases so that people of all ages can enjoy a better quality of life. These efforts have a profound impact on the quality of services and the costs of the national health system.

Health, ageing and quality of life are influenced in a complex way by a combination of both intrinsic factors, mainly related to each individual's genetics, and extrinsic factors, such as their lifestyle and the environment. Traditional approaches to treating diseases, due to their complexity and effect on biological mechanisms, are no longer considered sufficient.

In this context, a new approach to human health research is therefore being developed. This approach, based on causal pathways including genes, the environment and individual lifestyle, increasingly results in treatments based on the aetiology of the disease.

In particular, major technological advances of the last decade have paved the way for the global and systematic interrogation of the human genome (the complete DNA sequence of an individual) and other aspects of human biology. These include the epigenome (changes to the genome that often occur in response to the environment and alter gene expression and function), the transcriptome (the set of all RNA transcripts produced by the genome), the proteome (all proteins produced from the RNAs) and the metabolome (all metabolites present in a cell, organ, tissue or organism).

At the same time, digital technologies and advanced computational analysis generate comprehensive datasets covering a diverse multitude of information on many individuals and the methods required for their analysis. As a result, we are experiencing a new era for biomedical research in which important biological questions, directly related to human health, can - at least in part - be addressed by directly studying human subjects and, if necessary, still using model organisms and other simpler systems.

Integrating and harnessing information from these huge amounts of data have increased the possibilities for scientists to develop stratified approaches and better strategies, more targeted on fighting or preventing disease in a 'personalised' or 'stratified' approach to health, where information on the genetic make-up of individuals, or of their diseased tissue, is used to select the most appropriate treatments.

A number of these customised treatments are already being used in areas such as cancer, cystic fibrosis or hereditary forms of blindness, etc.

The development of these treatments depends on both knowing the specific DNA or protein sequence of the 'disease gene' in the patient and having a deep understanding of how a genetic change in that gene or protein can give rise to a disease state. It is widely believed that stratified or personalised approaches will change the way many diseases are treated, to the extent that many countries, including the UK, Finland, Iceland and the US, are undertaking large-scale genomic sequencing studies as part of the analysis of cohorts of individuals whose health and well-being are monitored over many years. At the same time, other types of large-scale data from heterogeneous sources, e.g. clinical or socio-economic data, can be exploited in

a similar way to develop new strategies for public health or to improve the management of healthcare systems, while also maximising people's health and well-being. Quite clearly, the current context of health-related research, as described above, calls for a holistic, multi-scale approach and the further development of new disciplines.

In light of the current, unprecedented opportunities for health research, the idea of implementing an Italian life science centre at the HT scale seems extremely appropriate.

RESEARCH AT HT

Given the context described above, HT has chosen to establish broad-based Research Centres, in disciplines or fields that can be applied to many different thematic areas related to human health and disease.

The rationale behind this strategic decision is, on the one hand, to increase the chances of recruiting outstanding research leaders, irrespective of their specific field of application, and on the other hand, to maximise opportunities for interdisciplinary collaboration within and beyond HT, which can be applied to a wide variety of biological and health issues.

HT's contribution to human health is achieved through a comprehensive and interdisciplinary approach to the study of human biology, aimed at understanding the basic mechanisms that regulate physiology and disease.

HT's research work contributes to advancing the understanding of and helping to develop new therapeutic strategies for various disease groups, including some chronic and degenerative diseases.

HT's research strategy is based on the following **5** complementary areas, which are all highly relevant to biomedical and health-related research: Genomics, Neurogenomics, Structural Biology, Computational Biology and Health Data Science.

RESEARCH CENTRES

GENOMICS

NEUROGENOMICS

STRUCTURAL BIOLOGY

COMPUTATIONAL BIOLOGY

HEALTH DATA SCIENCE

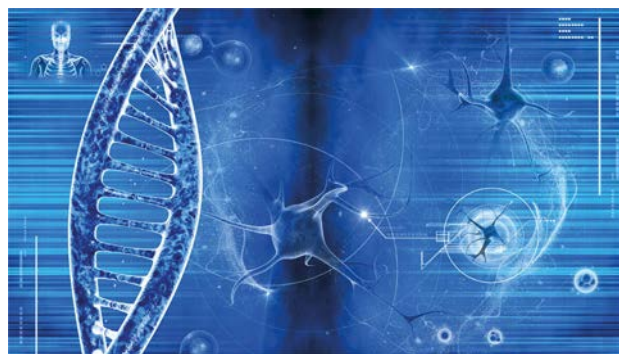
GENOMICS



The Genomics Research Centre pursues research aimed at uncovering the complex mechanisms governing gene expression and how heritable genetic information translates into phenotypic traits. The Centre develops technologies to study the fundamental mechanisms that regulate genomic activity in all cells of the human body, in both health and sickness. Applied to humans, and in the context of precision medicine, this type of research can identify molecular targets and markers for disease prevention, early diagnosis and personalised treatment. In addition to conducting genetic and genomic studies focusing on disease-related mechanisms, the Centre aims to implement large-scale genomic screening projects for patient stratification. The Genomics Research Centre currently consists of two complementary research programmes, one in *Population and Medical Genomics* (i.e. the use of genomic information to identify the genetic causes of specific defects) and the other in *Functional Genomics* (i.e. the development and use of new methods to study the relationship between the individual genome and biological function).

AS AT 31 DECEMBER 2023, 9 RESEARCH GROUPS HAD BEEN ESTABLISHED FOR THE GENOMICS CENTRE.

NEUROGENOMICS



Neurogenomics research investigates the mechanisms underlying human neuropsychiatric and neurological diseases, ranging from neurodevelopmental to neurodegenerative disorders, combining basic and applied research through different experimental systems and computational approaches (from brain organoids through animal models to epidemiological cohorts) in order to study the structure, function and development of the nervous system at multiple levels of resolution.

AS AT 31 DECEMBER 2023, **5** RESEARCH GROUPS HAD BEEN ESTABLISHED AT THE NEUROGENOMICS CENTRE.

STRUCTURAL BIOLOGY



How do macromolecular machines work and how do they harmonise their activities to form a fully functional cell? How are these processes regulated and what happens in human diseases? The Structural Biology Research Centre aims to answer these questions by acquiring detailed knowledge of the structure of macromolecules and macromolecular complexes so as to understand how they work, leveraging synergies with other HT research centres. The Structural Biology Research Centre uses a state-of-the-art Cryo-Electron Microscopy technology platform which, using Single Particle Analysis (SPA) and Cryo-Electron Tomography, aims to obtain high-resolution structures of macromolecules both in isolation and in their cellular context. The Centre also uses complementary approaches, such as X-ray crystallography, fluorescent single-molecule microscopy, native or cross-linking mass spectrometry and a wide range of biophysical analyses, to obtain details on the functioning mechanisms of macromolecules.

AS AT 31 DECEMBER 2023, **5** RESEARCH GROUPS HAD BEEN ESTABLISHED AT THE STRUCTURAL BIOLOGY RESEARCH CENTRE.

COMPUTATIONAL BIOLOGY



The Computational Biology Centre aims to develop new mathematical and computational approaches for the analysis and interpretation of medical and biological data. However, computational biology at HT is not only about the development of new data analysis methods but, in particular, about the importance of asking fundamental questions about human biology and health that can only be addressed using computational approaches, from mathematical modelling of dynamic systems to machine learning and artificial intelligence. The ultimate goal of the Centre is to make sense of the vast amount of data generated in biomedicine in order to design better treatments for patients. For example, identifying mechanisms of resistance to anti-cancer drugs to predict tumour evolution and ensure the early and effective treatment of each patient. The Computational Biology Centre is also involved in designing methods for cancer drug discovery and repurposing, using functional genomics data from cancer vulnerability screening and in vitro models. In addition to the analysis of genetic data from patients and model systems, activities are also focused on analysing single-cell and multi-cell data, as well as processing medical and microscopy images using artificial intelligence.

As at 31 DECEMBER 2023, 4 RESEARCH GROUPS HAD BEEN ESTABLISHED AT THE COMPUTATIONAL BIOLOGY CENTRE.

HEALTH DATA SCIENCE



The Health Data Science Centre, established in collaboration with the Politecnico di Milano, aims to contribute to transforming scientific understanding and, consequently, disease prevention and treatment by using large-scale data science to support concrete and innovative approaches that improve people's health.

The Centre's aim is to help research with important new clinical knowledge through innovative supplementary studies on genetic data, electronic medical records, imaging, wearable data and biomolecular data. The ultimate goal is to create new IT infrastructures, analytical capabilities, data science methods and multidisciplinary research programmes prompting the advancement of health research in Italy and worldwide.

To achieve this, the Centre uses three complementary approaches:

- ▶ collection and integration of health data from multiple administrative sources, establishing a dialogue with regional health districts, hospitals and scientific societies;
- ▶ generation of new biomolecular data from population studies;
- ▶ improved data analysis and interpretation, using new analytical methods supplemented with clinical epidemiology and health research.

The Health Data Science Centre thus intends to become a reference institution for large-scale health data analysis, working in synergy with national and international partners. The Centre's work reflects HT's comprehensive approach to life sciences, which includes basic research and the use of artificial

intelligence and big data to improve human health and well-being.

AS AT 31 DECEMBER 2023, 2 RESEARCH GROUPS HAD BEEN ESTABLISHED AT THE HEALTH DATA CENTRE

SCIENTIFIC FACILITIES - NATIONAL FACILITIES

HT is developing state-of-the-art infrastructures on its Campus and will also host the so-called '*National Facilities*', which can be accessed by Italian researchers through open and transparent calls and selection procedures.

The existing facilities that have been turned into National Facilities, to be extended or constructed anew as from January 2024 are:

NATIONAL FACILITY FOR GENOMICS

NATIONAL FACILITY FOR GENOME ENGINEERING AND DISEASE MODELLING

NATIONAL FACILITY FOR STRUCTURAL BIOLOGY

NATIONAL FACILITY FOR LIGHT IMAGING

NATIONAL FACILITY FOR DATA HANDLING AND ANALYSIS

NATIONAL FACILITY FOR GENOMICS



The National Facility for Genomics (GenO) offers innovative, cutting-edge services in the field of genomics. Its main mission is to develop experimental and analytical workflows to study all major domains of genomic exploration including, but not only, DNA, RNA, chromatin analysis and the assessment of other markers of epigenetic and regulatory activity. These techniques can be applied to different areas of biology, with a resolution extending to entire organisms, tissues or individual cells. Overall, the National Facility for Genomics aims to strengthen Italian scientific research in all areas of genomics.

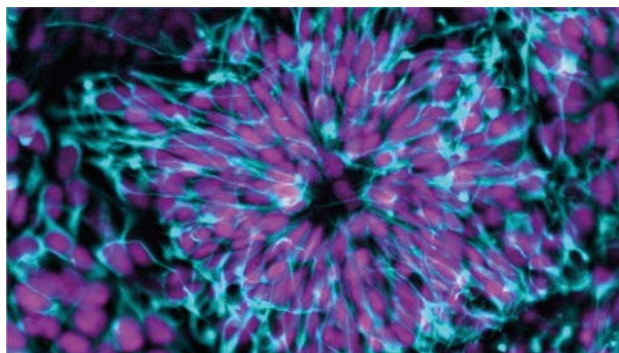
The National Facility for Genomics has **4** Infrastructural Units (IUs):

- ▶ IU1 High-throughput sequencing
- ▶ IU2 Multi-omics technologies
- ▶ IU3 Computational genomics
- ▶ IU4 Technology development

To ensure maximum productivity and quality of research, the National Facility for Genomics uses state-of-the-art equipment. Below is the list of available technologies:

- ▶ Illumina MiSeq
- ▶ Illumina NextSeq 2000
- ▶ Oxford Nanopore PromethION 48
- ▶ Promega Spectrum Compact
- ▶ 10x Genomics Chromium Controller and a Chromium X
- ▶ 10x Genomics Chromium Connect
- ▶ BD Rhapsody single-cell analysis system
- ▶ BD Bioscience
- ▶ CellenONE f1.4 ScienION
- ▶ Agilent 4200 TapeStation
- ▶ Agilent fragment analyser
- ▶ Agilent FEMTO Pulse
- ▶ Agilent Bravo NGS Workstations Option A and Option B
- ▶ Biomek i7 automated system integrated with
- ▶ Echo525 Acoustic Dispenser
- ▶ QIAGEN QIAcube HT
- ▶ Covaris E220 Focused Ultrasonicator
- ▶ Glomax Discover Promega microplate reader
- ▶ Nanostring Saptial GeoMX digital profiler

NATIONAL FACILITY FOR GENOME ENGINEERING AND DISEASE MODELLING



The main mission of the National Facility for Genome Engineering and Disease Modelling is to implement a multidisciplinary platform of services providing access to cutting-edge technologies in the fields of pluripotent stem cells, two- and three-dimensional cell model generation, and genomic engineering. Leveraging the latest laboratory automation technologies, the HT team translates critical protocols for stem cell generation, genomic manipulation and differentiation into modular workflows with high manufacturing and automation potential, simplifying key steps that limit speed in disease modelling, and improving standardisation and production. The system developed in HT's facility allows for the execution of a workflow that, starting from the patient, enables the generation of the full range of investigative tools that have revolutionised the study and modelling of previously inaccessible diseases.

The National Facility is divided into **4** Infrastructural Units:

- ▶ IU1 - Pluripotent Stem Cells (PSC) and Advanced Cell Culture (Integration)
- ▶ IU2 - Gene Editing Technologies
- ▶ IU3 - Validation and differentiation of modified modelling in standardised culture assays (including development and fine-tuning of differentiation protocols)
- ▶ IU4 - Technology development

The structure offers the scientific community the first facility for modelling human diseases at scale. Access to the Facility allows users to plan an experimental project by drawing on the entire catalogue of technologies in a modular and flexible way. Services, support and training are offered in the areas of gene editing of pluripotent stem cells and immortalised/cancer cell lines:

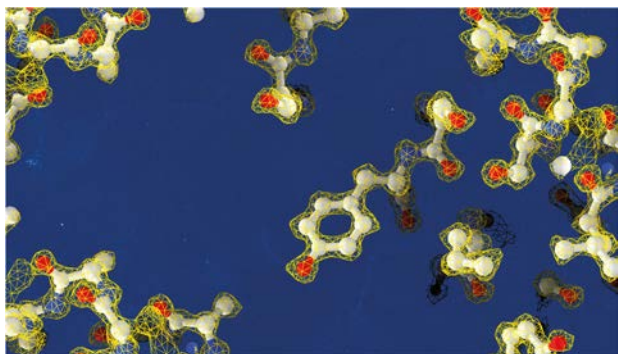
- ▶ Knock-out
- ▶ Gene editing
- ▶ Reporter cell lines
- ▶ Point mutations
- ▶ Design and development of customised projects

Additional support services are also offered:

- ▶ Reprogramming of PBMCs and fibroblasts in iPSCs
- ▶ Validation of the modified model using 2D or 3D differentiated cell cultures
- ▶ Customised development of the differentiation protocol

The facility is networking with leading stem cell biology facilities in Europe and beyond, with the aim of sharing expertise, harmonising procedures and protocols and creating a community that represents a reference point in stem cell biology.

NATIONAL FACILITY FOR STRUCTURAL BIOLOGY



The National Facility for Structural Biology (Struct-Bio) provides a comprehensive facility for structural characterisation across scales, from tissues to amino acid side-chains. The National Facility for Structural Biology will be managed by personnel with expertise in all aspects of sample preparation and characterisation as well as imaging. The structure aims to support the national scientific community in successfully investigating biological players of interest, both isolated and within their cellular compartments.

The National Facility for Structural Biology has **6** Infrastructural Units (IUs):

- ▶ IU1 - Cryo-EM
- ▶ IU2 - Biomass Production
- ▶ IU3 - Biophysics
- ▶ IU4 - Structural Proteomics
- ▶ IU5 - Dynamic Single-molecule
- ▶ IU6 - Technology development

To ensure maximum productivity and quality of research, the National Facility for Structural Biology uses state-of-the-art equipment. The list of technologies available for access by external users to the Cryoelectron Microscopy Unit (IU1) includes:

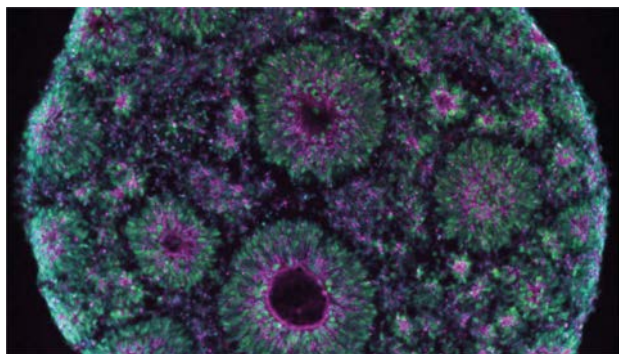
- ▶ a 300kV Thermo Scientific Titan Krios G4i TEM equipped with Thermo Scientific Falcon 4i direct electron detector, Thermo Scientific Selectris X energy filter, Thermo Scientific CETA 16M and Volta phase plate;
- ▶ a Thermo Scientific Spectra 300kV STEM equipped with Thermo Scientific CETA 16M with speed enhancement and fully dedicated to electron tomography workflows;

- ▶ a Thermo Scientific Glacios 200kV TEM equipped with Thermo Scientific Falcon 4i, Thermo Scientific Selectris X energy filter, CETA-D and Volta phase plate;
- ▶ a 120kV Thermo Scientific Talos L120C TEM equipped with Thermo Scientific CETA 16M to enable room temperature and cryogenic imaging with the Gatan ELSA cryogenic holder; a Leica Stellaris 5 confocal microscope equipped with white-light laser and cryostage to perform cryo-CLEM experiments;
- ▶ a Leica Thunder wide-field microscope equipped with cryostage to perform cryo-CLEM experiments;
- ▶ ancillary equipment for sample preparation, including: plunge freezing devices (Thermo Scientific Vitrobot Mark IV), glow discharger units (Pealco EasyGlow and Quorum GloQube), plasma cleaner (Gatan Solarus II), carbon coating system (Leica ACE600) and other sample preparation tools for high-pressure freezing (Leica EM ICE) and freeze substitution (Leica AFS2).

The Biomass Production and Biophysics Unit (BU2) will offer, among other dedicated tools:

- ▶ a fermentation laboratory equipped with fermenters for the large-scale production of yeasts and bacteria (InforsHT Techfors-s 15L and Techfors 150L); a laboratory for insect and mammalian cell production with two 0.5L (myControl) and 15L (ezControl) bioreactors.
- ▶ Tools for sample characterisation:
 - Refeyn OneMP (mass photometry)
 - Xtal Concepts SpectroLight 610 (Dynamic Light Scattering);
 - Nanotemper Tycho NT.6 and Prometheus NT.48 (nanoDSF).
- ▶ Tools for affinity determination:
 - Microcal PEAQ-ITC (isothermal titration calorimetry);
 - Sartorius Octet R8 (BioLayer Interferometry);
 - Nanotemper Monolith (Microscale thermophoresis).

NATIONAL FACILITY FOR LIGHT IMAGING

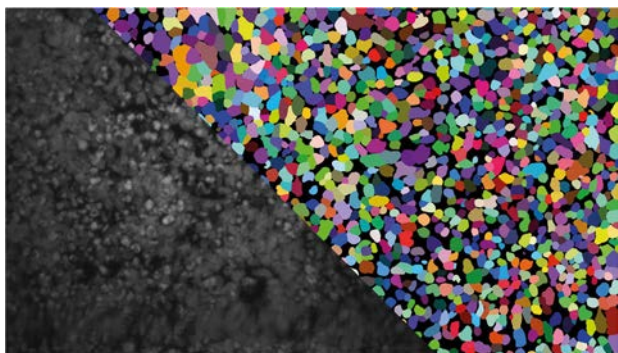


The National Facility for Light Imaging offers access to state-of-the-art optical microscopes, such as wide-field, confocal, spinning disk, super-resolution and light-sheet microscopes. The facility staff will supervise external users, taking care of optimal image acquisition. Once the facility is fully operational, additional services such as basic and advanced training, microscopy courses, sample preparation and customised opto-mechanical hardware design may be offered.

The National Facility for Light Imaging has **6** Infrastructural Units (IUs):

- ▶ IU1 Imaging
- ▶ IU2 Tissue processing
- ▶ IU3 Flow cytometry
- ▶ IU4 High Content Imaging
- ▶ IU5 Ion Imaging
- ▶ IU6 Technology development - customised microscopy

NATIONAL FACILITY FOR DATA HANDLING AND ANALYSIS



The mission of the National Facility for Data Handling and Analysis is to support the national research community by providing an initial state-of-the-art analysis of the data generated by the other National Facilities and to deliver the data to external users. The main objective of this Facility is to provide bioinformatics and bioimage analysis expertise for the evaluation of large-scale, complex biomedical datasets.

The NF for Data Management and Analysis has **3** Infrastructural Units:

- ▶ IU1 Image analysis (NoBIAS)
- ▶ IU2 Omics data analysis (NOAS)
- ▶ IU3 Technology development (DevOps/WebDev).

The NoBIAS unit provides high-quality image analysis solutions, including Quality Control (QC), image denoising and restoration, segmentation

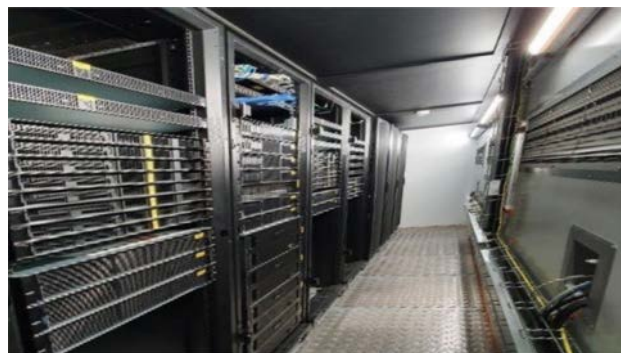
and basic quantification for imaging data. The NOAS unit is involved in analysing the omics data generated by the other Facilities and performs Quality Control (QC), alignment to reference genomes and read count calculation and/or variant analysis. The DevOps/WebDev unit focuses on providing installable and containerised versions of the facility's workflows, as well as creating user-friendly WebApps for browsing analysis status and transferring data. Technology development is a pillar of the National Facility for Data Handling and Analysis and aims to create research software that can be reused within the Facility, as well as to enable the distribution of innovative components that users can use in their own laboratories. Technology development will ensure that the Facility remains state-of-the-art and organically adapts to the needs of the scientific community.

Another pillar of the Facility is providing training to users and creating national awareness of our service portfolio by organising basic courses and enabling users to transfer the knowledge they have learnt to the institutions they belong to.

The National Facility for Data Handling and Analysis is supported by a large data centre and scientific computing infrastructure, initially consisting of an HPC system with approximately 90 compute nodes, 30 GPU nodes, 3-4 PB of scratch space and 15 PB of total storage space.

In addition to the National Facilities, the HT campus, as at 31 December 2023, had:

DATA CENTRE



Research activities require considerable storage capacity to handle and analyse an extensive amount of clinical information, biological data, images, etc. The Campus is therefore equipped with a data centre with a large storage and computing capacity that is served by an ultra-broadband network connection.

The Data Centre project, completed in 2022, involved the construction of new mechanical, electrical, special and fire-fighting systems serving the 'CED', 'Library' and 'UPS' rooms located in the basement of Palazzo Italia. The design solution adopted by HT now houses the new HPC systems consisting of 60 compute nodes, which are interconnected by an InfiniBand HDR100 network and 25Gb Ethernet. The

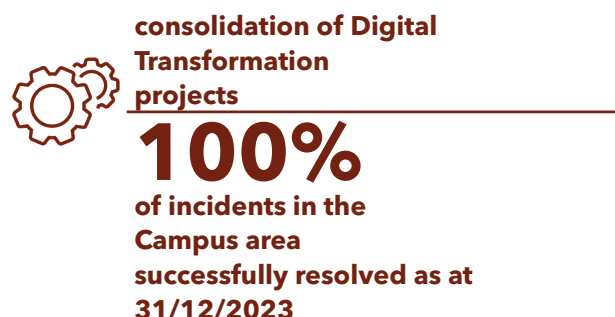
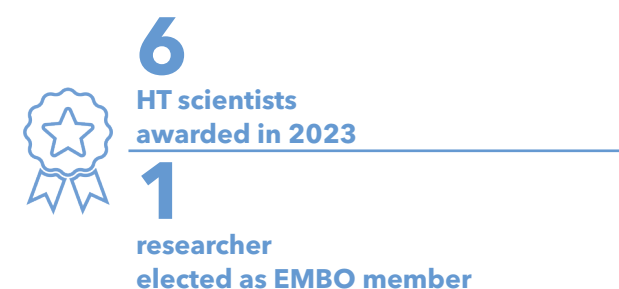
cluster is managed and made accessible to users via two redundant head nodes. All nodes access a BeeGFS-based parallel high-availability file system with a total storage capacity of 2.1PB. The cluster is also directly connected to the central data storage system installed in the Shelter that is physically located in the technical area outside Palazzo Italia. The backup server, based on Bacula Enterprise with dedicated 2.2 PB storage, is also housed in the CED room and is used to back up the Virtual Machines, Office365 and data shared on the central data storage system. In addition, an infrastructure with redundant cooling and power supply in 2N configuration serving the IT load has been built to ensure that the required thermo-hygrometric conditions are maintained.

For fire detection purposes, all rooms are equipped with smoke detection and early fire detection systems with air sampling. In the event of a fire, extinguishing is ensured by the NOVEC gas extinguishing system. The management and monitoring of critical and sensitive plant alarms will be integrated and managed by the BMS supervision system already present in Palazzo Italia.

1.3 Key Information

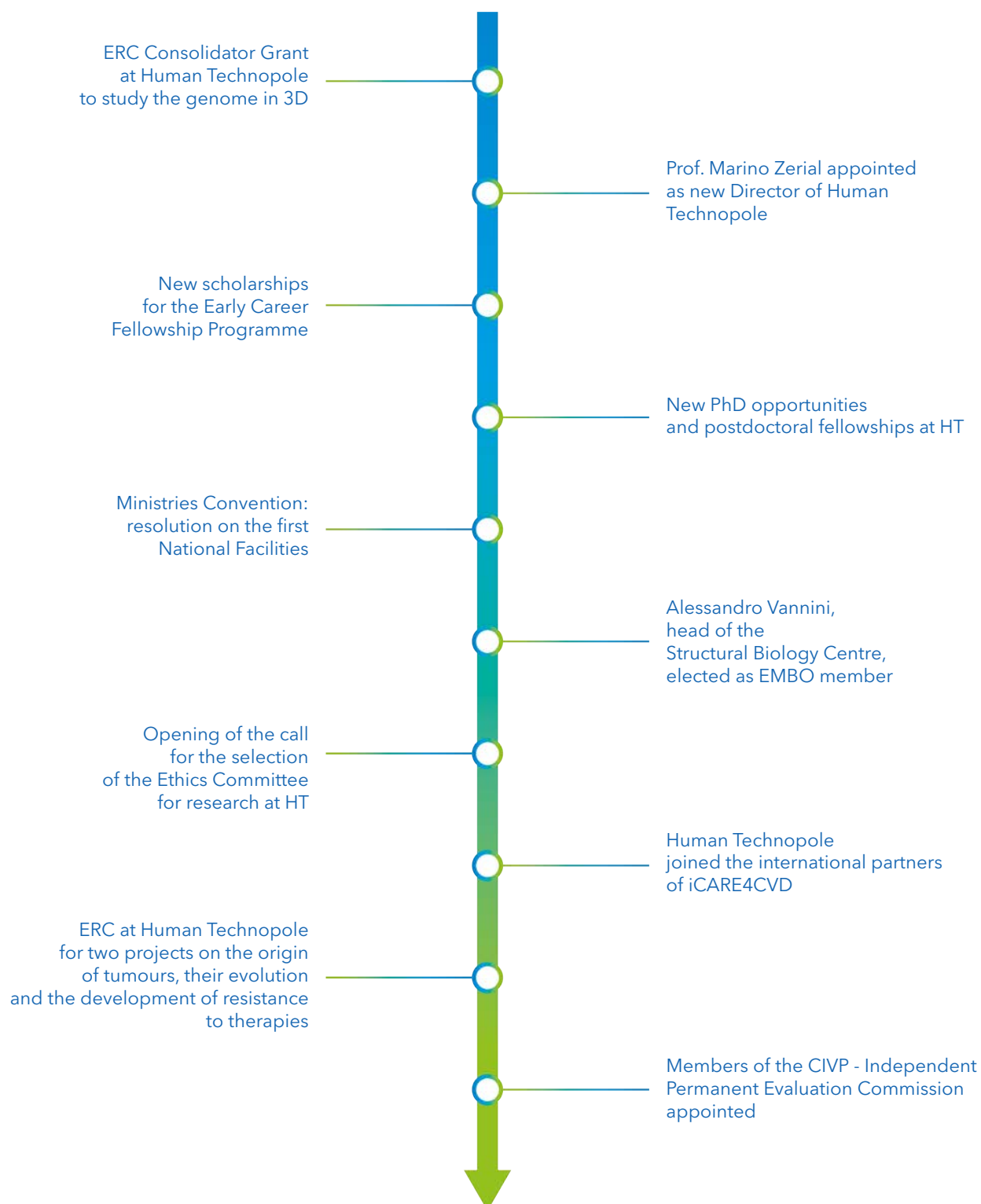
The figure below shows, for each strategic objective, some highlights of the year 2023:

HIGHLIGHTS 2023



ROADMAP 2023

Here are the highlights of HT in 2023:



ACTIVITIES in 2023

The figure below highlights the main activities and projects carried out by the departments and areas of the Human Technopole Foundation during 2023:

Governance activities

Appointment of the new Director of the Foundation, **Prof. Marino Zerial**

Appointment of the fifteenth member of the Scientific Committee, **Prof. Andrea Musacchio**

Launching of the Supervisory Board's activity concerning the updating of Model 231

Approval of the new Strategic Plan for 2024-2028

Approval of the National Facilities Implementation Plan

Appointment of National Facilities Evaluation Committee Members

Scientific Committee's assessment of scientific activities over the four-year period 2019-2022

Approval of the 2024-2026 multi-year programme plan

Scientific activities

Continuation of scientific training activities and participation in various international scientific initiatives

New formal partnerships and scientific collaboration agreements, both in Italy and abroad

Many publications in prestigious international journals, participation in several cohort studies and development of new experimental methods and protocols

Appointment of the new Group Leader Population and Medical Genomics

Prestigious international prizes and awards given to some researchers, as well as new loans granted by external research funds

Organisation of training events, including courses and workshops, involving external scientists from national and international institutes

Administrative and institutional activities

Launch of the operational phase of NP implementation, with the conversion of 5 core facilities

Recruitment of additional scientific and administrative staff

Purchase of land for the South Building

Performance of training activities in non-scientific fields

Promotion of communication and institutional initiatives targeting national and local stakeholders

Continuation of CITT [Centre for Innovation and Technology Transfer] activities

Continuation of Digital Transformation activities

Introduction of new communication tools to facilitate the dissemination of information and key messages within the Foundation's community

Introduction of initiatives to support employee welfare and work-life balance measures

Zero Impact Project: introduction of new measures for the canteen service aimed at reducing CO₂ impacts and emissions

Continuation of the Gender Equality Team's activities with various initiatives supporting gender equality

Campus activities

Completion of the works for the refunctionalisation of Palazzo Italia and the refunctionalisation and fitting out of the South Pavilion building

Approval of the final design of the South Building and Technological Pole

Finalisation of project reviews of the liquid nitrogen supply line serving CryoEm laboratories and the of project for the construction of the new biosafety level laboratory (BSL3)

Start of activities for the development of a technical-economic feasibility project for the expansion of Light Imaging Microscopy, Cryo-EM and Tape Library

1.4 Governance and organisation

The HT Articles of Association and Regulation provide for a governance system structured according to a dual model.

In particular, the Supervisory Board, chaired by HT's President, is the body responsible for the general direction and control of the Human Technopole

Foundation's activities, while the Management Committee, chaired by the Director, is the governance body responsible for carrying out the activities necessary to ensure the ordinary progress and achievement of HT's purpose.

THE PRESIDENT

The President is the legal representative of the Human Technopole Foundation, acts as President of the Supervisory Board, is the guarantor of the strategic direction of HT, manages institutional and public relations and promotes training and dissemination activities related to the social and economic impact of scientific research and HT's public commitment.

By decree of 7 July 2022, the Presidency of the

Council of Ministers appointed Prof. Gianmario Verona as the new President of HT's Supervisory Board. Prof. Verona is the second President of the Human Technopole Foundation, succeeding Prof. Marco Simoni, who was appointed in May 2018.

[Prof. Gianmario Verona was Rector of the Bocconi University of Milan from 2016 to 2022. He holds the Romeo and Enrica Invernizzi Foundation Chair in Innovation Management at Bocconi University in Milan and his research, teaching and advisory activities focus on the strategic and organisational management of technology and innovation.](#)

SUPERVISORY BOARD

The Supervisory Board ensures the excellence of the Human Technopole Foundation and its compliance with the rules on the appointment of its bodies, verifies the use of resources, supervises the general coordination of internal control functions, manages the scientific evaluation of HT's activities and carries out general guidance and control activities. As per HT's Articles of Association, the Supervisory Board has thirteen members, including the President:

► seven of whom are appointed by the President of the Council of Ministers, of whom two are designated by the Minister of Economy and

Finance, one by the Minister of Health and one by the Minister of University and Research;

► the remaining of whom are appointed by the President of the Council of Ministers, in consultation with the Ministers of Economy and Finance, Health, University and Research:

● one of whom is appointed by agreement between the Municipality of Milan and the Lombardy Region;

● one of whom is appointed by the Conference of Italian Rectors and Universities (CRUI);

- one of whom is appointed by the Council of Presidents of Public Research Organisations;
- two of whom are appointed by the Supervisory Board from among scientists in disciplines related to the HT project and from among international public health experts, who mainly carry out their activities abroad;
- one of whom is appointed by agreement between the participants, provided that, also in association, they pay at least three per cent of the annual State grant.

Each member of the Supervisory Board remains in office for four years and until its new members are appointed. Each member can only be confirmed once. The Supervisory Board meets approximately every 45 days and extraordinarily if necessary. In 2023, the Supervisory Board had **12** members, including the President. A thirteenth member may be appointed by the Participating Members, in agreement with each other, provided that, also in association, they pay at least three per cent of the annual State grant. To date, there are no Participating Members in the Human Technopole Foundation.

The members of the Supervisory Board as at 31 December 2023 were:

GIANMARIO VERONA	President of the Human Technopole Foundation. Former Rector of Bocconi University (2016/2022) and Professor of Innovation Management
MAURA FRANCESE	Deputy Head of Economic Structure Service, Department of Economics and Statistics, Bank of Italy™
GIOVANNA IANNANTUONI	President of CRUI, Rector of the University of Milan Bicocca and Professor of Political Economy
MASSIMO INGUSCIO	Professor Emeritus of Physics at the University Campus Bio-Medico, Rome
GIUSEPPE IPPOLITO	Professor of infectious diseases at the Unicamillus International University of Health Sciences; former Director General of the Italian Ministry of Health
BIAGIO MAZZOTTA	State Accountant General
MARCELLA PANUCCI	Chief of Cabinet of the Minister of University and Research
FRANCESCA PASINELLI	Director General of the Telethon Foundation
MARIA GRAZIA RONCAROLO	Director of the Centre for Definitive and Curative Medicine and Professor of Paediatrics and Medicine at Stanford University
SERENA SILEONI	Professor of Constitutional Law at the Suor Orsola Benincasa University, former advisor to the Presidency of the Council of Ministers
GIANLUCA VAGO	President of the CNAO Foundation, former Rector of the University of Milan
ALESSANDRO VESPIGNANI	Professor of Physics at Northeastern University and Founding Director of the Northeastern Network Science Institute in Boston

During 2023, the Supervisory Board met **17** times. Article 12, paragraph 8 of the Articles of Association of the Human Technopole Foundation says

that "*The Supervisory Board may be divided into sub-committees.*" During 2022, the Supervisory Board set up the following 3 Board committees:

CONTROL AND RISK COMMITTEE	The Committee has an advisory role, carries out preliminary investigations and submits proposals to the Supervisory Board in relation to risks and the internal control system, also with regard to the Organisational Model pursuant to Italian Legislative Decree 231/2001 and the Privacy Organisational Model, also liaising with Internal Audit & Compliance.
APPOINTMENTS AND REMUNERATION COMMITTEE	The Committee has an advisory role, carries out preliminary investigations and submits proposals to the Supervisory Board in relation to appointments for which the Board is responsible. The Committee also proposes initiatives to the Supervisory Board for the audit and supervision of appointments for which the Management Committee is responsible and also concerning staff remuneration policies.
SUSTAINABILITY COMMITTEE	The Committee has an advisory role, carries out preliminary investigations and submits proposals to the Supervisory Board in relation to broader policies related to ESG (Environmental, Social and Governance) sustainability issues and to inclusion policies, promoting the removal of any barrier that <i>de facto</i> limits equal opportunities within the Human Technopole Foundation, with regard to working conditions and remuneration policies.

THE DIRECTOR

The Director of the Human Technopole Foundation is responsible for implementing the multiannual Strategic Plan and chairs the Management Committee.

On 28 February 2023, HT's Supervisory Board

appointed Prof. Marino Zerial as HT's new Director. Prof. Zerial is the second Director of the Human Technopole Foundation, succeeding Prof. Iain Mattaj who, as from January 2019, led the first phase of HT's development.

Prof. Marino Zerial graduated in Biology at the University of Trieste in 1982. He joined HT after spending over 20 years at the Max Planck Institute of Molecular Cell Biology and Genetics, MPI-CBG (Dresden, Germany), of which he was a well-known Director and co-founder. He was also a research group leader at EMBL in 1989. He is Honorary Professor at the Medical Faculty, Technische Universität Dresden (Germany).

THE MANAGEMENT COMMITTEE

The Management Committee carries out the governance work necessary to ensure HT's ordinary progress and activities. The Committee has **5** members, including the Director chairing it. Each member of the Management Committee remains in office for four years and until its new members are

appointed. Each member can only be confirmed once. The members of the Management Committee are appointed by the Supervisory Board.

During 2023, the Management Committee met **16** times.

The members of the Management Committee as at 31 December 2023 were:

MARINO ZERIAL	Director of the Human Technopole Foundation. From 1998 to 2023 he was the Director and co-founder of the Max Planck Institute of Molecular Cell Biology and Genetics, MPI-CBG (Dresden, Germany)
IRENE BOZZONI	Full Professor of Molecular Biology at 'La Sapienza' University in Rome
NANDO MINNELLA	Director General at the National Institute of Nuclear Physics, former Head of the Technical Secretariat of the Ministry of Education, University and Research
STEFANO PICCOLO	Full Professor of Molecular Biology at the University of Padua
FABIO TERRAGNI	Partner and Director of Alchemia

THE SCIENTIFIC COMMITTEE

The Scientific Committee is the advisory body of the Human Technopole Foundation. The members of the Scientific Committee, appointed by the Supervisory Board from among eminent scientists from outside the Institute, are given an important

advisory role by HT's Articles of Association: they are in charge of assessing the protocols of scientific activities in terms of both quality and consistency with HT's multi-year plans.

The members of the Scientific Committee as at 31 December 2023 were:

GUALTIERO RICCIARDI*	Professor of Hygiene and Public Health, Università Cattolica del Sacro Cuore, Rome
GENEVIÈVE ALMOUZI	Director of Research, Centre National de la Recherche Scientifique, Institut Curie, France
ANDREA BALLABIO	Director, Telethon Institute of Genetics and Medicine (TIGEM), Italy
PIETRO DE CAMILLI	Director, Program in Cellular Neuroscience, Neurodegeneration and Repair (CNNR), Yale School of Medicine, USA
KRISTIAN HELIN	Chief Executive Officer and President, Institute of Cancer Research, UK
ALBERTO MANTOVANI	Scientific Director, Humanitas Clinical Institute, Italy
MARGARET MCMAHON	Global Head Data Science, Roche Information Solutions Data & Analytics, Switzerland
GENNARO MELINO	Full Professor of Biochemistry, Director of the 'Torvergata Oncoscience Research' Centre (TOR), University of Rome Tor Vergata, Italy
ANDREA MUSACCHIO	Director, Max-Planck Institute of Molecular Physiology, Department of Mechanistic Cell Biology, Germany
LUCA PANI	Professor of Clinical Psychiatry, University of Miami and Professor of Pharmacology and Clinical Pharmacology, University of Modena and Reggio Emilia, Italy
ALFIO QUARTERONI	Professor of Numerical Analysis, Politecnico di Milano, Italy, and Professor Emeritus, EPFL, Lausanne
NADIA ROSENTHAL	Scientific Director, The Jackson Laboratory, USA
MICHAEL SNYDER	Director, Centre for Genomics and Personalized Medicine, Stanford University School of Medicine, USA
GIULIO SUPERTI - FURGA	Scientific Director, CeMM Research Center for Molecular Medicine, Austria
FIONA WATT	Director, European Molecular Biology Organization, Germany

* Chairman

BOARD OF AUDITORS

The Board of Auditors consists of three standing members and three alternate members. They are appointed from among persons enrolled in the register of statutory auditors by Decree of the President of the Council, at the proposal of the Minister of Economy and Finance and after being designated by the Founding Ministries. Each Founder chooses one standing member and one alternate member. The members of the Board of Auditors remain in office for three years and may

be reconfirmed once only. The Board of Auditors monitors the regularity of the Human Technopole Foundation's management and its accounts, carries out cash audits and prepares reports on the final accounts, which it then submits to the Supervisory Board.

During the year 2023, the Board of Auditors met **14** times.

The members of the Board of Auditors as at 31 December 2023 were:

PIERA MARZO	Chairwoman, designated by the Minister of Economy and Finance
SARA ROSSI	Standing member, designated by the Minister of University and Research
ANDREA VESTITA	Standing member, designated by the Minister of Health

SUPERVISORY BOARD

The Human Technopole Foundation effectively implements an organisational and management model that can prevent the offences referred to in Italian Legislative Decree 231/2001 (Model 231).

The task of supervising the operation of and compliance with Model 231 and promoting its updating is entrusted to and performed by a body with independent powers of initiative and control, namely the Supervisory Board (SB).

The Human Technopole Foundation's Supervisory Board meets the following requirements for the effective performance of its duties:

- ▶ **Autonomy and independence:** these requirements are essential to ensure that the SB is not directly involved in the operational activities which it oversees. The hierarchical independence of the Supervisory Board must be guaranteed. The Supervisory Board is, therefore, positioned as a staff unit at the most senior level possible.
- ▶ **Professionalism:** the members of the SB have the technical and legal knowledge required to perform their duties. These characteristics, together with the independence of its members,

guarantee their objectivity.

- ▶ **Continuity of action:** the SB ensures its constant presence in order to ensure the effective and continuous application of the Organisational, Management and Control Model under Italian Legislative Decree 231/2001 (Model 231).

In particular, the Supervisory Board performs its supervisory functions in relation to:

- ▶ the effectiveness and adequacy of Model 231, i.e. its concrete ability to prevent predicate offences, having regard to the organisation and operations of the Human Technopole Foundation;
- ▶ the effectiveness of Model 231, i.e. the monitoring of compliance with it by its recipients;
- ▶ the fulfilment of the requirements of effectiveness and adequacy over time;
- ▶ the promotion of the updating of Model 231 where necessary or appropriate, especially in case of changes in the organisation or operations of the entity or in the relevant regulations.

The members of the Supervisory Board as at 31 December 2023 were:

VITO BRANCA*	Lawyer
ANDREA CALLEA	General Counsel & Head of Legal at HT
SALVATORE SCUTO	Lawyer

* Chairman

In the course of 2023, the Human Technopole Foundation continued to implement the 'Organisational, Management and Control Model' pursuant to Legislative Decree no. 231/2001 (Model 231), regulating the administrative liability of entities for wrongful acts caused by crime, last updated on 29 June 2022.

The Supervisory Board also continued to monitor the operation of and compliance with Model 231. In relation to the handling of reports of possible violations of Model 231 and of predicate offences giving rise to the entity's administrative liability, the activity of the Supervisory Board also complied with the recently-enacted whistleblowing law (Italian

Legislative Decree 24/2023).

In the latter part of the financial year 2023, the Supervisory Board also began another activity for which it is responsible, i.e. updating Model 231 in relation to the recent expansion of the catalogue of predicate offences. Lastly, in relation to Model 231, training activities were carried out for managerial and non-managerial personnel.

During 2023, the Supervisory Board met **9** times.

INTERNAL AUDIT & COMPLIANCE

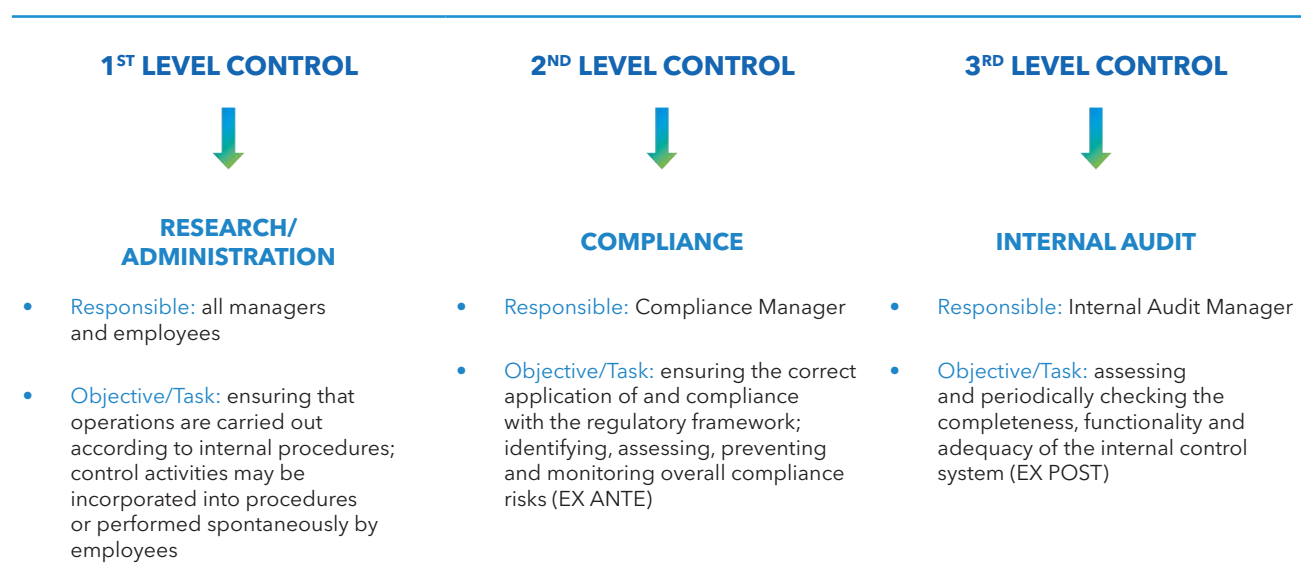
The Human Technopole Foundation, being aware of the importance of internal controls and being, in particular, an institution mainly financed by public funds, has voluntarily set up an Internal Audit & Compliance unit that functionally and organisationally reports to the President with regard to Compliance activities and to the Supervisory Board, through the President, with regard to Internal Audit activities.

The unit liaises with the departments and areas of HT engaged in day-to-day operations, performing

first-level controls. The function operates either ex ante as Compliance (second level controls) to ensure the definition of an internal regulatory framework, or ex post, as Internal Audit (third level controls), to carry out compliance audits.

The 3-level set makes up the Human Technopole Foundation's 'Control Structure', which is systematically presented and illustrated to each new recruit during onboarding.

HUMAN TECHNOPOLE FOUNDATION - CONTROL STRUCTURE



In accordance with the *International Professional Practices Framework* (IPPF) drawn up by the *Institute of Internal Auditors* (Florida-USA) - a professional association recognised as the sole international reference on the subject - Internal Audit has its own charter and regulation approved by the Supervisory Board. The charter formalises the unit's purposes, powers and responsibilities, establishing its position within the organisation and its functional

reporting lines, and also authorises access to the data, people and assets of the Human Technopole Foundation necessary to perform its activities, including their scope. The unit's regulation governs its activities and the related methods, results and information flows, also vis-à-vis the Supervisory Board.

ACTIVITIES in 2023

The process for the definition of the 2023 Internal Audit Plan included the performance of a Risk Assessment aimed at identifying the HT Areas/Departments with the greatest risk, on which to focus assurance activities.

Internal Audit:

1. mapped, as part of the Risk Assessment process, **132** processes involving **13** Areas/Departments;
2. estimated the potential risk (Inherent Risk = Frequency x Impact) for each process;
3. evaluated the effectiveness of the safeguards in place (controls, internal regulations) in reducing the potential risk and estimated the net risk (Residual Risk = Inherent Risk - Safeguards);
4. defined the Audit Plan according to the areas/departments presenting the highest Residual Risk.

The Audit Plan was approved by the Supervisory Board on 2 February 2023.

The following audits were identified for the year 2023:

- ▶ Supply Chain Audit;
- ▶ ICT Security Audit - Penetration test;
- ▶ Audit concerning negotiated procedures without the prior publication of a call for bids under Art. 63 of Decree-Law 50/2016;
- ▶ Audits to verify the ineligibility, incompatibility and conflict of interest of the members of Human Technopole Foundation bodies;

During 2023, the audits, and their follow-ups, that had begun in 2022 were completed, in particular: Finance Audit, Strategy & Scientific Affairs Audit, Institutional Relations and Public Affairs Audit.

As far as the Compliance structure is concerned, the Human Technopole Foundation has set up a system of internal regulatory documents aimed at ensuring the transposition of the laws in force as well as the uniform performance of activities. These documents are of three types, as illustrated below:

TYPES OF INTERNAL REGULATORY DOCUMENTS

A	Regulations provide the general framework for each area of activity, defining the general principles that govern the fundamental aspects of the organisation's operations. Regulations are rarely subject to change APPROVED BY THE SUPERVISORY BOARD
B	Internal Procedures define in detail the internal modus operandi for carrying out the different activities regulated therein (e.g. workflows), establishing the conduct expected of their recipients; Internal Procedures are reviewed periodically to ensure that they are up-to-date - APPROVED BY THE MANAGEMENT COMMITTEE
C	Guidelines provide explanations and general indications on specific issues for which the Foundation intends to give guidance in the form of operational instructions APPROVED BY THE DIRECTOR

When a document is first drafted or later revised, the person responsible for the draft is required to forward it to Compliance for ex-ante controls and audit.

With regard to Compliance activities, during 2023 the unit codified new Regulations, Procedures or Guidelines, assisting the internal departments concerned. The department continues to manage the Register of Conflicts of Interest.

ADMINISTRATION

The implementation of HT's scientific activities goes hand in hand with the expansion and consolidation of administrative and support activities for scientific research.

As early as 2021, the Supervisory Board approved HT's 'Organisational Regulations', which codify the organisational structure as well as the allocation of duties and responsibilities within the Human Technopole Foundation. The Organisational Regulations define HT's organisational macro-structure, illustrate the activities and responsibilities of the various organisational units and define

the hierarchical and functional relationships between them. The organisational structure is instrumental to the pursuit of HT's institutional and statutory purposes and meets the criteria of good governance, transparency, effectiveness and efficiency. As part of the Organisational Regulations, an Administration Department was thus established, reporting to the Head of Administration, which coordinates and supervises all areas and functions. In February 2024, **Elena Trovesi**, with extensive quality and administrative experience in the field of scientific research, was appointed as HT's new Head of Administration.

FINANCIAL REPORTING OFFICER

The position of Financial Reporting Officer was established as early as 2021 in accordance with the Ministry of Economy and Finance circulars for the application of Article 154-bis of the Consolidated Law on Finance to the companies in which it holds an interest.

The Financial Reporting Officer is also the head of the Finance area, and was appointed on 13 July 2021 following the Supervisory Board's resolution on 30 June 2021 with the approval of the Organisational Regulations of the Human Technopole Foundation, pursuant to Article 154-bis of Italian Legislative Decree 58/1998. The Financial Reporting Officer is responsible for:

- ▶ establishing administrative and accounting procedures necessary for the preparation of accounting and corporate documents and any other financial communications, also ensuring their adequacy and effective application;
- ▶ certifying, jointly with the Management Body of the Human Technopole Foundation, in a special report attached to the Financial Statements:
 - the adequacy and effective application of these procedures during the period covered by the documents;

- that the documents are in accordance with the national accounting standards issued by the OIC (Italian Accounting Board);
- that the documents are consistent with the Foundation's accounting books and records;
- that they give a true and fair view of the assets and liabilities, operating performance and financial position of the Human Technopole Foundation;
- that, with regard to the Financial Statements, the Report on Operations includes a reliable analysis of the development and results of operations, as well as the situation of the Human Technopole Foundation, together with a description of the main risks and uncertainties to which it is exposed.

During the year 2023, the development of the project aimed at analysing and mapping the 'as is' situation vs. the 'to be' situation with regard to the SoD (Segregation of Duties) and the main manual/automatic controls of the Finance area was further pursued to monitor and mitigate risks, also with a view to further developments.

The project focused, in particular, on the following operational processes:

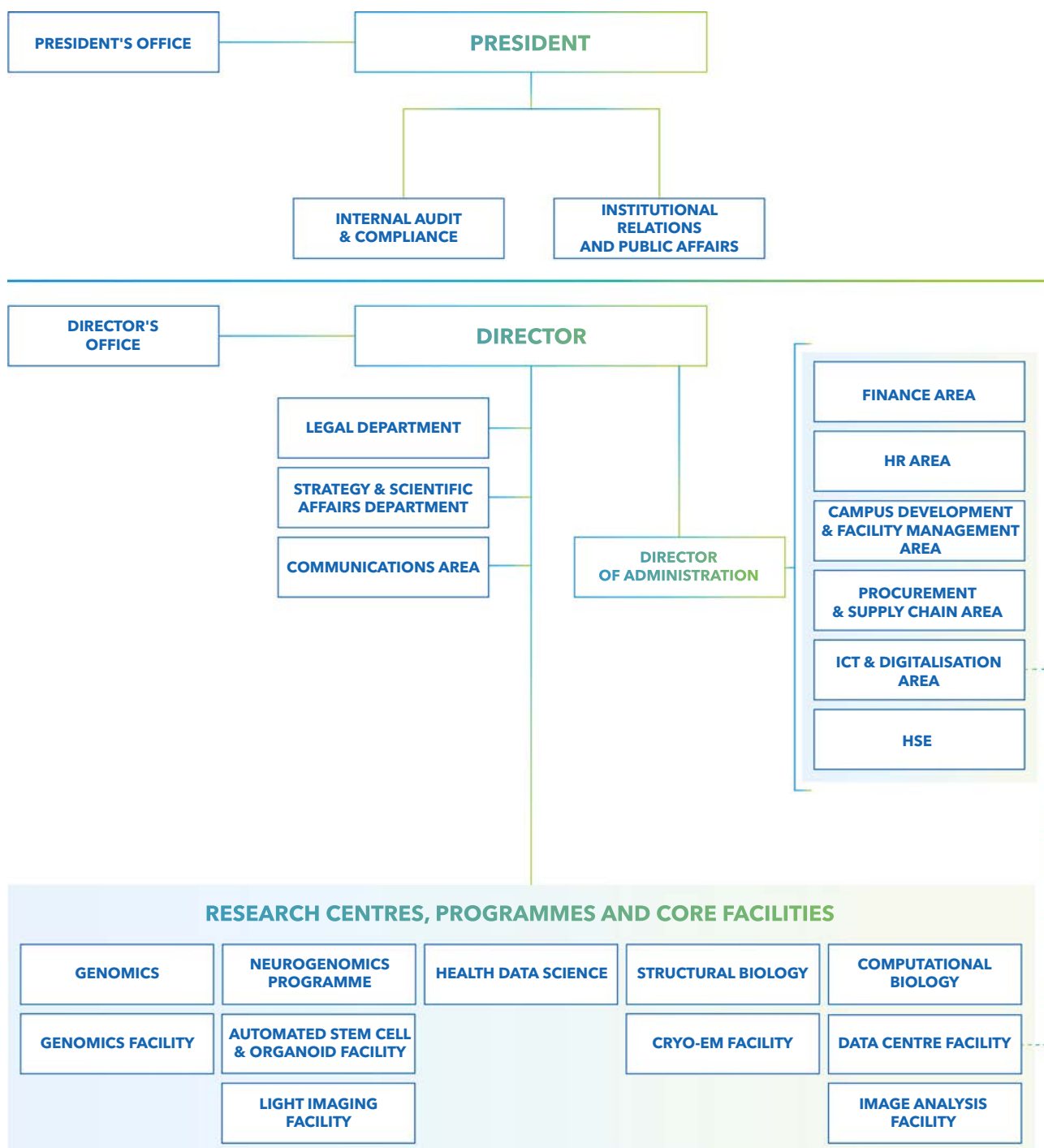
- ▶ Warehouse cycle;
- ▶ Expenditure reporting cycle (review and fine-tuning);
- ▶ Grant Cycle (European and smaller grants).

In addition, in 2023 and early 2024, the expenditure reporting cycle and the warehouse cycle were

tested to verify the operational effectiveness of the controls applied.

ORGANISATION CHART*

HT's organisational structure is formalised in the organisation chart shown below:



* Organisation chart as at 31/12/2023.

02

OUR APPROACH TO VALUE CREATION

Human Technopole has been created to bring added value to the scientific research ecosystem in Italy and Europe

2.1 Stakeholder engagement and materiality matrix	52
2.2 Value creation model	71
2.3 Strategy	152
2.4 Responsible and sustainable approach	188



Janine Weber

Senior Technician
National Facility for Structural Biology

2.1 Stakeholder engagement and materiality matrix

MATERIALITY ASSESSMENT

With regard to the materiality assessment, in line with what was developed in 2022, the Human Technopole Foundation maintained a dual operational approach also for the financial year 2023. On the one hand, HT's strategic objectives, as set out in the materiality matrix already reported in the 2022 edition of the Integrated Report (materiality matrix for strategic objectives), were confirmed. On the other hand, material topics which, based on the materiality assessment conducted in 2022, highlighted actual and potential (positive and negative) impacts on the environment, people and the economy resulting from HT's activities and that might influence stakeholders' decisions (ESG materiality), were deepened and measured.

It is underlined that the two approaches are closely interrelated and that each impact identified and measured in the ESG materiality matrix is linked to at least one strategic objective mentioned in the '*materiality matrix for strategic objectives*' and to a UN 2030 Agenda sustainable development objective.

The ESG materiality assessment thus highlights the most significant environmental, social and economic impacts of HT's operations underlying the eight strategic objectives reported both in the '*materiality matrix for strategic objectives*' and in the value creation model.

MATERIALITY MATRIX FOR STRATEGIC OBJECTIVES

The prioritisation of HT's strategic objectives was determined by involving corporate bodies, management and corporate functions and reflects the guidelines set out in the 2020-2024 Strategic Plan. The latest mission entrusted to the Human Technopole Foundation by law, namely the creation, management and maintenance of 'National Facilities', was also taken into account. Besides, this mission had already been incorporated in 2021 in the strategic objective entitled '*Development and provision of innovative research infrastructures and*

tools', following the signing of an Agreement at the end of December 2020 between HT and the three supervising Founding Ministries (Art. 1, paragraph 276, letter a, of Law No. 160 of 17 December 2019).

The figure below therefore shows **HT's 8 strategic objectives** and, for each of them, some of the results achieved or to be achieved in the coming years:

STRATEGIC OBJECTIVES

RESULTS



Generate **innovation and quality of research**



5 Research Centres and **25** research groups.
122 publications in international peer-reviewed journals.
37 new methods/tools/protocols tested.



Develop and provide **infrastructure and innovative research tools**



5 National Facilities, about **41%** sqm of the Campus dedicated to research, **410** 'dry' workstations, **190** 'wet' workstations already implemented.



Attract and train talents and share research outputs



59 PhD and **35** postdoctoral fellowships as at 31 December 2023.
61% of researchers from foreign institutions.
98 scientific seminars held at HT.
280 employees as at 31 December 2023.



Obtain **scientific reputation** and promote **dissemination**



In 2023, HT scientists were hosted at **187** conferences and won **6** internationally prestigious awards.
390 participants in scientific training events organised by HT.



Promoting **innovation through research**



€2 Mln grant in 2023 to the management of CITT..
More than **5** HT scientists were trained in Technology Transfer in 2023, **500** participants attended events on TT



Contribute to **sustainability (environmental, social and economic)**



81% of energy from renewable sources and numerous initiatives related to gender equality and work-life balance support.



Build **partnerships and networking** and promote **stakeholder engagement**



18 new partnerships with universities/IRCCS (research and healthcare scientific institutes)/research centres/industries, collaborations with entities in the MIND area
43,750 followers on social media



Achieve **effectiveness and efficiency of operational processes**

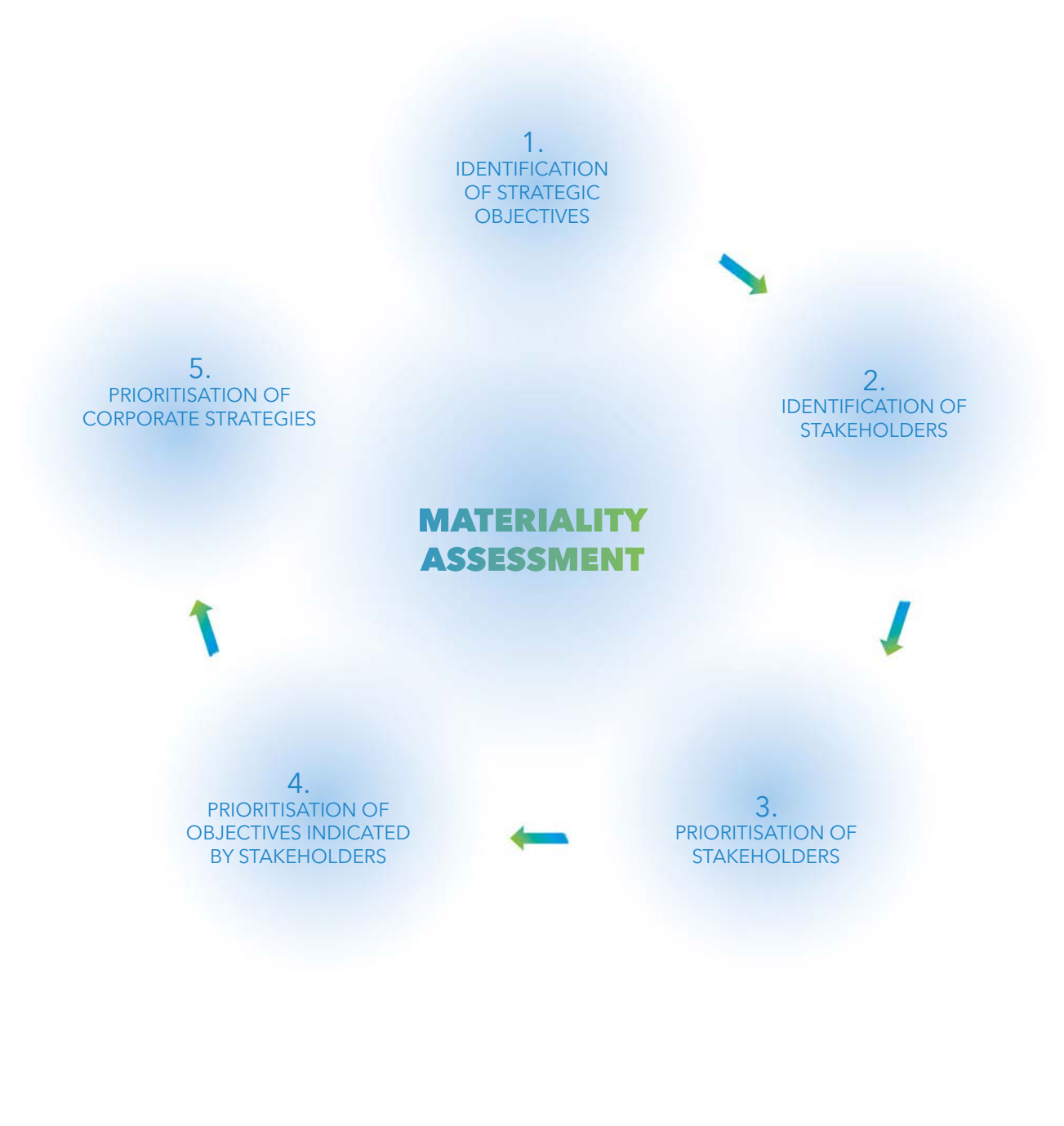


Consolidation of Digital Transformation projects.
457 incidents in the Campus area resolved in 2023 (**100%**)

For further details on HT's strategic objectives, please refer to subchapter 2.3 'Strategy'.

The materiality assessment was conducted in accordance with the IIRC (International Integrated Reporting Council) guidelines. With regard to the definition of key issues and the application of materiality principles, reference was made to the Accountability Criteria and the GRI Standards (Global Reporting Initiative).

The following image shows the stages of the materiality assessment implemented by the Human Technopole Foundation as early as the 2020 financial year and confirmed in subsequent years:



The materiality matrix summarises the different priorities of HT and of its stakeholders, providing a summary of the strategic objectives that, on the one hand, guide the actions and performance of the Human Technopole Foundation and, on the other, can influence stakeholders' decisions. The materiality matrix also shows the degree of alignment or misalignment between the priorities assigned by stakeholders to the different strategic objectives and the level of HT's commitment to them.

Looking in detail at HT's major stakeholders, the analysis found 7 different categories: **HT internal structure, Founding Ministries, Industrial Associations, Local Institutions, Civil Society and Local Communities, Suppliers and Partners, Research Institutions and Communities.**

The importance of the various stakeholders was assessed and weighted on the basis of the following parameters: dependence (i.e. the importance of the relationship to the stakeholder), influence (i.e. the importance of the relationship to HT) and urgency (i.e. timing in the relationship).

With reference, instead, to the eight strategic objectives of HT, the following issues were examined in detail:

- ▶ As regards stakeholders, **the importance of each strategic objective as perceived by them and the 'direction' of their expectations** (i.e. an expectation of commitment rather than disengagement on the part of HT);
- ▶ As regards HT, the **assessment of strategic objectives according to HT's current and future commitment** to them and their impact on the Human Technopole Foundation's activities.

The importance of the strategic objectives for HT's stakeholders was pictured by analysing the results of interviews as well as of engagement and dialogue initiatives undertaken by HT over the

years. Interviews, surveys, institutional relations at national and local level and media monitoring are just a few examples of the methods used by HT to reach its stakeholders.

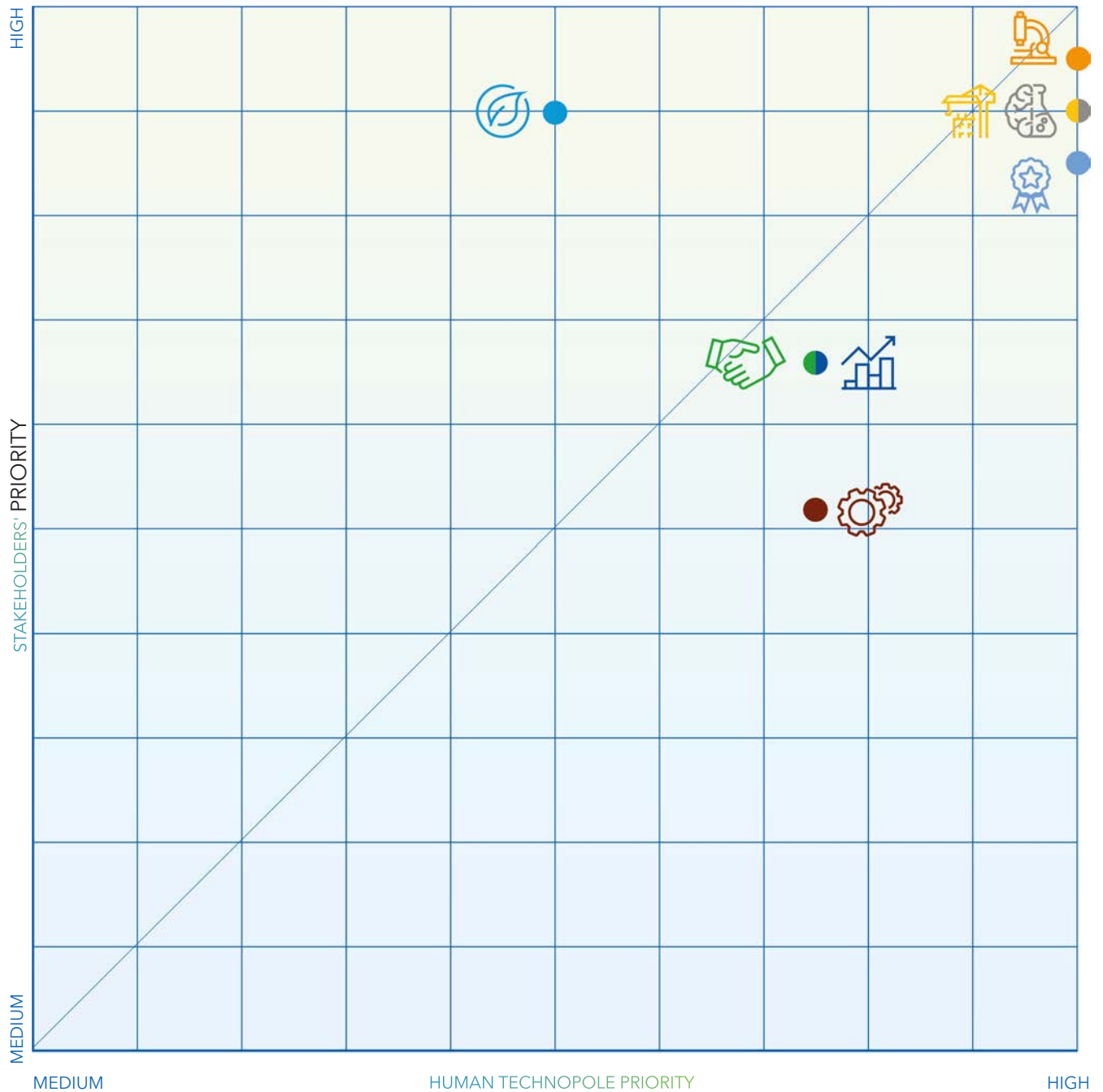
With reference to the 2023 financial year, since the Human Technopole Foundation approved the new 2024-2028 Strategic Plan in December 2023 (to which reference is made for more details in section 2.3 'Strategy'), it was deemed appropriate to keep the materiality matrix prepared in 2022 unchanged, postponing to 2024 the engagement process aimed at identifying and analysing stakeholders' priorities.

Therefore, examining the materiality matrix, with reference to each of its axes, shows:

- ▶ on the **vertical axis**, the **priorities**, duly calibrated on the basis of their importance to HT, given by **stakeholders** to the various strategic objectives. The upper part of the matrix, therefore, shows the topics for which stakeholders demand most commitment from HT in terms of investments, enhancement of existing activities and management systems or the formalisation of clear commitments and policies;
- ▶ on the **horizontal axis**, the **strategic objectives on which HT plans to focus its efforts**. The right-hand side of the matrix therefore shows the topics on which a high level of current commitment is guaranteed within the framework of HT's strategic objectives.

The combination of these two different perspectives leads to the identification of the most important strategic objectives for both HT and its stakeholders and, consequently, to the assessment of the level of alignment (or misalignment) between external expectations and internal importance.

MATERIALITY MATRIX 2023



- Innovation and quality of research
- Partnerships, networking and stakeholder engagement
- Talent attraction and training, and research output sharing
- Development and provision of infrastructure and innovative research tools
- Effectiveness and efficiency of operational processes
- Sustainability (environmental, social and economic)
- Innovation through research
- Scientific reputation and dissemination

COMMENTS ON THE MATERIALITY MATRIX FOR STRATEGIC OBJECTIVES

The materiality matrix, also for the year 2023, shows substantial general alignment between almost all of HT's strategic objectives and the priorities expressed by its stakeholders. The matrix shows that, as in the previous year, the strategic objectives deemed most important by HT, i.e. **'Innovation and quality of research'** and **'Scientific reputation and dissemination'** are prioritised also by its stakeholders, as is the strategic objective referred to **'Development and provision of infrastructure and innovative research tools'**. The latter, confirming the findings of previous years, was identified as a priority by both HT's bodies and the scientific stakeholders, i.e. research institutes and universities. These considerations are confirmed, among other things, by the considerable efforts made by the Human Technopole Foundation, in the course of 2023, to implement the Agreement signed with the Founding Ministries - Ministry of University and Research, Ministry of Economy and Finance and Ministry of Health. In fact, the Agreement assigns to HT, as part of its mission as an infrastructural scientific hub supporting national scientific research, the task of supporting newly identified "infrastructural scientific facilities", defined as "facilities, resources and related services used by the scientific community to conduct high-quality research in their respective fields, without any official or national affiliation". Furthermore, it should be noted that HT's commitment to the strategic objective of **'Talent attraction and training, and research output sharing'** is even more important internally. These four strategic objectives are those to which HT has now attached the highest level of priority and on which the Human Technopole Foundation has focused most of its efforts.

It is also worth noting that the strategic objective of **'Effectiveness and efficiency of operational processes'** has been assigned a high priority, both internally and externally, compared to the previous year; this is also due to the continuous and intense development and growth in size that HT has been undergoing in recent years.

The objectives of **'Innovation through research'** and **'Partnerships, networking and stakeholder engagement'** are positioned, on both axes, with a high level of priority, highlighting a clear alignment with the need and desire to invest in cooperation and partnership between HT and its scientific and institutional stakeholders. Likewise, the topic related to innovation through research is also incredibly important both outside and inside the Human Technopole Foundation. In particular, in 2023 the activities of the Centre for Innovation and Technology Transfer focused on entrepreneurial training, the creation and implementation of a network of technology transfer players and the promotion and study of international models potentially applicable to the Italian context. HT's commitment to innovation through research remains high so that, in the near future, appropriate strategies will be developed to foster technology transfer processes that typically require a medium- to long-term time horizon.

Lastly, with reference to the strategic objective of **'Sustainability'**, which is positioned at an ever-increasing level of external prioritisation, the Human Technopole Foundation has shown its commitment with the formal appointment of a Sustainability Committee as early as 2022 as well as a series of concrete initiatives, some of which have already been implemented and whose details are provided in the section of this document on HT's responsible and sustainable approach (subchapter 2.4).

Stakeholder engagement, in addition to providing the necessary elements for the development of the materiality matrix, has allowed for an in-depth analysis of the degree of alignment of each individual stakeholder with HT's strategic objectives.

The table below shows the different categories of our key stakeholders and their main characteristics:

Stakeholder	Expectations on HT	Stakeholder Priorities			
					
FOUNDING MINISTRIES	As founding and funding members, the Ministries demand that HT carry out its statutory activities according to criteria of cost-saving, effectiveness and disclosure. They also demand transparent information on how funds are used, the activities carried out and the development prospects of HT	●	●	●	●
INDUSTRIAL ASSOCIATIONS	Industrial associations require HT to market the results of research by creating partnerships and promoting technology transfer	●	●		●
LOCAL INSTITUTIONS	Local institutions require HT to implement programmes of scientific excellence and efficiency in operational processes, so as to contribute to the development of local territories in terms of global sustainability	●	●		
CIVIL SOCIETY AND LOCAL COMMUNITIES	Civil society and local communities demand that HT contribute to the development of local territories in terms of global sustainability and by creating partnerships				●
SUPPLIERS AND PARTNERS	This category of stakeholders demands that HT engage in the development of valuable, fair and transparent partnerships, also contributing, where possible, to adding value to the MIND area				●
HT INTERNAL STRUCTURE	Employees play a key role in ensuring the achievement of HT's strategic objectives. It is important to understand their needs and aspirations by creating an optimal working environment for the development of the best skills	●	●	●	●
RESEARCH INSTITUTIONS/ COMMUNITIES	Research institutions require HT to be available to create scientific partnerships, establishing joint projects and making the developed scientific infrastructure available	●	●	●	●



Link to output capitals

HT's commitment

- Relational Capital
- Intellectual Capital
- Human Capital
- Infrastructural Capital

- Development of programmes and activities in line with the missions entrusted by the Ministries
- Accountability in the use of resources and transparency in financial reports and disclosures
- Involvement in defining policies for HT's growth

- Relational Capital
- Financial Capital

- Development of partnerships and collaborations with external parties in the implementation of CITT (Centre for Innovation and Technology Transfer) activities

- Relational Capital
- Intellectual Capital
- Infrastructural Capital

- Development of programmes of scientific excellence
- Organisation of science dissemination events and initiatives and development of scientific partnerships and collaborations
- Development of digitisation programmes and internal procedures streamlining business processes

- Relational Capital
- Intellectual Capital

- Development of initiatives to raise awareness of scientific research
- Development of initiatives focused on sustainable activities and ESG topics
- Enhancement of scientific reputation and sharing of research outputs

- Relational Capital
- Intellectual Capital

- Organisation and management of fair and transparent procurement, tendering and 'expression of interest' processes
- Development of interactions aimed at creating partnerships in the MIND area also with regard to sustainability issues

- Relational Capital
- Intellectual Capital
- Human Capital

- Training programmes and welfare systems
- Employee engagement through surveys and regular meetings
- Conventions and welfare programmes
- Work-life balance initiatives
- Internal communication campaigns
- Code of Ethics
- Development of gender equality programmes

- Intellectual Capital
- Human Capital
- Infrastructural Capital
- Relational Capital

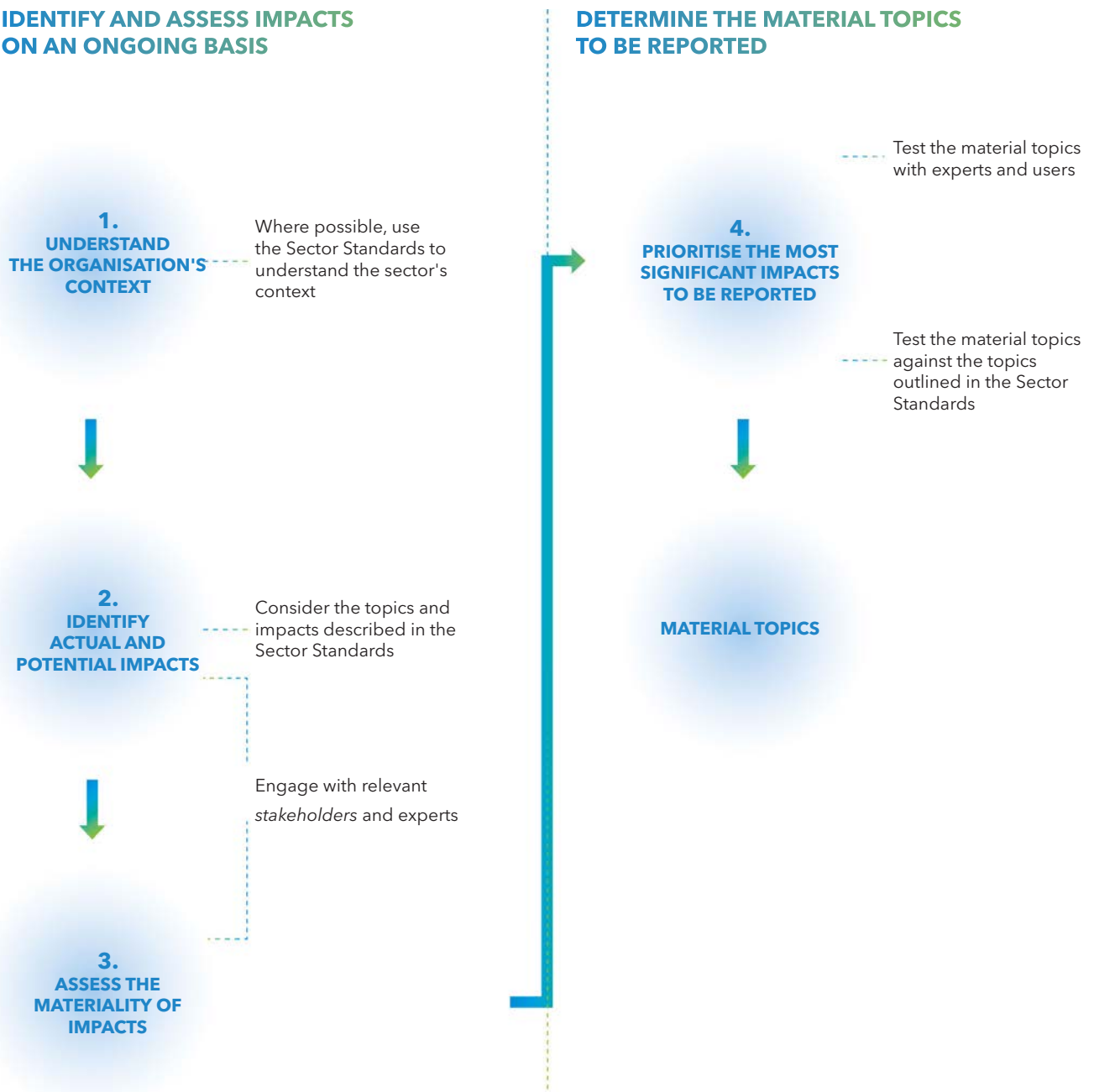
- Creation of scientific partnerships and joint scientific research projects
- Sharing of infrastructure and research tools
- Development and Implementation of National Facilities

ESG MATERIALITY ASSESSMENT

As described above, the Human Technopole Foundation, in addition to presenting again the materiality matrix showing HT's strategic objectives, has carefully examined the impacts that its underlying operations generate from an environmental, social and economic perspective. As with the materiality matrix for strategic objectives, the ESG materiality assessment remained unchanged in 2023 and the

material ESG topics already identified and prioritised in 2022 were confirmed.

The process of identifying impacts and material topics was divided into four steps, taking into account the new GRI 3. The process is illustrated below:



STEP 1: UNDERSTANDING THE ORGANISATION'S CONTEXT

Since no specific Sector Standards for the Human Technopole Foundation's activities were yet available at the date of implementation of the Integrated Report 2023, the starting point for the analysis of actual and potential impacts was as follows:

1. Contextualisation of HT based on an understanding of its mission and values and on an analysis of its Strategic Plan as well as of the impacts generated by the new mission assigned to HT by law (i.e. the implementation and management of what are known as *National Facilities*);
2. Analysis of the operational activities underlying HT's strategic objectives already included in the materiality matrix for the years 2020, 2021 and 2022;
3. Analysis of possible changes to the value creation model already implemented in previous years;
4. Confirmation of stakeholders already engaged and opening up of engagement activities to new stakeholders. The previously identified categories remained unchanged. HT's constructive dialogue with its stakeholders continued, in an even more structured form, with the aim of making its sustainable and responsible growth path explicit and transparent. In particular, relations with national and international scientific research institutes were consolidated and expanded, institutional relations were intensified, and it was also deemed important to foster and have more constant relations with the local institutions and players that are connected, in various capacities, to the MIND (the Milan Innovation District) area.

STEP 2: IDENTIFYING ACTUAL AND POTENTIAL IMPACTS

In addition to the initial considerations made in the previous step, the following activities were carried out to identify actual and potential impacts:

1. Identification and analysis of all new company policies in order to understand the direction and initiatives taken by HT's governance bodies;
2. Identification of the main news concerning HT, whether coming from its website or published on the press or found on the web. Such news refers to the main activities and events involving HT during 2023;
3. Analysis of the main scientific collaboration programmes developed by the Human Technopole Foundation in 2023;
4. Internal discussions with the executives in charge of the different areas and departments (both scientific and administrative) of HT with regard to the main activities carried out and the development of future programmes;
5. Analysis of the contents of the fortnightly plenary meetings chaired by the Director and involving the entire HT population ('HT All Staff Meetings').

In the 'ESG materiality' analysis, as set out in GRI 3, the 27 (actual/potential) impacts with both positive and negative implications that had been previously identified were confirmed. These impacts are the consequence, in ESG terms, of the main operational activities included in HT's 8 strategic objectives.

The operational activities identified were as follows:

- ▶ Development of scientific research programmes of excellence;
- ▶ Development and sharing of sustainable and innovative buildings and infrastructures (National Facilities);
- ▶ Activities and programmes for the development of the 'Centre for Innovation and Technology Transfer';
- ▶ Development of an approach to digital transformation;
- ▶ Development of partnerships and collaborations with players in the MIND area;
- ▶ Development of partnerships and collaborations with universities and research institutes on scientific research projects;
- ▶ Adoption of a Code of Ethics and Model 231;
- ▶ Award and management of public contracts according to the principles of cost-saving, efficiency, timeliness and fairness;
- ▶ Support for work-life balance and parenthood;
- ▶ Responsible supply chain management;
- ▶ Development of job opportunities for researchers and administrative staff;
- ▶ Education and training programmes for the next generation of scientists, also by promoting initiatives for the exchange of scientific knowledge, researcher mobility and the organisation of scientific initiatives and events;
- ▶ Sustainable consumption management and development of energy efficiency programmes;
- ▶ Efficient waste management;
- ▶ Greater attention to health and safety issues at HT through preventive actions (HSE policies);
- ▶ Greater awareness of gender issues at HT and in the scientific research world in general;
- ▶ Achievement of gender balance in senior, leadership and decision-making positions;
- ▶ Fight against discrimination and gender harassment.

These operational activities were then grouped into the following 6 macro-categories:

RESEARCH AND INNOVATION

GOVERNANCE AND ETHICS

SOCIAL ISSUES AND PEOPLE

ENVIRONMENTAL PROTECTION

HEALTH AND SAFETY AT WORK

GENDER EQUALITY

The 27 identified impacts, previously validated by the Sustainability Committee, an advisory body within the Supervisory Board, were ordered on a

priority basis by our stakeholders to determinate their degree of materiality.

STEP 3: ASSESSING THE IMPORTANCE OF IMPACTS

In assessing the impacts, the Human Technopole Foundation determined a level of materiality taking into account the following elements:

IMPORTANCE	i.e. how serious a negative impact is (or might be) and how beneficial a positive impact is (or might be);
SCALE	i.e. how widespread a negative or positive impact is (or might be);
IRREMEDIABLE CHARACTER	i.e. how difficult it is to counteract or remedy the damage resulting from a negative impact;
LIKELIHOOD	i.e. the chance of a potential impact occurring.

The level of materiality was then weighted according to the influence that each stakeholder has on HT, thus in line with the approach used to determine the priorities expressed by HT's stakeholders with respect to its strategic objectives (materiality

matrix for strategic objectives).

The impacts were then assessed by HT's stakeholders through engagement activities consisting of interviews and surveys.

STEP 4: PRIORITISING THE IMPACTS TO BE REPORTED

After determining the level of materiality and taking into account the results of the internal and external stakeholders' prioritisation process, impacts were divided between those with a '*higher level of materiality*' and those with a '*lower level of materiality*'.

The Integrated Report 2023 discusses and describes only the impacts positioned above the materiality threshold defined in the previous step (STEP 3), along with the mitigation activities implemented by the Human Technopole Foundation to counteract the negative impacts.

The table below shows all 27 identified impacts, ordered according to the prioritisation process carried out on the basis of the results of discussions with stakeholders.

As can be seen from the table, each impact is associated with:

- ▶ the related operational activity that generates it;
- ▶ the macro category into which it falls;
- ▶ the main related strategic objective set out in the 'materiality matrix for strategic objectives';
- ▶ the Sustainable Development Goals (SDGs) set out in the UN 2030 Agenda, which HT meets or believes it meets;
- ▶ the indication concerning the reporting of the impact in the Integrated Report 2023.

PRIORITISATION OF MATERIAL TOPICS

HT STRATEGIC OBJECTIVES	ACTIVITIES
 INNOVATION AND QUALITY OF RESEARCH	Development of scientific research programmes of excellence
 PARTNERSHIPS, NETWORKING AND STAKEHOLDER ENGAGEMENT	Development of partnerships and collaborations with universities and research institutes on scientific research projects
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Support for work-life balance and parenthood
 TALENT ATTRACTION AND TRAINING, AND RESEARCH OUTPUT SHARING	Education and training programmes developed for scientists, including by promoting initiatives for the exchange of scientific knowledge, researcher mobility and the organisation of scientific events
 SCIENTIFIC REPUTATION AND DISSEMINATION	
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Effective waste management
 INNOVATION THROUGH RESEARCH	Activities and programmes for the development of the 'Centre for Innovation and Technology Transfer'
 DEVELOPMENT AND PROVISION OF INFRASTRUCTURE AND INNOVATIVE RESEARCH TOOLS	Development and sharing of sustainable and innovative buildings and infrastructures (National Facilities)

IMPACTS	MACRO CATEGORY	SDGs	INTEGRATED REPORT 2023
Effects on people's wellbeing and health status through scientific research programmes of excellence	RESEARCH AND INNOVATION	3 and 9	YES
Effects on the environment from the use of chemical preparations for experiments, production of potentially hazardous waste (crops and biological agents), etc.			
Positive effects on the economy and people as a result of the development of partnerships and collaborations with universities and research institutes on scientific research projects, also exploiting NRRP opportunities	RESEARCH AND INNOVATION	3 and 9	YES
Potential negative economic effects due to a possible competitive risk arising in case of ineffective management of collaborations/partnerships with other scientific institutions			
Positive effects on people's wellbeing due to the adoption of policies supporting work-life balance and parenthood	SOCIAL ISSUES AND PEOPLE	8	YES
Positive effects on people as a result of education and training programmes developed for scientists, including through initiatives promoting the exchange of scientific knowledge, researcher mobility and the organisation of scientific events	SOCIAL ISSUES AND PEOPLE	4	YES
Positive effects on the environment through effective management of hazardous and non-hazardous waste, water discharge monitoring, HSE policy for environmental impact analysis	ENVIRONMENTAL PROTECTION	6, 11, 12	YES
Environmental impacts caused by the consumption of automotive resources, CO ₂ emissions into the atmosphere and noise pollution from vehicle traffic resulting from waste management during disposal			
Potential positive effects on economic resources and people through development programmes aimed at promoting the economic exploitation of intellectual property (new scientific patents) and the related technology transfer to the market ('Centre for Innovation and Technology Transfer')	RESEARCH AND INNOVATION	8 and 9	YES
Potential positive effects on the environment, economic resources and people's wellbeing through the development of a 'user access' strategy that can ensure transparent and effective use of HT infrastructures (National Facilities) by making them available to the national scientific community	RESEARCH AND INNOVATION	9 and 11	YES

HT STRATEGIC OBJECTIVES	ACTIVITIES
 TALENT ATTRACTION AND TRAINING, AND RESEARCH OUTPUT SHARING	Development of job opportunities for researchers and administrative staff
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Achievement of gender balance in senior, leadership and decision-making positions
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Responsible supply chain management
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Sustainable consumption management and development of energy efficiency programmes
MATERIALITY THRESHOLD	
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Fight against discrimination and gender harassment
 SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Award and management of public contracts according to the principles of cost-saving, efficiency, timeliness and fairness

IMPACTS	MACRO CATEGORY	SDGs	INTEGRATED REPORT 2023
Positive effects on the economy and people from the development of job opportunities for researchers and administrative staff	SOCIAL ISSUES AND PEOPLE	8 and 9	YES
Indirect negative effects on the environment, particularly in terms of atmospheric emissions, due to increased mobility and traffic (as a result of an increase in HT's population)			
Potential positive effects on people from the achievement of gender balance in senior, leadership and decision-making positions	GENDER EQUALITY	5	YES
Potential positive effects on the environment, economic resources and people's wellbeing from responsible supply chain management (with a focus on environmental and social sustainability requirements)	SOCIAL ISSUES AND PEOPLE	8 and 12	YES
Potential negative economic effects resulting from excessive bureaucracy and long lead times for the acquisition of resources due to the para-public nature of HT			
Positive effects on the environment from sustainable consumption management and the development of energy efficiency programmes (e.g. appointment of an Energy Manager, installation of photovoltaic plants, energy consumption monitoring plans, HSE policy for environmental impact analysis, monitoring of emissions into the atmosphere)	ENVIRONMENTAL PROTECTION	7	YES
Potential short-term negative effects on people due to the use of more financial resources for energy efficiency investments, such as plant implementation/maintenance, resulting in fewer resources for scientific research			
Positive effects on people as a consequence of fighting gender discrimination and harassment	GENDER EQUALITY	5	NO
Positive effects on the environment, economy and people from the award and management of public contracts according to the principles of cost-saving, efficiency, timeliness and fairness, taking into account social and environmental sustainability criteria	GOVERNANCE	8, 12, 16	NO
Potential negative economic effects caused by excessive bureaucracy and long lead times for the acquisition of resources due, mainly, to the para-public nature of HT. Consequent slowdown in infrastructural investments and in the implementation of HT's strategy, as resolved by its internal bodies			

HT STRATEGIC OBJECTIVES		ACTIVITIES
	PARTNERSHIPS, NETWORKING AND STAKEHOLDER ENGAGEMENT	Development of partnerships and collaborations with players in the MIND area
	SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Adoption of a Code of Ethics and Model 231
	SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Awareness-raising initiatives on gender issues at HT and in the scientific research world in general
	EFFECTIVENESS AND EFFICIENCY OF OPERATIONAL PROCESSES	Development of an approach to digital transformation
	SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)	Carrying out preventive actions to protect health and safety within the Human Technopole Foundation

As can be seen from the table above, the impact prioritisation process shows 17 topics positioned above the materiality threshold. These impacts are discussed in-depth in subchapter 2.4 '*Responsible and sustainable approach*' of this report.

IMPACTS	MACRO CATEGORY	SDGs	INTEGRATED REPORT 2023
Potential effects on the environment, economy and people as a result of the development of partnerships and collaborations with players in the MIND area aimed at fostering sustainability, innovation and inclusiveness	RESEARCH AND INNOVATION	9	NO
Positive effects on the environment, economy and people thanks to the adoption of a Code of Ethics and a Model 231 with the aim of providing an absolute guarantee of legality, transparency and fairness in the management of its activities (e.g. environmental compliance, accounting compliance and management of relations with Supervisory Authorities and Financial Backers, health and safety compliance, operational tools for whistleblowing and violence harassment reports)	GENDER EQUALITY	8, 12, 16	NO
Potential negative effects on the environment, economic resources and people's wellbeing connected with the failed or slower socio-economic development of the community in the area in which HT operates due to non-compliance with the 231 legislation on offences			
Positive effects on people from awareness-raising initiatives on gender issues at HT and in the scientific research world in general	GENDER EQUALITY	5	NO
Effects on economic resources and people's wellbeing following the development of Digital Transformation programmes aimed at achieving greater operational efficiency	RESEARCH AND INNOVATION	9	NO
Potential negative effects on economic resources and people's health and safety in case of inadequate internal management and regulation of Digital Transformation (e.g. psychophysical wellbeing and Cyber Crime)			
Positive effects on people from carrying out preventive actions to protect health and safety, implemented through mandatory training, health monitoring, H&S risk assessments, workplace accident/hazard reporting tools	HEALTH AND SAFETY AT WORK	8	NO



The research conducted by HT is high-level and with a high technological impact, in areas that are very important in biomedical and health terms. This aspect contributes to bringing together researchers of national and international standing who provide high-value and in-depth research and results.

2.2 Value creation model

This section of the Integrated Report includes a chart that describes how the Human Technopole Foundation generates sustainable value for its stakeholders. HT's value creation model focuses on strategic objectives that direct its activities to the generation of different outputs, by using the different types of capital available to it.

If we look at the value creation model in depth, we can see that, even though HT has not yet been fully implemented and structured, it can already make a significant, sustainable and socially responsible contribution to the scientific community and the region through its activities.

The research conducted by HT is high-level and with a high technological impact, in areas that are very important in biomedical and health terms. This aspect contributes to bringing together researchers of national and international standing who provide high-value and in-depth research and results.

The infrastructure and technologies available to HT, which will be further implemented in the future, will be accessible to external scientists and will contribute significantly to meeting the needs of the scientific community.

The Agreement signed with HT's three Founding Ministries, by establishing that a quota of the public funds guaranteed to HT, feeds into what is known as the *National Facilities*, fitting in perfectly with the strategic objective of sharing HT's infrastructure and making it available to others.

Advanced scientific training programmes available both inside and outside HT are another of HT's strategic pillars. The fundamental and guiding principle of these training activities is to implement a centre of excellence for the training of talented researchers in the biomedical sciences and to provide broad access to HT's expertise, methods and resources.

For HT, human capital, i.e. its people, their skills and diversity, is a fundamental asset. In addition to human capital, HT uses the important resources deriving from its financial capital, which, as laid down by Article 1, paragraph 119 of Law No. 232 of 11 December 2016, consists of grants from the Founding Italian Ministries and is increased by further contributions from different sources, such as grants or contributions from collaboration agreements. Infrastructural capital, consisting of assets and Facilities, as well as intellectual capital, i.e. HT's know-how, contribute to achieving the objectives of scientific excellence and the sharing of infrastructure with external scientists and other research institutions. Stakeholder relations, partnerships and collaborations with other research institutions, i.e. relational capital, are at the heart of the activities of the value creation model.

All these different types of capital make up the fundamental basis for creating value through strategic initiatives in the short, medium and long term.

INPUT



Financial Capital

Financial resources available through public and private funding



Human Capital

Expertise, experience, excellence and diversity of scientific and non-scientific staff



Infrastructural Capital

HT's assets, Facilities, infrastructure, equipment and services



Relational Capital

Stakeholder relations, collaborations with research centres and universities



Intellectual Capital

The Foundation's knowledge base and organisation of scientific research

INNOVATION AND QUALITY OF RESEARCH

- Centre for Genomics
- Centre for Neurogenomics
- Centre for Computational Biology
- Centre for Structural Biology
- Centre for Health Data Science



SUSTAINABILITY

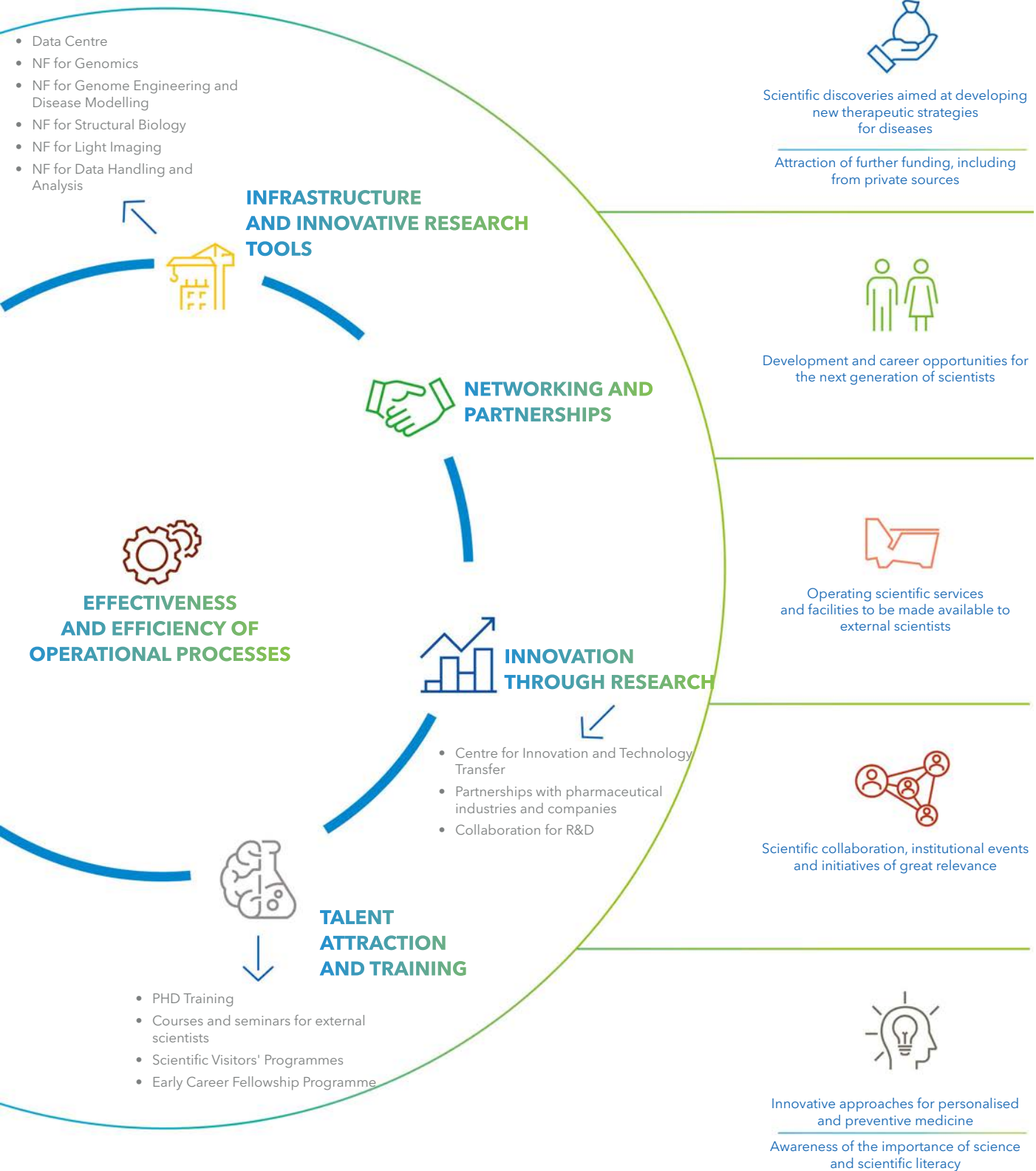


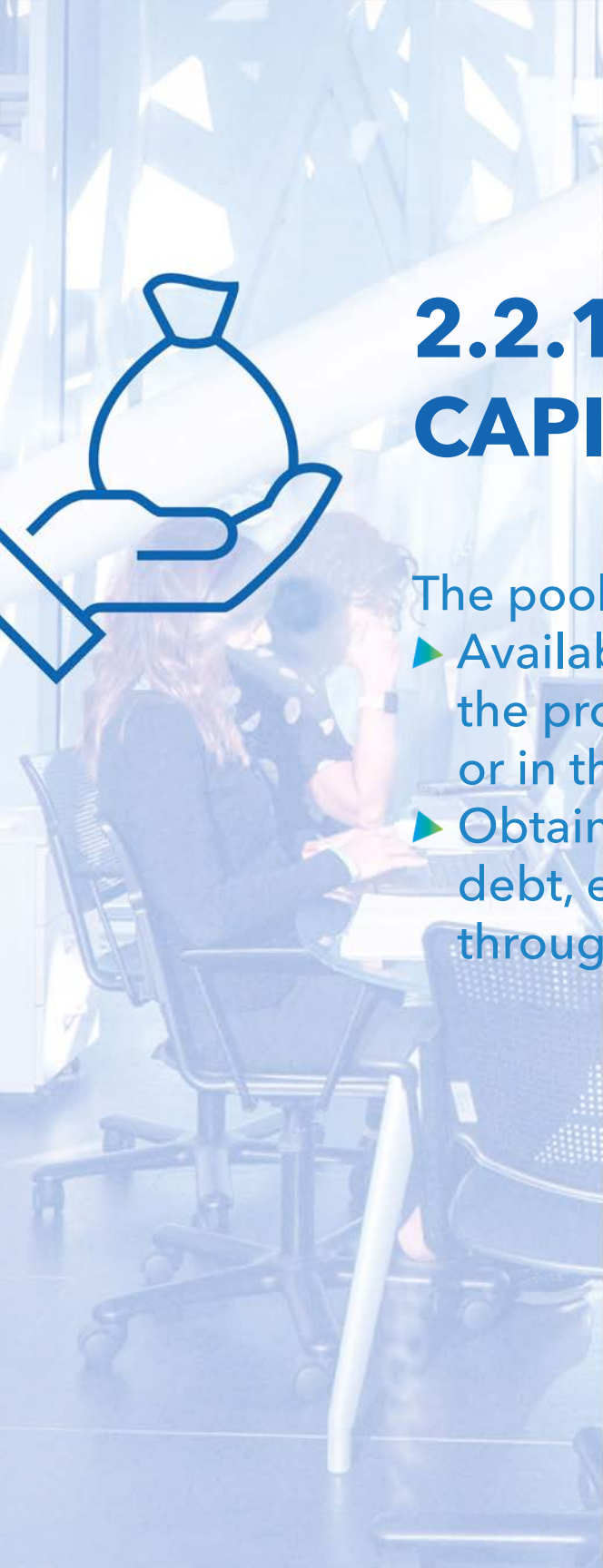
SCIENTIFIC REPUTATION AND DISSEMINATION



- Awards
- Events
- Conferences
- Scientific initiatives
- Conventions

OUTPUT





2.2.1 FINANCIAL CAPITAL

The pool of funds that is:

- ▶ Available to an organisation for use in the production of goods or in the supply of services
- ▶ Obtained through financing, such as debt, equity or grants, or generated through operations or investments

The core funding for infrastructural development and the performance of HT's activities comes from public funds allocated by the Italian government. These funds are provided for by Article 1, paragraph 121 of Law No. 232 of 11 December 2016, and, as of the financial year 2021, are used taking into account also the provisions of the Agreement signed by HT on 30 December 2020 with its Founding Ministries, pursuant to Law No. 160/2019. The Agreement establishes that a quota of no less than 55% of the funds allocated by law is earmarked for what are known as National Facilities (NFs), i.e. for the construction, operation and maintenance of specific scientific infrastructures, identified through a multi-level consultation process, to be made available to external scientific projects.

HT's financial capital is also composed of government grants received pursuant to Article 49/bis of Decree-Law No. 34/2020, which set up the 'Centre for Innovation and Technology Transfer in the Life Sciences' (CITT). The aforementioned Decree-Law, converted with amendments by Law No. 77 of 17 July 2020, provides precisely that the Human Technopole Foundation must adopt specific organisational measures for the use of the funds allocated for this purpose.

Finally, HT's financial capital also consists of additional financing and grants, some of which were formalised in the financial years 2023, 2022 and 2021, from sources other than government grants. Given the growth and development of the Human Technopole Foundation and the implementation of scientific research activities, HT is expected to be able to attract an increasing quantity of different forms of grants from different sources.

HT's assets are divided into an Endowment Fund, which cannot be disposed of and is tied to the pursuit of its purposes laid down in its Bylaws, and an Operating Fund intended to fund its operating expenses.

HT's Endowment Fund is tied to the start-up of the scientific project and was initially assigned to the Istituto Italiano di Tecnologia (IIT) for an original amount of €79,900,000 and later transferred to the Human Technopole Foundation, both in the form of financial resources and assets in kind, for the amount of €77,230,557. The difference between the original amount of the fund and the amount transferred to the Human Technopole Foundation corresponds to the costs incurred for the start-up of the project by IIT.

With reference to the Operating Fund, paragraph 121 of founding Law No. 232 of 11 December 2016 authorised spending on the HT project as follows: €10 million for 2017, €114.3 million for 2018, €136.5 million for 2019, €112.1 million for 2020, €122.1 million for 2021, €133.6 million for 2022 and €140.3 million as from 2023. This grant is paid out in line with the progress of the Human Technopole project. Finally, the same Operating Fund also includes the amounts covered by the former Article 49/bis of Decree-Law 34/2020, whereby grants amounting to €10 million for 2020 and €2 million per year as from 2021 are made HT to promote and finance the 'Centre for Innovation and Technology Transfer'.

FINANCIAL CAPITAL - 2023 RESULTS

The Operating Fund, as of the closing date of the 2023 financial year, was recorded among the Human Technopole Foundation's equity items for a total amount of €464,166,462 and includes the grants indicated in Article 1, paragraph 121 of Law no. 232 of 11 December 2016, relating to the years 2018, 2019, 2020, 2021, 2022 and 2023, for the portion not used at the closing date of the financial year and the portion, yet to be used, of the contributions granted for the 'Centre for Innovation and Technology Transfer in the Life Sciences'.

This fund consists of three different items:

- ▶ the Operating Fund for internal research activities amounting to €231,802,262;
- ▶ the Operating Fund for infrastructure hub activities (known as National Facilities) amounting to €219,593,481;
- ▶ the Operating Fund for the Centre for Innovation and Technology Transfer amounting to €12,770,719.

The table below shows the changes in the Operating Fund and its allocation between the HT quota and the National Facilities quota for a total of €455,539,353:

HT AND NF OPERATING FUND [€]

PERIOD	GRANTS PURSUANT TO LAW 232/2016	GRANTS USED						GRANTS TO BE USED	OF WHICH	
		2018	2019	2020	2021	2022	2023		HT	NF
2017	10,000,000	275,387	5,070,516	4,654,097	-	-	-	-	-	-
2018	114,300,000	-	-	68,154,251	46,145,749	-	-	-	-	-
2019	136,500,000	-	-	-	2,596,626	-	-	133,903,374	133,903,374	-
2020	112,100,000	-	-	-	-	-	-	112,100,000	112,100,000	-
2021	122,100,000	-	-	-	52,530,252	-	-	69,569,748	-	69,569,748
2022	133,600,000	-	-	-	-	69,248,708	-	64,351,292	(9,243,138)	73,594,431
2023	140,300,000	-	-	-	-	-	64,685,061	75,614,939	30,639,080	1,242,025*
TOTAL	768,900,000	275,387	5,070,516	72,808,348	101,272,627	69,248,708	64,685,061	455,539,353	267,399,316	144,406,204

* The figure relating to the 2023 utilisation, in particular the amount of €30,639,080 referred to HT and €1,242,025 referred to the National Facilities, refers to the report submitted to the Ministry of Economy and Finance (MEF) for the period 01.01.2023_30.06.2023.

The table below shows the changes in the CITT operating fund:

CITT OPERATING FUND [€]

PERIOD	GRANTS PURSUANT TO ART. 49-BIS OF DECREE-LAW 34/2020 (CONV. INTO LAW NO. 77/2020)	GRANTS USED						GRANTS TO BE USED
		2018	2019	2020	2021	2022	2023	
2020	10,000,000	-	-	90,775	422,857	254,939	460,711	8,770,718
2021	2,000,000	-	-	-	-	-	(2,000,000)	-
2022	2,000,000	-	-	-	-	-	-	2,000,000
2023	2,000,000	-	-	-	-	-	-	2,000,000
TOTAL	16,000,000	-	-	90,775	422,857	254,939	(1,539,289)	12,770,718

The grant to the Centre for Innovation and Technology Transfer for 2020 amounted to €10,000,000 and to €6,000,000 for 2021, 2022 and 2023. Following the costs incurred and the reversal of the €2,000,000 grant relating to 2021 (these resources referred to the authorisation granted under Decree Law no. 24/2020 Art. 49 bis, so the resources from the financial year 2021 could only be retained for the financial year 2022), the amount of the grant as of 31/12/2023 was €12,770,718.

The 2023 financial year of the Human Technopole Foundation closed with a profit of €35,339, after provisions for corporate income tax (IRES) and regional production tax (IRAP) of €694,085. Depreciation, amortisation and write-downs of tangible and intangible assets in the amount of €15,853,076 were recognised.

The activities carried out in 2023 resulted in total financial commitments of €134,326,924. These commitments resulted in the recognition in the financial statements of operating grants and capital grants of over €66,609,077, relating to the quota pertaining to the year, and approximately €139,007,012 in deferred income, for the part of commitments pertaining to future years.

In financial terms, revenues of approximately €380,038,065 in grants were recognised in 2023 against cash outlays of approximately €74,401,471. Revenues mainly refer to grants received from the Ministry of Economy and Finance totalling €377,786,337.

The table below gives details of the key figures for the financial year 2023, compared with the previous year:

EURO	31/12/2023	31/12/2022
VALUE OF PRODUCTION	66,609,077	65,779,053
EBITDA	16,923,524	13,521,012
OPERATING RESULT	730,815	666,249
PROFIT FOR THE YEAR	35,339	38,032
FIXED ASSETS	131,361,161	125,810,834
TOTAL EQUITY	541,562,132	470,516,175
NET FINANCIAL POSITION	419,566,523	113,929,831

RECLASSIFIED INCOME STATEMENT

The value of production includes grants made by the MEF for a total of €65,145,771, of which €48,148,019 relating to operating grants and €15,802,019 to capital grants attributable to HT's activities; in addition, operating grants of €460,711 relate to the activities of the new Centre for Innovation and Technology Transfer (CITT) and €735,022 to the National Facilities.

Lastly, grants from other entities (non-MEF funds) in the amount of €1,318,139 and 'other revenues' in the amount of €145,166, mainly referring to revenues from commercial activities, which took the shape of the rental of space in Palazzo Italia, as well as the quota of revenues from the scientific project financed by the Wellcome Sanger Institute, were recognised.

The reclassified income statement, compared with that of the previous year, is as follows (in euro):

RECLASSIFIED INCOME STATEMENT [€]	31/12/2023	31/12/2022	CHANGE
VALUE OF PRODUCTION	66,609,077	65,779,053	830,024
EXTERNAL COSTS	28,332,216	34,605,713	(6,273,498)
VALUE ADDED	38,276,861	31,173,340	7,103,521
PERSONNEL EXPENSE	21,353,337	17,652,328	3,701,009
EBITDA	16,923,524	13,521,012	3,402,513
AMORTISATION/DEPRECIATION, WRITE-DOWNS AND OTHER PROVISIONS	16,192,709	12,854,763	3,337,947
OPERATING RESULT	730,815	666,249	64,566
NON-RECURRING INCOME	-	-	-
FINANCIAL INCOME AND CHARGES	1,391	10,777	(9,386)
ORDINARY RESULT	729,424	655,472	73,952
REVALUATIONS AND WRITE-DOWNS	-	-	-
PRE-TAX PROFIT	729,424	655,472	73,952
INCOME TAXES	694,085	617,441	76,645
PROFIT FOR THE YEAR	35,339	38,032	(2,693)

RECLASSIFIED BALANCE SHEET

The main changes in the balance sheet during the financial year 2023 are summarised in the table below. Assets and liabilities have been duly

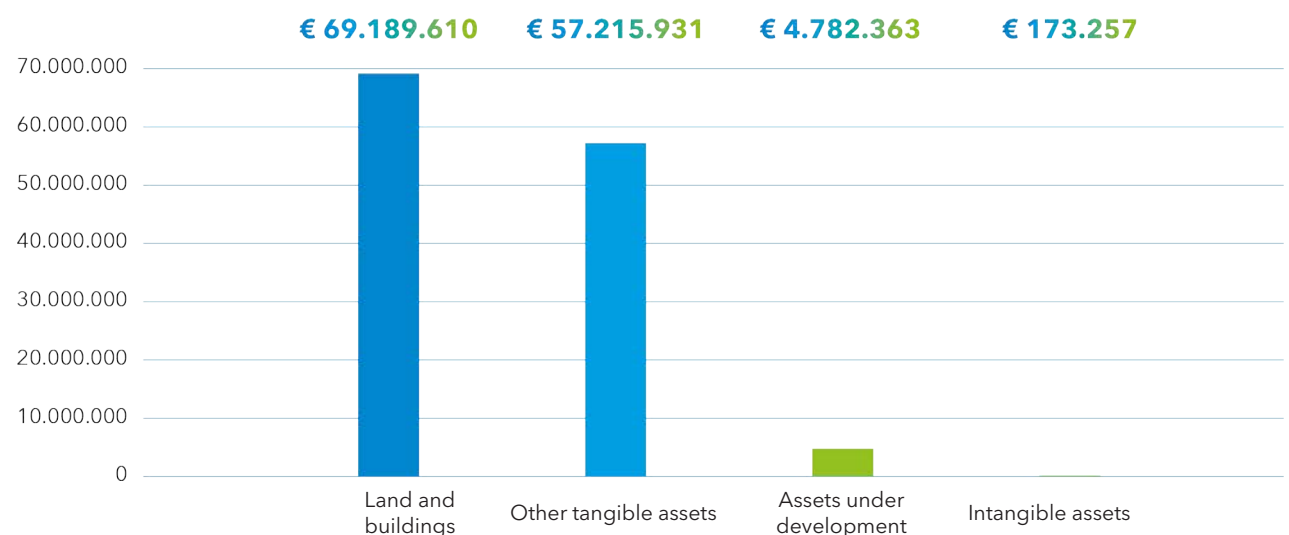
reclassified in order to give evidence of invested capital, sources of funding and their determinants.

The table shows the figures for the financial year 2023 compared with the previous year:

RECLASSIFIED BALANCE SHEET [€]	31/12/2023	31/12/2022	CHANGE
NET INTANGIBLE ASSETS	173,257	158,736	14,521
NET TANGIBLE ASSETS	131,187,904	125,652,098	5,535,806
EQUITY INVESTMENTS AND OTHER FINANCIAL ASSETS	-	-	-
FIXED CAPITAL	131,361,161	125,810,834	5,550,327
INVENTORIES	82,084	58,004	24,080
TRADE RECEIVABLES	116,526	87,702	28,824
OTHER RECEIVABLES	151,204,102	390,172,018	(238,967,916)
ACCRUED INCOME AND PREPAYMENTS	1,593,069	1,452,443	140,626
SHORT-TERM OPERATING ASSETS	152,995,781	391,770,166	(238,774,385)
TRADE PAYABLES	16,227,267	20,482,890	(4,255,623)
ADVANCES	-	-	-
TAX AND SOCIAL SECURITY PAYABLES	3,382,932	4,045,710	(662,778)
OTHER LIABILITIES	1,931,870	1,188,949	742,921
ACCRUED EXPENSES AND DEFERRED INCOME	139,007,012	134,252,672	4,754,341
SHORT-TERM OPERATING LIABILITIES	160,549,081	159,970,220	578,861
NET WORKING CAPITAL	123,807,861	357,610,780	(233,802,919)
SEVERANCE PAY	1,495,397	1,023,134	472,263
TAX AND SOCIAL SECURITY PAYABLES (BEYOND THE NEXT FINANCIAL YEAR)	-	-	-
OTHER MEDIUM AND LONG-TERM LIABILITIES	316,854	1,301	315,553
MEDIUM- AND LONG-TERM LIABILITIES	1,812,251	1,024,436	787,816
INVESTED CAPITAL	121,995,609	356,586,344	(234,590,735)
EQUITY	(541,562,132)	(470,516,175)	(71,045,957)
MEDIUM- AND LONG-TERM NET FINANCIAL POSITION	-	-	-
SHORT-TERM NET FINANCIAL POSITION	419,566,523	113,929,831	305,636,692
EQUITY AND NET FINANCIAL DEBT	(121,995,609)	(356,586,344)	234,590,735

The table below shows the breakdown of fixed assets as at 31 December 2023 as well as changes from the previous year:

FIXED ASSETS 2023



DETAIL OF CHANGES IN FIXED ASSETS [€]

31/12/2023 31/12/2022 NET INVESTMENTS

TANGIBLE ASSETS

LAND AND BUILDINGS	69,189,610	61,396,105	7,793,505
PLANT AND MACHINERY	2,403,592	2,713,821	(310,229)
INDUSTRIAL AND COMMERCIAL EQUIPMENT	29,867,201	31,975,887	(2,108,685)
OTHER ASSETS	24,886,228	23,694,308	1,191,920
ASSETS UNDER DEVELOPMENT	4,782,363	5,871,977	(1,089,614)
OTHERS	58,910	-	58,910

INTANGIBLE ASSETS

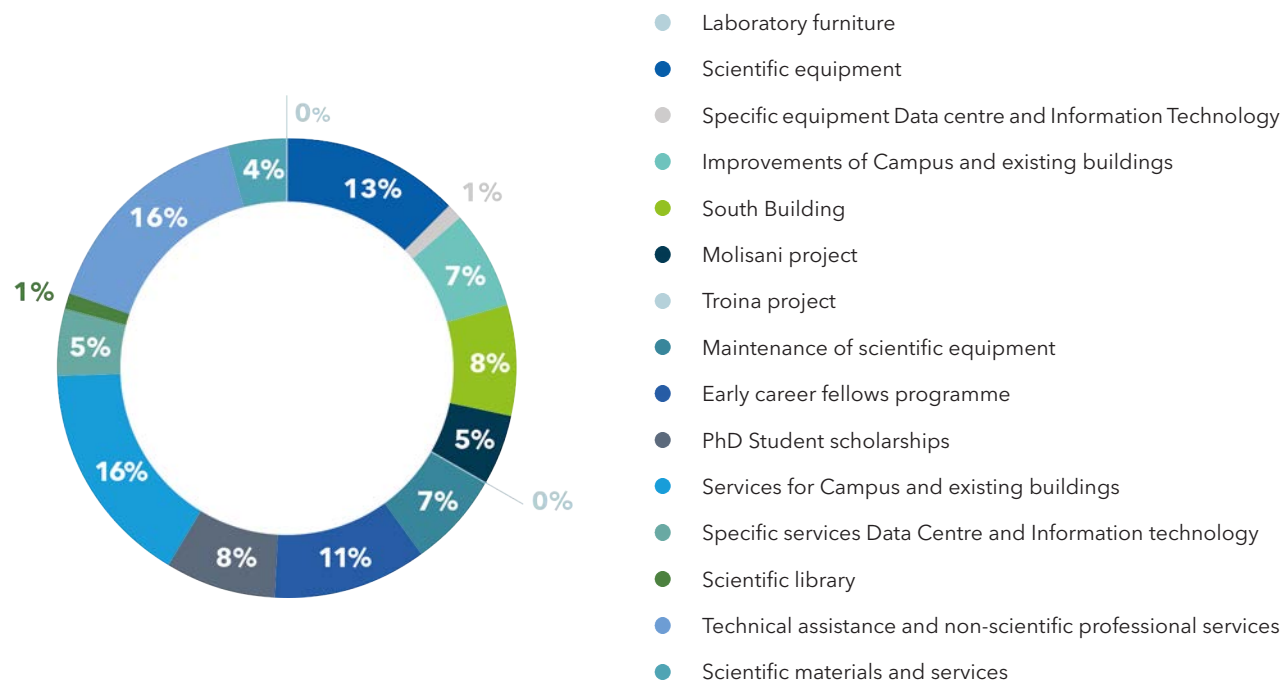
CONCESSIONS, LICENCES, TRADEMARKS AND SIMILAR RIGHTS	70,996	38,134	32,862
OTHERS	102,261	120,602	(18,341)

The item 'Land and Buildings' refers to the acquisition of the buildings owned by HT, namely Palazzo Italia, the US6/North Pavilion and the Cardo/South Pavilion as well as the related repurposing costs.

This item also includes the purchase of the land in 2023, on which the South Building and the Technological Hub will be built.

The table below shows the breakdown of the commitments as at 31 December 2023, not stated in the Balance Sheet, which will be completed in the coming years, totalling €47,538,194.

ONGOING 2023 COMMITMENTS



In addition, as at 31 December 2023, HT recognised commitments for ongoing purchase procedures amounting to €20,179,653.

ECONOMIC VALUE GENERATED AND DISTRIBUTED

The table below gives details of how HT generates and distributes value:

DETERMINATION OF ECONOMIC VALUE DIRECTLY GENERATED AND DISTRIBUTED [€]	2023	2022
ECONOMIC VALUE GENERATED	66,609,077	65,779,053
OTHER INCOME	66,609,077	65,779,053
FINANCIAL INCOME AND INTEREST	-	-
ECONOMIC VALUE DISTRIBUTED	50,405,109	52,901,951
OPERATING COSTS	28,357,687	34,628,869
EMPLOYEE REMUNERATION	21,353,337	17,652,328
PUBLIC ADMINISTRATION REMUNERATION	694,085	617,441
LENDER REMUNERATION	-	3,313
ECONOMIC VALUE RETAINED	16,203,968	12,877,102
AMORTISATION/DEPRECIATION, WRITE-DOWNS AND ADJUSTMENTS	15,853,076	12,837,770
PROVISIONS FOR RISKS AND OTHER PROVISIONS	315,553	1,301
PROFIT FOR THE YEAR ALLOCATED TO RESERVES	35,339	38,031

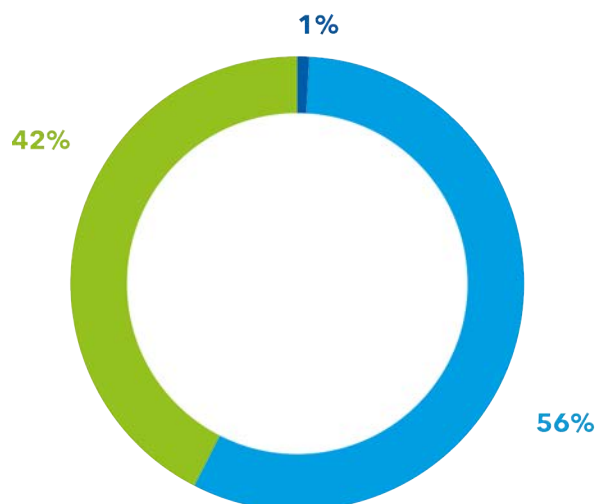
In the year ended 31 December 2023, the Human Technopole Foundation generated value of €66,609,077, up by about 1% compared with 2022 mainly due to operating grants and capital grants received from the MEF, as well as operating grants related to CITT and the National Facilities. The Economic Value Generated was supplemented by other grants for scientific projects as well as, to a lesser extent, other revenues from commercial activities. The Economic Value Distributed among HT's stakeholders amounted to €50,405,109, of which approximately 56% is attributable to suppliers (costs

for the purchase of materials, services, etc.) and 42% to employees (wages and salaries). The remainder (about 1%) is the remuneration of the public administration for taxes and duties.

The retained economic value, on the other hand, is almost entirely attributable to depreciation, amortisation and write-downs, adjustments and provisions for risks, and only a minimal part (0.22%) is attributable to self-financing (operating surplus) from commercial activities.

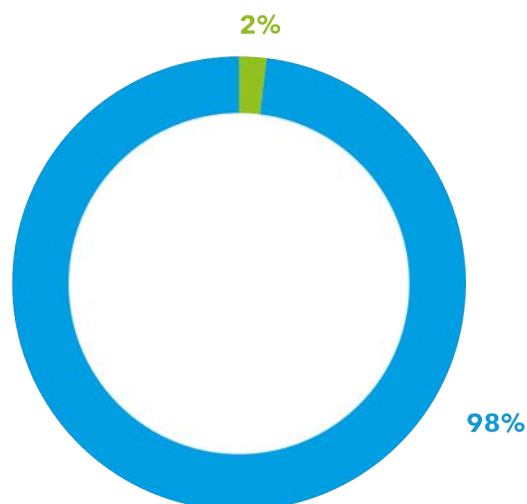
ECONOMIC VALUE GENERATED AND DISTRIBUTED IN 2023 AT A GLANCE

ECONOMIC VALUE DISTRIBUTED €50.405 M



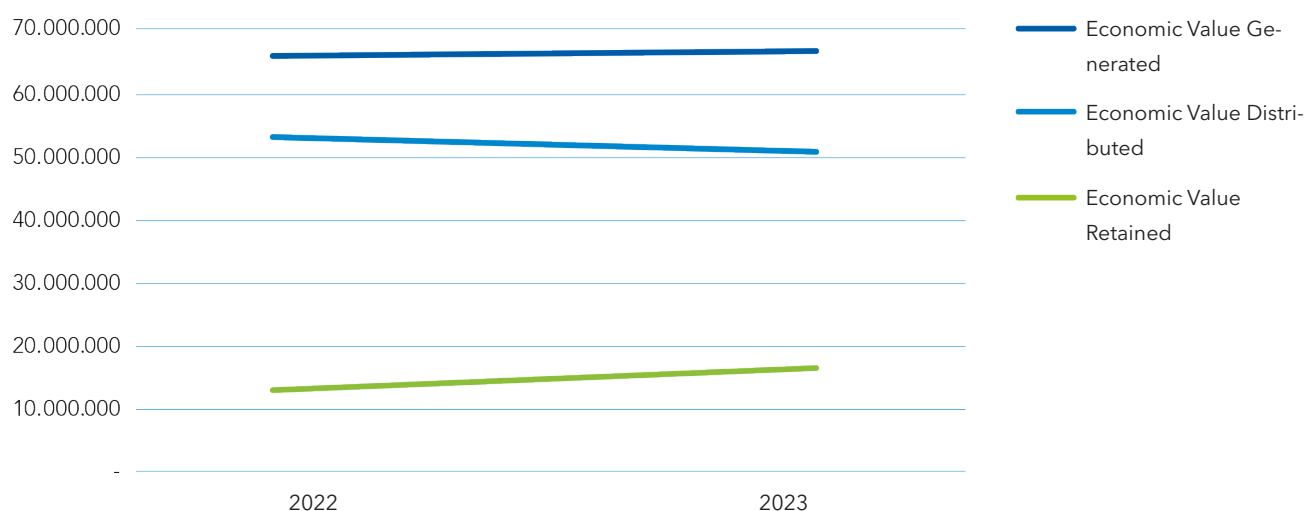
- Operating costs
- Employee remuneration
- Public Administration remuneration

ECONOMIC VALUE RETAINED €16.203 M



- Depreciation, amortisation and write-downs
- Provisions for risks and other provisions

ECONOMIC VALUE GENERATED AND DISTRIBUTED [€]



ADDITIONAL FINANCING

During 2023, the Human Technopole Foundation was able to attract additional financing other than that provided by the government for more than €10,000,000. These are grants and funding awarded to HT within the framework of scientific projects and collaboration agreements.

The tables below give a list of these resources and their amount, the related project/collaboration and the financing entity.

For the sake of completeness, data on the early months of 2024 are also given:

RESEARCH CENTRE/AREA	FUNDING ENTITY	TITLE OF RESEARCH PROJECT	EURO
STRUCTURAL BIOLOGY	EMBO European Molecular Biology	EMBO Postdoctoral Fellowship / Alessandro Borsellini	134,400
STRUCTURAL BIOLOGY	EMBO European Molecular Biology	EMBO Postdoctoral Fellowship / Leroy Elodie	134,400
COMPUTATIONAL BIOLOGY	Horizon Europe Programme	IMAGINE Next generation imaging technologies to probe structure and function of biological specimen across scales in their natural context	189,875
FUNCTIONAL GENOMICS	Horizon Europe Programme	RADIALIS Illuminating radial genome organization in the nucleus	1,464,500
HEALTH DATA SCIENCE	Horizon Europe Programme	iCARE4CVD individualised care from early risk of cardiovascular disease to established heart failure	463,729
GENOMICS - POPULATION	Otar Sanger	IMMERSE: Comprehensive CRISPR perturbations with multimodal readouts to unravel targets in immune cells	271,637
NEUROGENOMICS	ItsME Foundation	Development of a highly defined human pluripotent stem cell-derived brainstem encephalitis model	50,000
NEUROGENOMICS	Telethon Foundation	Modelling ADA-SCID neuropathology at scale using patient-derived organoids	157,981
NEUROGENOMICS	Horizon Europe Programme	ReMEND building resilience against mental illness during endocrine-sensitive life stages	361,675
STRUCTURAL BIOLOGY	Silicon Valley Community Foundation	Protein Origami Nanostructures for High-Resolution cryo-CLEM Ap	94,899
NEUROGENOMICS/ GENOMICS - POPULATION	Gilbert Family Foundation	Assembloid Platform to Model Cellular Interactions Driving NF1 Glioma Pathology	135,683
COMPUTATIONAL BIOLOGY	AIRC Foundation for Cancer Research	Turning Off Treatment Adaptation by Limiting Resistance from Epigenetic Cell recall	1,358,000
STRUCTURAL BIOLOGY	Swiss National Science Foundation	Unravelling the molecular mechanisms of thyroglobulin endocytosis mediated by the R2 receptor.	109,071
COMPUTATIONAL BIOLOGY	Eureka	PhD Sissa 39th cycle	148,600
COMPUTATIONAL BIOLOGY	Nerviano Medical Sciences	Elucidating the interplay between DNA damage and immune responses in cancer via multi-omics data integration	132,600
SCIENTIFIC TRAINING	EMBO European Molecular Biology	DL4MIA Deep Learning for Microscopes Image Analysis	45,000
STRUCTURAL BIOLOGY	EMBO European Molecular Biology	EMBO Postdoctoral Fellowship // Antonio Sponga	134,400
TOTAL GRANTS FORMALISED IN 2023			

RESEARCH CENTRE/AREA	FUNDING ENTITY	TITLE OF RESEARCH PROJECT	EURO
COMPUTATIONAL BIOLOGY	EU - ERC CONSOLIDATOR GRANT	Dark Matter	1,995,582
COMPUTATIONAL BIOLOGY	EU - ERC CONSOLIDATOR GRANT	DepShock	1,999,455
NEUROGENOMICS	CARIPLO	Targeting ADA-SCID neuropathology in a patient-derived organoid platform	199,949
NEUROGENOMICS	BBRF	Investigating Autism Spectrum Disorders Leveraging Brain Assembloids And Single-Cell Omics: The CHDS Paradigm	63,348
COMPUTATIONAL BIOLOGY	AIRC	Project IG 2023 Iorio	728,000
TOTAL GRANTS FORMALISED IN 2024 (AS AT 15.04.24)			

RESEARCH CENTRE/AREA	FUNDING ENTITY	TITLE OF RESEARCH PROJECT	EURO
GENOMICS - POPULATION	Prin2022	iTAGC: iTalian ArchaeoGenomiCs in the peninsula's "heart"	0*
GENOMICS - POPULATION	Prin2022	ConcordAnce Between EmbRyonic aNd Extraembryonic Tissues (CABERNET)	53,180
GENOMICS - POPULATION	Prin2022	Telomere-to-telomere sequencing: the new era of Centromere and neocentromere eVolution (CenVolution)	25,850
GENOMICS - POPULATION	Rosetrees Trust	Utilising single-cell technologies to understand the immunopathogenesis of paediatric acquired demyelinating syndromes.	228,294
COMPUTATIONAL BIOLOGY	Otar Sanger	Open Targets Perturbation Catalogue	196,788
TOTAL GRANTS AWARDED THOUGH NOT YET FORMALISED (AS AT 15.04.24)			

*contribution in kind, no funds for HT.

PROCUREMENT AND PURCHASES 2023

THE PRINCIPLES OF HT'S PROCUREMENT ACTIVITIES

When awarding contracts for the acquisition of works, services and supplies, the Foundation acts in compliance with the principles of cost-effectiveness, efficiency, timeliness and fairness, also respecting the principles of free competition, non-discrimination, transparency, proportionality and disclosure, as well as the principle of rotating invitations and awards in those procedures that require it, having regard to the criteria of energy and environmental sustainability and avoiding any conflict of interest.

As an institutional unit of the public administration sector (Sector S.13)T, the Human Technopole Foundation complies with Legislative Decree 50/2016 et seq. for its procurement activities. During 2023, from the moment of its entry into force, HT also complied with the new Public Contracts Code pursuant to Decree Law 36/2023.

The Human Technopole Foundation also ensures compliance with the principles of disclosure and transparency, as set out in Article 29 of Legislative Decree 50/2016 as amended, providing for the publication of the information required by ANAC Resolution no. 1134/2017 - Annex I, Section Invitations to tender and Contracts, with reference to the private entities covered by Article 2-bis, para. 3, of Legislative Decree no. 33/2013.

HT has adopted a Regulation that also regulates conflicts of interest and provides for appropriate measures to fight fraud and corruption as well as to detect, prevent and effectively resolve any conflict of interest in its contract award procedures, so as to avoid any distortion of competition and ensure equal treatment for all economic operators.

Lastly, the Human Technopole Foundation carries out the checks required by Article 80 on its suppliers, which also include an assessment of corruption offences (Legislative Decree 50/2016, Article 80, para. 1 letter a)).

ACTIVITIES IN 2023

In 2023 HT was engaged in the following activities for the procurement of goods and services:

TYPE OF PURCHASE	VALUE PURCHASED (IN EURO)
PURCHASES OUTSIDE THE PROCEDURE LAID DOWN BY LEGISLATIVE DECREE 50/2016	1,708,246
PURCHASES UNDER LEGISLATIVE DECREE 50/2016 - ABOVE-THRESHOLD PROCUREMENTS	7,249,928
SIGNING FRAMEWORK AGREEMENTS/CENTRAL PURCHASING AGREEMENTS	8,117,507
PURCHASES UNDER LEGISLATIVE DECREE 50/2016 - BELOW-THRESHOLD PROCUREMENTS	10,122,101
TOTAL	27,197,782

In 2023, about 500 purchase orders were finalised with a significant share of sub-threshold purchases.

The evidence required under GRI-204 is given below along with a comparison with previous years.

Trade payables, as at 31 December 2023, were composed geographically as follows:

- ▶ 90.12% Italian suppliers;
- ▶ 4.15% EU suppliers;
- ▶ 5.73% non-EU suppliers.

GRI 204-1

	PROCUREMENT PRACTICES		
	2021	2022	2023
TOTAL TRADE PAYABLES	€18,807,062	€20,482,890	€16,227,267
PAYABLES TO LOCAL SUPPLIERS (ITALY)	€18,196,371	€20,126,349	€14,623,896
PAYABLES TO EU SUPPLIERS	€509,551	€36,788	€673,945
PAYABLES TO NON-EU SUPPLIERS	€101,140	€319,752	€929,426
PERCENTAGE OF LOCAL SUPPLIERS (ITALY)	96.75%	98.26%	90.12%
PERCENTAGE OF EU SUPPLIERS	2.71%	0.18%	4.15%
PERCENTAGE OF NON-EU SUPPLIERS	0.54%	1.56%	5.73%



2.2.2 HUMAN CAPITAL

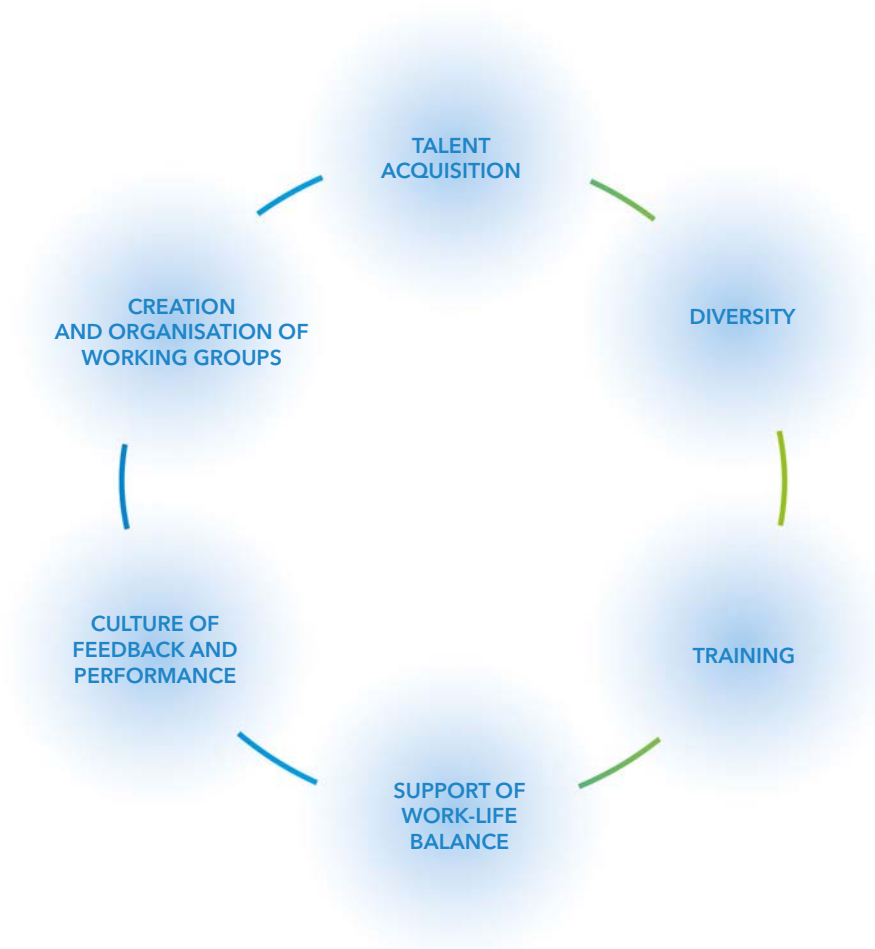
People's expertise, capabilities and experience and their motivation to innovate, including their:

- ▶ **Alignment with and support for the organisation's governance framework, risk management approach and ethical values**
- ▶ **Ability to understand, develop and implement an organisation's strategy**
- ▶ **Loyalty and motivation to improve processes, goods and services, including their ability to manage and collaborate**

The strategy of HT's Human Resources area is guided by the knowledge that the skills and involvement of staff are crucial to the success of the Human Technopole Foundation. Hard skills and professional expertise are, quite obviously, fundamental requirements, but HT also emphasises the importance of soft skills in its role as an international and multicultural research institute.

These elements are crucial in sharing a culture based on specific values, which are directly reflected in working and leadership styles, in people's behaviour and the working environment. HT's ambition is also to be an internationally recognised research institute that can attract the best scientists and talents.

The guiding principles of the strategy of HT's Human Resources area are as follows:



When recruiting staff, the Human Technopole Foundation takes into account the principles of disclosure, transparency, gender equality and non-discrimination, and is constantly striving to create research groups that are as diverse as possible in order to promote the exchange of ideas and achieve the

best results in each field. For this reason, HT selects and welcomes researchers of all levels and with diverse experiences: from young PhD students to experienced scientists leading highly competitive research centres.

The table below shows the heads of HT's research areas as at 31 December 2023:

HEADS OF HT RESEARCH AREAS AS AT 31 DECEMBER 2023

PIERO CARNINCI	Functional Genomics	Geneticist, Head of the Genomic Research Centre, Functional Genomics Programme. Team Leader of the Laboratory for Transcriptome Technology, Director of the Division of Genomic Technologies and Deputy Director of the RIKEN Centre for Integrative Medical Sciences in Yokohama (Japan); he is also a member of the European Molecular Biology Organisation (EMBO)
NICOLE SORANZO	Medical and Population Genomics	Geneticist, Head of the Genomic Research Centre, Medical and Population Genomics Programme. She is also Senior Group Leader at the Wellcome Sanger Institute in Hinxton (UK), Professor of Human Genetics at the University of Cambridge and a member of the European Molecular Biology Organisation (EMBO); in 2022 she was also elected as a member of the Executive Office of the International Common Disease Alliance (ICDA) and of the Accademia Europea
GIUSEPPE TESTA	Neurogenomics	Molecular biologist, Head of the Neurogenomic Research Programme under an agreement with the University of Milan. He is Full Professor of Molecular Biology in the Department of Oncology and Haemato-Oncology of the University of Milan; he is also Director of the Science in Society Project at the European Institute of Oncology, member of the Scientific Council and Group Leader of the 'High Definition Disease Modelling Lab Stem Cell and Organoid Epigenetics'; in 2022 he was elected member of the European Molecular Biology Organisation (EMBO)
ALESSANDRO VANNINI	Structural Biology	Molecular biologist and biochemist, Head of the Structural Biology Research Centre, after nearly eight years in the UK as Principal Investigator and Deputy Head of Division at the Institute of Cancer Research in London. He has been member of the European Molecular Biology Organisation (EMBO) since 2023

HEADS OF HT RESEARCH AREAS AS AT 31 DECEMBER 2023

GAIA PIGINO	Structural Biology	Biologist, Associate Head of the Structural Biology Research Centre. She is also a research group leader and faculty member at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden (Germany), and since 2022, a member of the European Molecular Biology Organisation (EMBO)
ANDREA SOTTORIVA	Computational Biology	Head of the Computational Biology Research Centre. He is Director of the Centre for Evolution and Cancer and Leader of the Evolutionary Genomics and Modelling Team at the Institute of Cancer Research in London
EMANUELE DI ANGELANTONIO	Health Data Science	Head of the Health Data Science Research Centre, set up under an agreement with the Politecnico di Milano. Professor of Clinical Epidemiology in the Department of Public Health and Primary Care at the University of Cambridge and elected Senior Investigator of the National Institute for Health and Care Research (NIHR) in the UK in 2022
FRANCESCA IEVA	Health Data Science	Associate Head of the Health Data Science Research Centre with the Politecnico di Milano. She is Associate Professor of Statistics at MOX, the Modelling and Scientific Computing laboratory at the Department of Mathematics, Politecnico di Milano

TRAINING AT HT

One of the most important aspects for HT is improving the skills of its staff through training programmes and initiatives. HT supports researchers in their scientific career development by providing training in cutting-edge topics and technologies in biomedical and life sciences research, and by actively promoting the career development of scientists at all stages of their professional life. Training at HT is designed not only for internal scientists but also for external researchers through the development and

provision of advanced training opportunities. HT's dynamic and multidisciplinary nature provides an ideal environment to foster the growth of talented young scientists. Training activities at HT are inclusive and designed to promote a diverse environment. Details of these activities are given below.

INTERNAL TRAINING

In-house training is designed to enable scientists to reach their full potential as independent researchers

and future scientists of excellence.

INTERNAL TRAINING

TRAINEES	Training projects are available within HT's research groups for students enrolled in a university course (Bachelor's degree, Master's degree) and for postgraduate researchers who have graduated in the last 12 months. They can benefit from an international scientific environment that grants access to a rich training programme and career development activities
DOCTORATES	HT participates in doctoral programmes in cooperation with national and international academic institutions. For example, the Foundation is a host institution of the European School of Molecular Medicine (SEMM) PhD programme in Systems Medicine. HT is also part of the joint doctoral programme in Data Analytics and Decision Sciences (DADS) with Politecnico di Milano and is the host institution of the Theoretical and Scientific Data Science (TSDS) - SISSA doctoral programme and the AI Doctoral Course for Health and Life Sciences
POST-DOCTORAL TRAINING	Postdoctoral training at HT is designed to broaden and strengthen the research and soft skills of researchers, to enhance their career prospects and enable them to become successful independent scientists
GROUP LEADER & FACILITY MANAGER TRAINING	Group Leaders and Facility Managers benefit from a comprehensive training programme designed to enhance the skills needed to effectively run a laboratory and to establish themselves as leaders in their field. The training programme includes laboratory leadership courses, mentoring programmes, career development activities, as well as access to high-level scientific lectures and speakers

EXTERNAL TRAINING

The guiding theme of HT's external training activities is the intention to create a centre of excellence for the training of promising researchers in the biomedical sciences, while providing broad access to the expertise, methods and resources of the Human Technopole Foundation. Training events for external scientists include conferences, symposia, workshops and cutting-edge theoretical and practical courses related to scientific and technological development in areas that are highly relevant to

modern biomedical research. The events are open to the national and international community. Each initiative is designed by a committee composed of internal and/or external scientists. With the growth of HT's community and its scientific training offering, some courses in key scientific areas have become recurring courses, such as courses on Deep Learning Image Analysis, Computational Neurogenomics and symposia on DNA/RNA sequencing technologies.

SCIENTIFIC VISITORS

HT offers researchers from the national and international scientific community the opportunity to spend a period of time in its laboratories to develop research collaborations, to learn and/or teach cutting-edge methods and technologies, or to use its infrastructure and Facilities. Specifically, a Scientific Visitor is an external researcher from anywhere in the world and at any stage of his or her career, who is hosted for a variable period (from one week up to one year). During this period, a Group Leader or Head of Facility of HT (the 'Scientific Host') hosts the scientific visitor in their laboratory or Facility to collaborate on a research project of mutual interest

and/or to train or be trained in a specific topic or technology. Following the launch of a dedicated programme, these initiatives were regulated as early as 2022 through the Management Committee's approval of the 'Internal Procedure on Scientific Visitors'. For more details on these initiatives, please refer to subchapter 2.3.3 'Strategy' in the section '*Talent attraction and training, and research output sharing*'.

EARLY CAREER FELLOWSHIP (ECF) PROGRAMME

The ECF programme is designed to support career development by helping talented researchers start their own independent research.

The programme is open to researchers of all nationalities who have completed a PhD and whose

projects focus on one of HT's research areas: Genomics, Neurogenomics, Computational Biology, Structural Biology and Health Data Science. Thanks to the ECF programme, young researchers are given the opportunity to win a scholarship worth €200,000/year for five years to support their research activities.

EMPLOYEE SAFETY AT HT

HT remains committed to the implementation of a Health, Safety and Environment policy as an integral activity of its Strategic Plan.

A central role in this respect is undoubtedly played by the HSE function reporting to the Administrative Directorate.

The Human Technopole Foundation, through the HSE function, defines ways to improve occupational health and safety issues, prevent environmental

pollution, eliminate hazards and minimise health risks. Moreover, for the purposes of its operation and the performance of its institutional tasks, the Human Technopole Foundation has identified responsibilities for the management of occupational health and safety (Employer, Prevention and Protection Manager, and Prevention and Protection Service), in compliance with Legislative Decree no. 81/2008 as amended, and of current environmental legislation (Environmental Representative), in compliance with Legislative Decree no. 152/2006 as amended.

The HSE Area, in support of the Employer and the Environmental Manager of HT, is therefore responsible for:

- ▶ the preliminary and systematic assessment of context-related risks and opportunities, occupational health and safety risks (Risk Assessment Document), environmental impacts/risks (Environmental Analysis) related to HT's processes and activities;
- ▶ the definition and implementation of verification activities and internal controls;
- ▶ the periodic evaluation of HSE requirements in order to ensure the Human Technopole Foundation's compliance with the law;
- ▶ the identification of training needs, the planning and disclosure of information, staff education and training;
- ▶ HSE emergency management;
- ▶ the periodic meeting required by Article 35 of Legislative Decree 81/08 as an opportunity to review performance of the Prevention and Protection Service (a special working group regulated by Article 2, paragraph 1, letter l) of Legislative Decree 81).

INFORMATION RELATING TO OCCUPATIONAL HEALTH AND SAFETY RISKS

No occupational accidents that caused the death of any registered employee occurred in 2023.

During the year, by implementing a system for the collection of reports, the HSE area recorded and promptly managed and resolved:

- ▶ 1 accident that occurred within the Human Technopole Foundation during the performance of work activities;
- ▶ 2 accidents that occurred in the outdoor areas of the Human Technopole Foundation and not during the performance of work activities;
- ▶ 3 near misses.

During 2023 no occupational illnesses involving employees or former employees of HT were claimed.

Furthermore, in 2023 HT made the following significant investments in personnel safety:

1. it assessed occupational health and safety risks by updating the Risk Assessment Document, consisting of a general section and specific assessments;

2. health surveillance: the corporate physician saw 246 patients and carried out 104 instrumental tests;
3. fire and first aid management: six-monthly fire fighting audits were conducted by an external entity, as well as the annual emergency and evacuation drill in December 2023. Monthly monitoring of fire-fighting equipment and first-aid kits was ensured by the HSE team on the basis of specific internal procedures;
4. information, education and training;
5. the periodic Prevention and Protection Service meeting was held in December 2023;
6. staff involvement and awareness-raising: HT's staff received regular communications by e-mail or through publications on HT's intranet. All employees have been receiving an 'HSE Newsletter' since 2022 and the HSE area has been periodically involved in the operational meetings of HT's Lab Managers.

TRADE UNION REPRESENTATION

During 2023, constant dialogue continued with the trade union representatives, as a result of which work began on drafting a supplementary agreement to adapt the regulatory part of the collective bargaining agreement to HT's needs with respect to different topics: working hours, business trips and missions, leave and permits, parental leave, donation of accrued leave, fixed-term employment, smart working, welfare and participation. Dialogue and cooperation ensure positive discussion and mutual listening on issues that are relevant to HT's interest and to staff management.

The dialogue between HT and the trade union representatives also led to an increase in the scope and extent of the canteen replacement service provided by Lendlease through Zero Impact. As regards availability, a meeting was held to monitor the status of activities with regard to 2023, following which possible implementations and/or improvements were reported to the relevant offices - CDFM, IT, HSE and Laboratories.

2023 RESULTS

HT's recruitment and selection activities continued throughout the financial year. At the end of 2023, its workforce consisted of 280 people, 30 more than at the end of 2022.

In the research area, in particular, a number of senior positions were filled following the selection of additional Group Leaders in the areas of Genomics, Computational Biology and Health Data Science.

The Group Leaders of the Human Technopole Foundation hired in 2023 are listed below:

ALICE GIUSTACCHINI	Group Leader in the Genomics Research Centre, Medical and Population Genomics Programme. Her research group aims to develop new strategies to prevent and treat leukaemia progression
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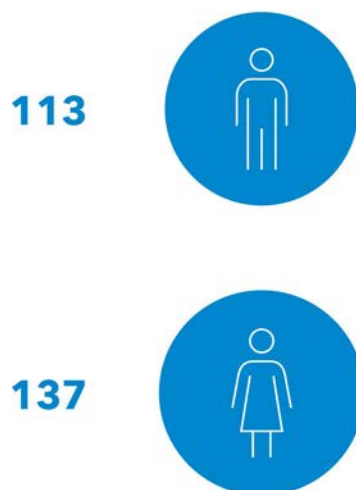
The Group Leader mentioned above is in addition to those already selected in previous years:

MAGDA BIENKO	Group Leader in the Genomics Research Centre, Functional Genomics programme. Her research is mainly intended to understand the principles and design mechanisms that shape the spatial arrangement of DNA, RNA and proteins in the mammalian cell nucleus, developing new sequencing and single cell microscopy methods, as well as new mathematical modelling approaches
LORENZO CALVIELLO	Molecular and computational biologist. His laboratory uses omics technologies and computational approaches to highlight different aspects of translational control, examining both the coding and non-coding transcriptome
ANA CASAÑAL	Expert biochemist in integrated structural biology with a focus on Cryo-Electron Microscopy. At HT, her group combines state-of-the-art Cryo-Electron Microscopy with biochemical and biophysical methods to decipher mRNA processing mechanisms and understand how their deregulation affects diseases
CECILIA DOMÍNGUEZ CONDE	Group Leader in the Genomics Research Centre, Medical and Population Genomics Programme. Her research group uses state-of-the-art genomic and computational methods to study human immunity in early childhood and immune-mediated diseases in children
FRANCESCA COSCIA	Italian biochemist expert in Electronic Cryo-Microscopy. Her research focuses on the molecular mechanisms underlying thyroid function and diseases
PHILIPP ERDMANN	Chemical biologist and microscopist. His laboratory focuses on analysing the effects of liquid-liquid phase separation (LLPS) using cryo-electron tomography
CRAIG GLASTONBURY	Group Leader in the Genomics Research Centre, Medical and Population Genomics Programme. His laboratory develops and applies machine learning methods to understand the genetic basis of a broad spectrum of complex diseases through the collection of large-scale biomedical imaging datasets

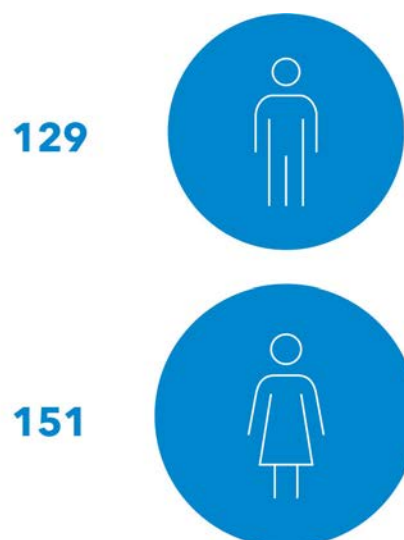
OLIVER HARSCHNITZ	Stem cell biologist. His research focuses on the mechanisms that cause neuro-immunological diseases, in particular what leads to inflammation in the brain
FRANCESCO IORIO	Group Leader in the Centre for Computational Biology where he is establishing a research programme in Computational Cancer Pharmacogenomics and Therapeutic Target Discovery
FLORIAN JUG	Group Leader in the Centre for Computational Biology. His research seeks to push the boundaries of what artificial intelligence and machine learning can do to better analyse and quantify biological data
NEREO KALEBIC	Group Leader in the Centre for Neurogenomics. His research focuses on the molecular and cellular biological mechanisms underlying the development of the human neocortex and its implications for human evolution and neurodevelopmental disorders
IVANO LEGNINI	Molecular and systems biologist. A member of the Genomics Research Centre, he will work in the field of gene regulation and RNA metabolism, as well as on the development of new genomic technologies to perturb and measure gene expression
FERNANDA PINHEIRO	Group Leader in the Computational Biology Research Centre. Her group brings together experimental and theoretical research to develop a predictive framework for evolutionary processes under conditions of ecological complexity, based on models of cell metabolism
BLAGOJE SOSKIC	Immunologist and geneticist. His research group uses a wide range of genomic and immunological experiments to study variations in the immune system. The group is particularly interested in understanding the genetic control of T cell-B cell interaction and antibody production
ELENA TAVERNA	Neuroscientist. Her research seeks to understand how neuronal stem cells influence brain formation. Answering this question is crucial to understanding the mechanisms of brain development and evolution and how these mechanisms are altered in neurodevelopmental disorders
JOSÈ DAVILA-VELDERRAIN	Computational systems biologist. He is interested in developing a deeper understanding of the diversity and dynamic behaviour of human brain cells
LUISA ZUCCOLO	Group Leader in the Health Data Science Research Centre. In her laboratory, epidemiologists, statisticians and data scientists analyse complex, high-dimensional data to improve understanding of maternal and child health, with a focus on intergenerational effects

Below is an overview of HT's workforce as at 31 December 2023 compared with the previous year:

250 EMPLOYEES (DECEMBER 2022)



280 EMPLOYEES (DECEMBER 2023)



BREAKDOWN OF EMPLOYEES AS AT 31 DECEMBER 2023

TOTAL EMPLOYEES	280
EMPLOYEES ON TEMPORARY CONTRACTS (including apprenticeship contracts)	110
OF WHICH WOMEN	50%
OF WHICH MEN	50%
OF WHICH ITALIAN	65%
OF WHICH NON-ITALIAN	35%
PERMANENT EMPLOYEES	170
OF WHICH WOMEN	56.5%
OF WHICH MEN	43.5%
OF WHICH ITALIAN	88%
OF WHICH NON-ITALIAN	12%
PART-TIME EMPLOYEES	9
OF WHICH WOMEN	67%
OF WHICH MEN	33%
OF WHICH ITALIAN	78%
OF WHICH NON-ITALIAN	22%
FULL-TIME EMPLOYEES	271
OF WHICH WOMEN	53%
OF WHICH MEN	47%
OF WHICH ITALIAN	79%
OF WHICH NON-ITALIAN	21%

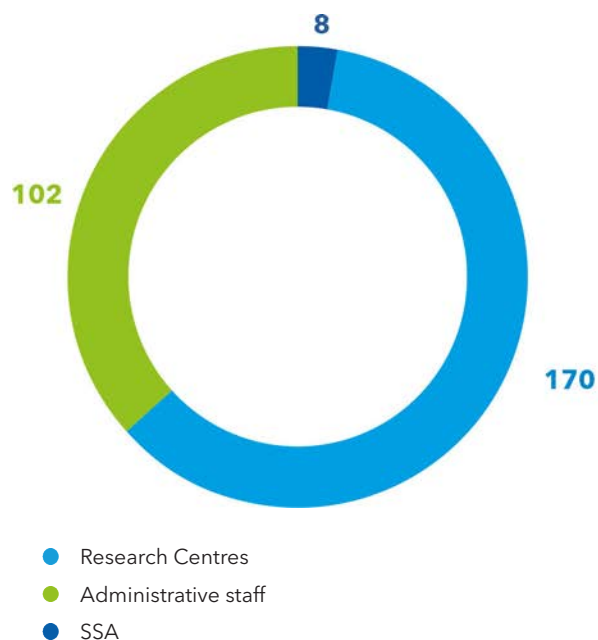
The table required under GRI 2-7 is given below along with a comparison with previous years

GRI 2-7

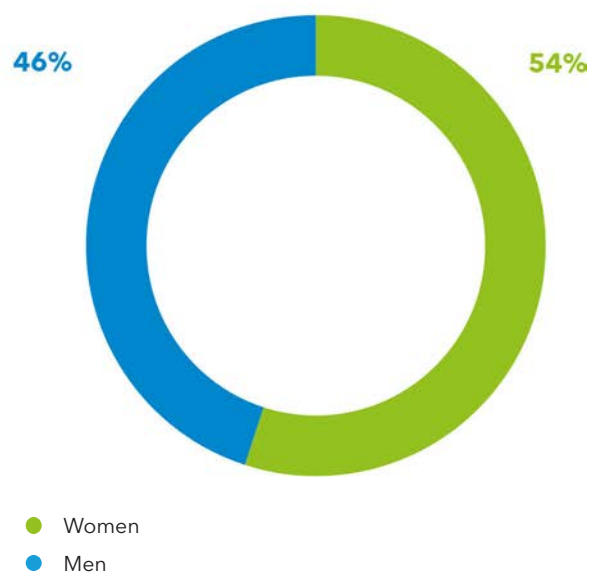
EMPLOYEES	2021	2022	2023	CHANGE % (22-23)
TOTAL NUMBER OF EMPLOYEES	159	250	280	12.00%
PERMANENT CONTRACT	117	173	170	-1.73%
OF WHICH MEN	53	74	74	0.00%
OF WHICH WOMEN	64	99	96	-3.03%
TEMPORARY CONTRACT	42	77	110	42.86%
OF WHICH MEN	22	38	55	44.74%
OF WHICH WOMEN	20	39	55	41.03%
FULL-TIME CONTRACT	154	243	271	11.52%
OF WHICH MEN	73	109	127	16.51%
OF WHICH WOMEN	81	134	144	7.46%
PART-TIME CONTRACT	5	7	9	28.57%
OF WHICH MEN	2	3	3	0.00%
OF WHICH WOMEN	3	4	6	50.00%

The tables below show the HT population as of 31 December 2023 by area of work, gender, age and nationality:

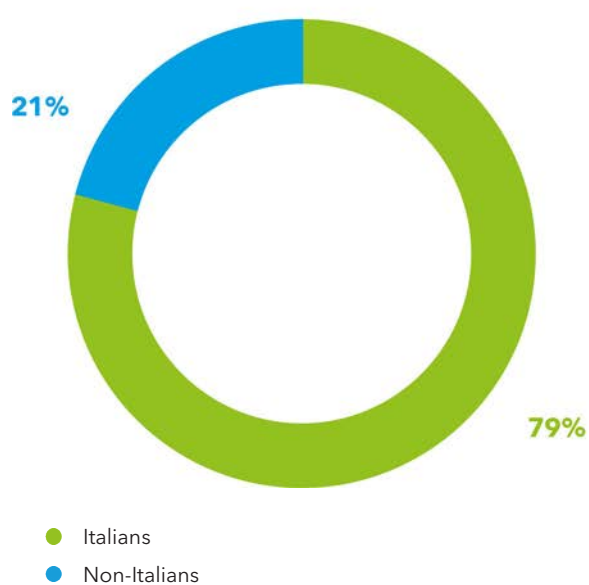
HT EMPLOYEES BY AREA 2023



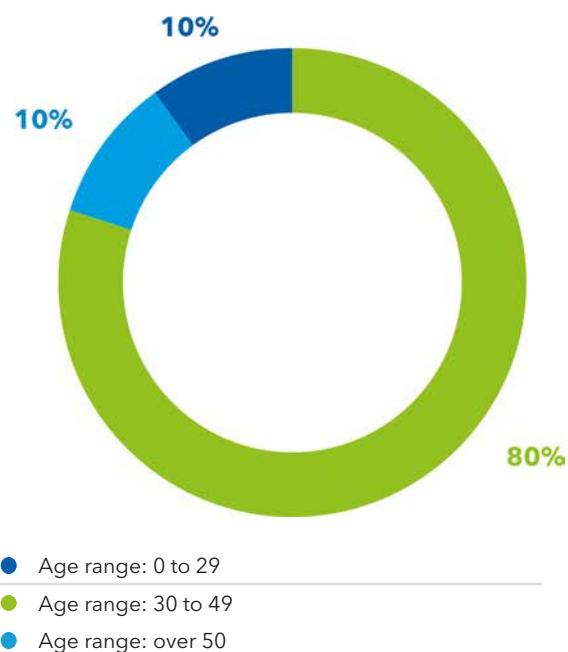
HT OVERALL GENDER DIVERSITY RATIO 2023

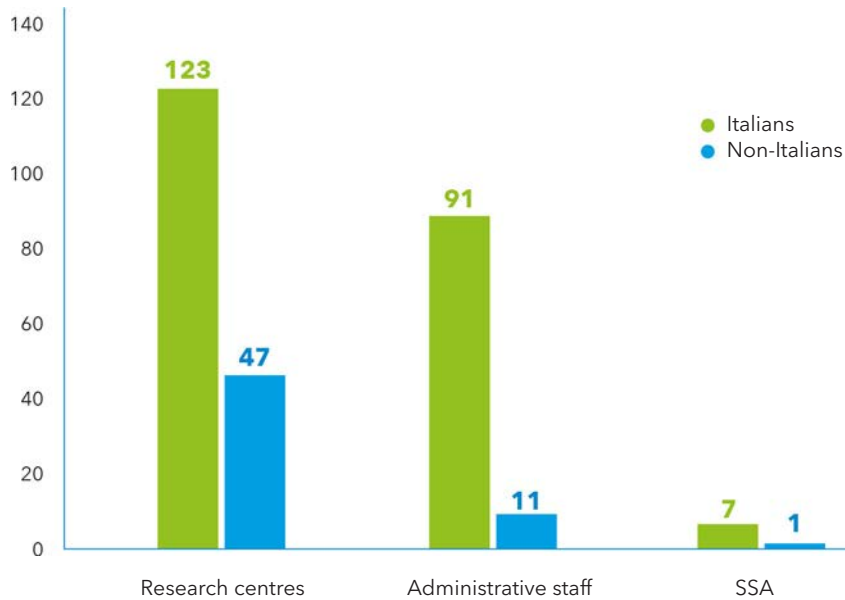
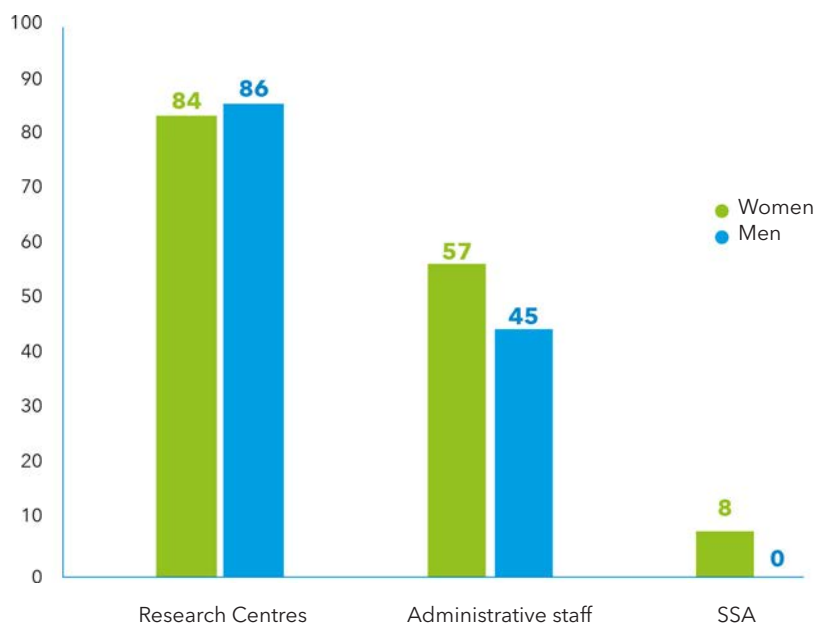


NON-ITALIANS/ITALIANS RATIO AT HT IN 2023



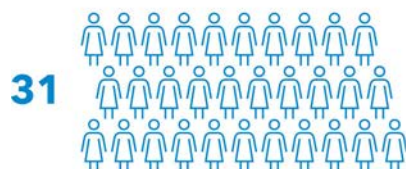
AGE DISTRIBUTION AT HT IN 2023



NON-ITALIANS/ITALIANS DISTRIBUTION AT HT BY AREA - 2023**GENDER DISTRIBUTION BETWEEN AREAS AT HT - 2023**

Below is an overview of employees hired and terminated in 2023, broken down by gender and age:

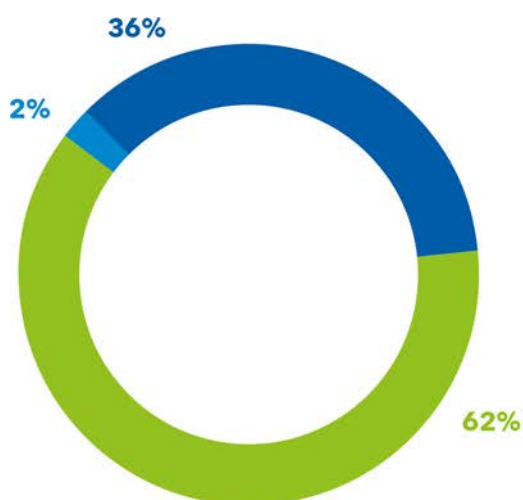
58 EMPLOYEES HIRED IN 2023



28 EMPLOYEES TERMINATED IN 2023

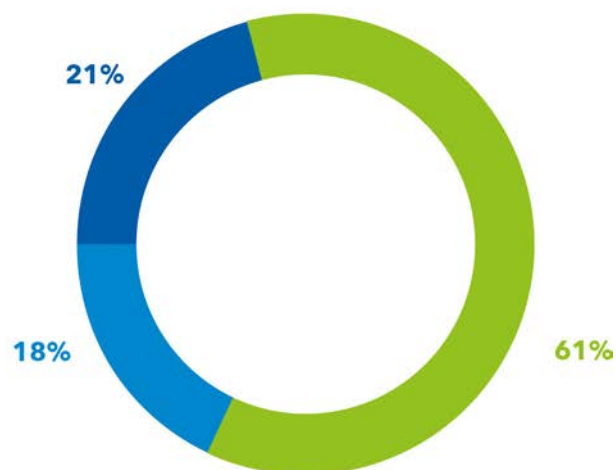


DISTRIBUTION OF RECRUITS BY AGE AT HT IN 2023



- Age range: 0 to 29
- Age range: 30 to 49
- Age range: over 50

DISTRIBUTION OF EMPLOYEES TERMINATED BY AGE IN 2023



2023 also saw a significant increase in the number of PhD students and postdoctoral fellows.

79% of new employees in 2023 were Italian and 21% were non-Italian.

86% of employees terminated in 2023 were Italian and 14% were non-Italian.

As at 31.12.2023 the Human Technopole Foundation also had **14** workers on 'Co.Co.Co.' contracts (workers serving on a co-ordinated and continuous basis). In addition, staff included **83** PhD students and trainees mainly engaged in scientific work.

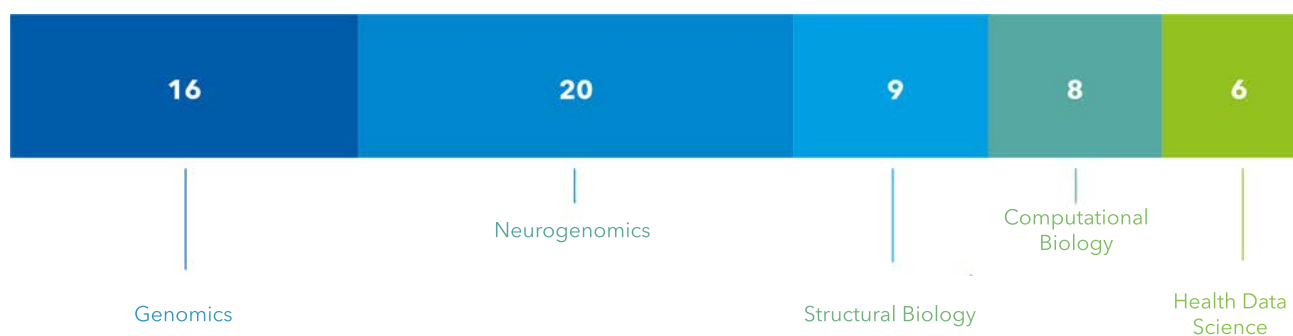
The tables below show the breakdown of postdocs by area as at 31 December 2023 and the number of PhD students as at the same date:

POSTDOCS AS AT 31 DECEMBER 2023

INSTITUTE OF ORIGIN	COUNTRY OF THE INSTITUTE OF ORIGIN	DEPARTMENT
Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)	Germany	Structural Biology Research Centre
University of Milan Bicocca	Italy	Computational Biology Research Centre
University of Milan	Italy	Neurogenomics Research Centre
Institute for Biomedicine	Italy	Health Data Science Research Centre
Leiden University	The Netherlands	Structural Biology Research Centre
Grenoble Alpes University	France	Health Data Science Research Centre
University of Coimbra	Portugal	Neurogenomics Research Centre
Otto Von Guericke University Magdeburg	Germany	Population and Medical Genomics Research Centre
CRUK Manchester Institute	UK	Computational Biology Research Centre
Institut für Molekulare Medizin	Germany	Neurogenomics Research Centre
Nature G Chinese Academy of Sciences	China	Structural Biology Research Centre
University College London	UK	Computational Biology Research Centre
Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)	Germany	Structural Biology Research Centre
Seqplexing SL	Spain	Population and Medical Genomics Research Centre
San Raffaele University	Italy	Functional Genomics Research Centre
University of Oxford	UK	Functional Genomics Research Centre
University of Oxford	UK	Neurogenomics Research Centre
University of Leicester	UK	Functional Genomics Research Centre
Vali d'Hebron Institute of Research	Spain	Functional Genomics Research Centre

INSTITUTE OF ORIGIN	COUNTRY OF THE INSTITUTE OF ORIGIN	DEPARTMENT
MPI-CBG, Dresden and the Gurdon Institute & Cambridge Advance Imaging Centre and GSK	Germany	Neurogenomics Research Centre
Genentecs	USA	Functional Genomics Research Centre
University of Geneva	Switzerland	Structural Biology Research Centre
Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG)	Germany	Structural Biology Research Centre
University of Regensburg	Germany	Functional Genomics Research Centre
University of Bordeaux	France	Structural Biology Research Centre
University of Trento	Italy	Functional Genomics Research Centre
Politecnico di Milano	Italy	Health Data Science Research Centre
European Institute of Chemistry and Biology (Bordeaux)	France	Structural Biology Research Centre
University of Cambridge	UK	Structural Biology Research Centre
University of Zurich	Switzerland	Structural Biology Research Centre
IEO	Italy	Population and Medical Genomics Research Centre
University of Turin	Italy	Computational Biology Research Centre
University of Natural Resources and Life Sciences	Austria	Structural Biology Research Centre
Imperial College London	UK	Structural Biology Research Centre
Technische Universität München	Germany	Computational Biology Research Centre

PHD STUDENTS AS AT 31 DECEMBER 2023



TRAINING INITIATIVES AND ACTIVITIES IN 2023

In 2023, HT developed and approved a new internal procedure for human resources management processes. This procedure describes and regulates the HR processes described below and, in particular, the processes related to gender equality, which constitute the management system, governed by the 'Manual of the Gender Equality Management System' pursuant to UNI/PdR 125/2022 practice:

- ▶ **Selection and recruitment:** the principles guiding staff recruitment are established. In addition, in line with the values of diversity and inclusion, the internal procedure addresses issues related to gender differences, how they can play a key role during the selection process, how gender biases can manifest themselves during staff selection and the possible solutions available to limit their effects. The purpose of the internal procedure is to ensure that selection and recruitment take place in a fair and non-discriminatory manner, in accordance with the law on equal opportunities and treatment between men and women, avoiding any direct or indirect discrimination based on gender, age, personal or family care needs, pregnancy, maternity or paternity.
- ▶ **Equal pay:** this process is particularly focused on the principles of scientific excellence, internationality and diversity in a work context centred around the principle of gender equality. HT's ambition is to be a benchmark and internationally recognised research institute that can attract and retain the best researchers and talents. This process presents an overview of all elements offered to staff and is intended to prohibit any pay discrimination, whether direct or indirect, by ensuring that job classification systems adopt common criteria for men and women and that pay is commensurate with their role and responsibility.
- ▶ **Career management:** a general framework is provided for managing current staff and supporting, in terms of rules and attractiveness, the development of HT's human resources and the professionalism of students and researchers, using the international context of scientific institutes and the best practices of public research institutions as benchmarks. The aim of this process is to promote inclusion, gender equality and integration by ensuring equal opportunities and non-discrimination when accessing employment, training and professional advancement, and by prohibiting any discrimination based on gender, marital or family status, pregnancy, maternity or paternity, or any other characteristic and at any level.
- ▶ **Parenthood and care:** the measures taken by HT to fully support parenthood in a person-centred perspective are identified. This process is intended to provide effective support to mothers and fathers in balancing their work commitments with the new demands of parenthood.
- ▶ **Work-life balance:** this process seeks to define the tools and initiatives made available to HT's personnel to reconcile their personal and professional life. The Human Technopole Foundation intends to create and promote a working environment that enhances motivation, performance and creativity in a highly interconnected environment that allows and calls for increasing flexibility.
- ▶ **Training:** this process aims to provide HT personnel with the specialised and soft technical skills necessary to perform their work activities, contributing to the continuous improvement of their performances. Furthermore, by respecting gender policy principles and observing the guidelines set out in the procedures, the training process offers pathways supporting gender equality and inclusion.

In the financial year 2023, HT's Human Resources area also introduced some important initiatives to support its employees:

► **Updating of the internal procedure for the prevention of abuse and harassment.** The purpose of the procedure is to:

- prevent and eliminate harassment and abuse in the workplace. This objective requires the creation of a safe and respectful working environment through the promotion of organisational behaviour based on equal treatment and the dissemination of appropriate behaviour;
- punish any act or behaviour amounting to harassment or violence in the workplace, in all its forms;
- promote a working environment in which everyone's dignity is respected and interpersonal relations are fostered, based on the principles of respect, equality and mutual fairness.

The procedure defines the process for reporting and handling any harassment and/or violence suffered at work, including the use of secure and confidential reporting channels, the investigation of complaints and the adoption of appropriate measures to protect employees.

► **New Regulation on the Human Resources Area:** it defines the principles inspiring the Human Technopole Foundation in employee management, as well as the operational processes and activities carried out by the Human Resources Area. The guiding principles in carrying out its activities are (i) impartiality, (ii) transparency, (iii) equal treatment, gender equality, inclusion and non-discrimination. In particular, HT values and preserves diversity by supporting equity between the sexes, ethnicities and social classes in the workplace. HT is thus committed to:

- guaranteeing fair treatment of all employees and promoting and ensuring gender equality with regard to the presence and professional growth of women;
- promoting and disseminating the gender equality policy;

- determining and regularly reviewing the Gender Equality Plan;
- ensuring the effective operation of the gender equality management system, its results and stakeholders' corresponding satisfaction, as well as ensuring its monitoring and guidance by qualified persons;

The said Regulation defines the main processes handled by the Human Resources area, i.e. those relating to staff administration and recruitment, organisation and staff planning, compensation and benefits, non-scientific training, mediation and counselling, international desk and mobility management and trade union relations.

► **Implementation of guidelines to address gender bias in recruitment and selection processes:** the guidelines are intended to describe how gender bias can manifest itself during the personnel selection process as well as to suggest solutions to limit its effects through gender bias prevention measures and training initiatives for personnel involved in personnel recruitment processes.

During 2023, the Human Technopole Foundation continued to pursue the initiatives launched in previous years:

- Feedback sessions: since 2022, with the introduction of a Mediator, in-depth meetings with newcomers have been planned with the aim of monitoring their work experience at HT during their trial period. These are individual and informal meetings of about half an hour each, during which the Mediator keeps records of their responses anonymously which can be used for later data analysis. The first meeting is scheduled approximately six weeks after the employment start date, while the second is approximately six weeks before the end of the trial period. At the request of the employee or line manager, interim meetings may be held to realign expectations and objectives, or to

bring up problems encountered at work. In addition, yearly feedback sessions were launched in 2023 to monitor each employee's experience at HT. In particular, during these meetings, questions are asked about each employee's job satisfaction, their relationship with their colleagues or managers, their perception of HT's culture and identity, the availability and quality of tools for carrying out their work activities, their workloads, etc. During 2023, **140** meetings were organised since the beginning of the service.

- Onboarding, namely a series of activities and meetings for newcomers, aimed at familiarising them with HT and its organisational structure, working environment, colleagues and the essential information they need to make the most of their initial, more sensitive period at HT. The onboarding process includes the participation of at least one representative from certain functions and/or areas, such as the Communications area, the Internal Audit & Compliance area, the Human Resources area and the Finance area. Since 2023, participation in the onboarding process has been extended to the Purchasing and Supply Chain area, and a further extension to other areas and functions of HT is planned for the future.
- Since 2023, a Psychological Counselling service has been in place to support all HT employees, co-workers and collaborators. The service takes the shape of individual counselling meetings oriented towards occupational wellbeing and aimed at preventing and reducing work-related stress. Counselling focuses on optimising work-life balance and provides insights for employees into how work interacts with other self-functioning dimensions and other areas of personal life. The service involves several meetings, on request, at varying intervals as the case may be, which are held, considering the presence of different cultures within HT, also in English, French, German, Portuguese and Spanish. During 2023, HT received **29** requests to access the service, and a total of **94** meetings

were held. The service is also supported by an internal counselling/mediation activity, which in 2023 consisted of **26** counselling meetings and **17** mediation meetings.

- In February 2022, the Human Technopole Foundation approved and published a Gender Equality Plan (GEP), which meets the guidelines of the European Institute for Gender Equality (EIGE). To ensure the proper implementation of the GEP, a dedicated team (Gender Equality Team - GET) was appointed, consisting of members and co-workers from different HT functions and coordinated by the Administrative Director. In June 2023, the GEP was updated and re-approved, after a complex and articulated preparatory and analytical work by the ad-hoc Diversity and Inclusion Advisory Committee, the Management Committee and the Supervisory Board. The GEP contains measures tailored to the context and specific needs of the Human Technopole Foundation and outlines, for the three-year period 2022-2024, a series of specific objectives to be pursued and the necessary actions to be implemented to achieve them. The project team, coordinated by the Human Resources Area, has been working in recent months on the implementation of the planned actions, also with the collaboration of a number of other internal functions, pursuing all the specific measures and objectives for the period. The process of obtaining the Uni/PdR 125:2022 gender equality certification also began. The members of the Gender Equality Team (GET) were also reviewed and updated in the face of employment terminations during 2023.

For more details and information on the GEP, please refer to subchapter 2.4.9 '*Responsible and sustainable approach*' in the section '*Achievement of gender balance in senior, leadership and decision-making positions*'.

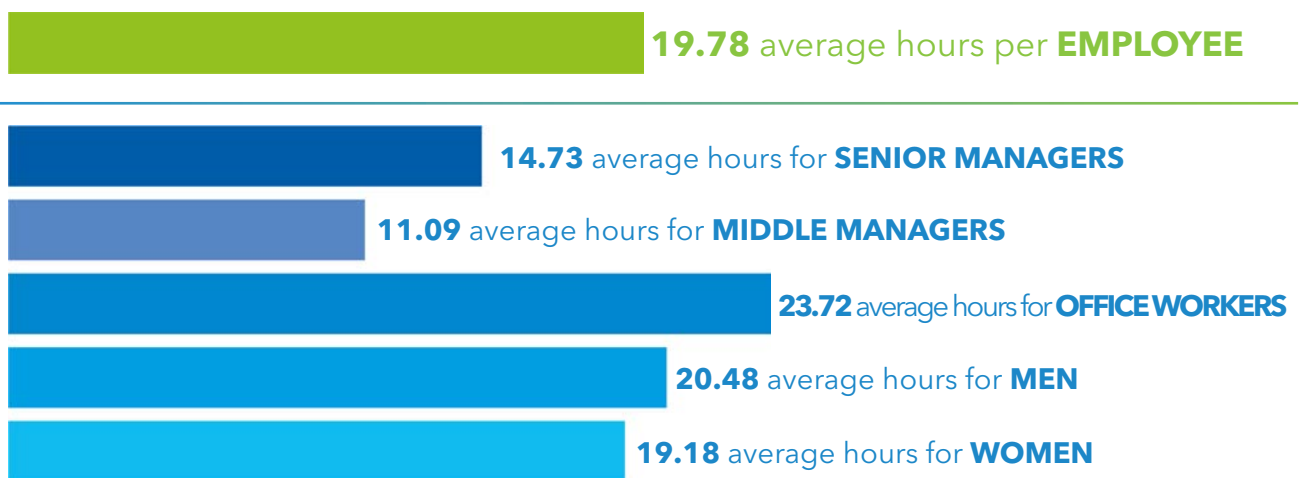
Finally, training activities are another key part of HT's HR strategy. For details of internal scientific training activities, please refer to subchapter 2.3.3 '*Strategy*',

in the sections '*Talent attraction and training, and research output sharing*' and '*Scientific reputation and dissemination*'. The training opportunities related to the administrative area are appropriately

detailed in sub-chapter 2.3.8 'Strategy' in the section '*Effectiveness and Efficiency of Operational Processes*'.

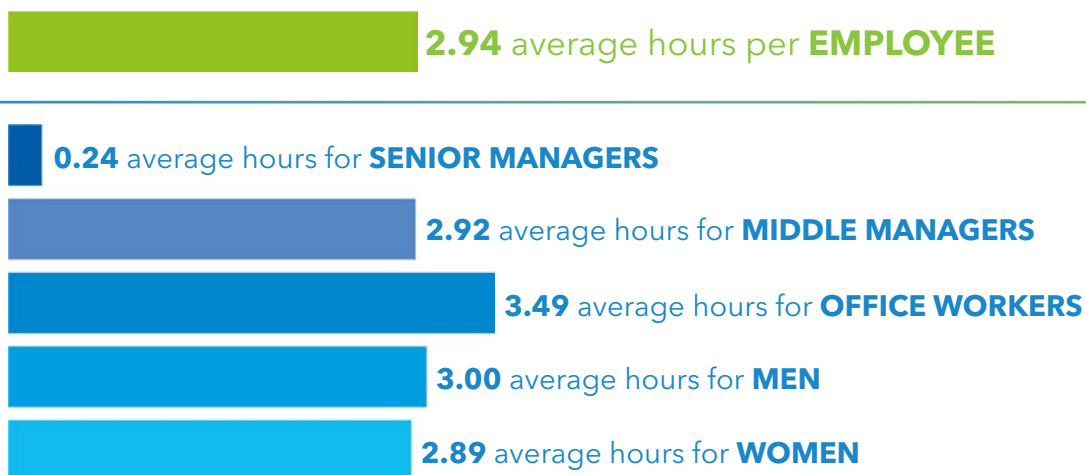
Below are the average hours of training (scientific and administrative) broken down by category and gender:

AVERAGE TRAINING HOURS IN 2023



With regard to HSE training, details of average training hours by category and gender are given below:

AVERAGE HOURS OF HSE TRAINING IN 2023



With regard to mandatory Health & Safety training, an internal e-learning platform was launched at the end of the year, containing training proposals covering general training, specific training for scientists, specific training for video screen operators and technicians, as well as **20** 'special' courses for workers and **10** courses for senior managers and

supervisors, valid as refresher courses in the following five-year period. The topics covered in the HSE training courses included basic health and safety, smart working, fire prevention, defibrillator use and biological and ionising radiation hazards.

The table required by GRI 404-1 with evidence of training hours and average hours, for the year 2023, broken down by gender and professional category is shown below.

GRI 404-1³

EMPLOYEES			2023
BY GENDER AND PROFESSIONAL CATEGORY	MEN	WOMEN	TOTAL
SENIOR MANAGERS	21	16	37
MIDDLE MANAGERS	30	31	61
OFFICE WORKERS	78	104	182
TOTAL	129	151	280
TRAINING HOURS			2023
BY GENDER AND PROFESSIONAL CATEGORY	MEN	WOMEN	TOTAL
SENIOR MANAGERS	302	243	545
MIDDLE MANAGERS	421.5	255	676.5
OFFICE WORKERS	1,918.5	2,398	4,316.5
TOTAL	2,642	2,896	5,538
AVERAGE TRAINING HOURS			2023
PER EMPLOYEE			19.78
OF WHICH MEN			20.48
OF WHICH WOMEN			19.18
AVERAGE TRAINING HOURS			2023
BY GENDER AND PROFESSIONAL CATEGORY	MEN	WOMEN	
SENIOR MANAGERS	14.38	15.19	
MIDDLE MANAGERS	14.05	8.23	
OFFICE WORKERS	24.60	23.06	

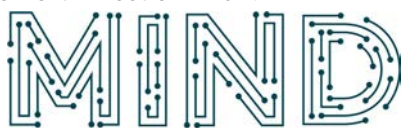
³ The training hours refer only to scientific/administrative and non-mandatory training hours.



2.2.3 INFRASTRUCTURAL CAPITAL

- ▶ Manufactured physical objects (as distinct from natural physical objects) that are available to an organisation for use in the production of goods or the supply of services, including: buildings, equipment and infrastructure (such as roads, ports, bridges, and waste and water treatment plants)
- ▶ Manufactured capital is often created by other organisations, but includes goods manufactured by the reporting organisation for sale or when used for its own purposes

HT lies at the heart of [MIND \(Milan Innovation District\)](#), a new city district covering over one million square metres on the former EXPO 2015 site, located in the north-west of Milan.



MILANO INNOVATION DISTRICT

Upon completion of its development, MIND will represent a mix of public and private functions, integrated into a science and technology park dedicated to Life Sciences, Healthcare, Biotech, Pharma, Agri-Food, Nutrition, Data Science and Smart Cities. MIND is also a public-private partnership involving two main entities: AREXPO (the site owner), representing the public sector, and the Australian multinational Lendlease, representing the private sector, an expert in urban and infrastructure regeneration projects. The MIND area also hosts the new headquarters of the Ospedale Galeazzi - Sant'Ambrogio IRCCS (which is part of the San Donato private hospital group), the headquarters of the Triulza Foundation, the

'Federated Innovation' new model of public-private collaboration and, in the future, the campus of the science faculties of the Milan University. Important companies such as Valore Italia, Rold, Bio-4Dreams, Astrazeneca, Illumina and Esselunga already have their offices in the Mind area.

The Decumanus, the central section of the site, which is about 1,500 metres long, will become a green area, thus one of the longest linear parks in Europe. Plans for the complete urban redesign of the area are based on the masterplan proposed by the international design and innovation firm Carlo Ratti Associati, winner of the international competition to redesign the site.

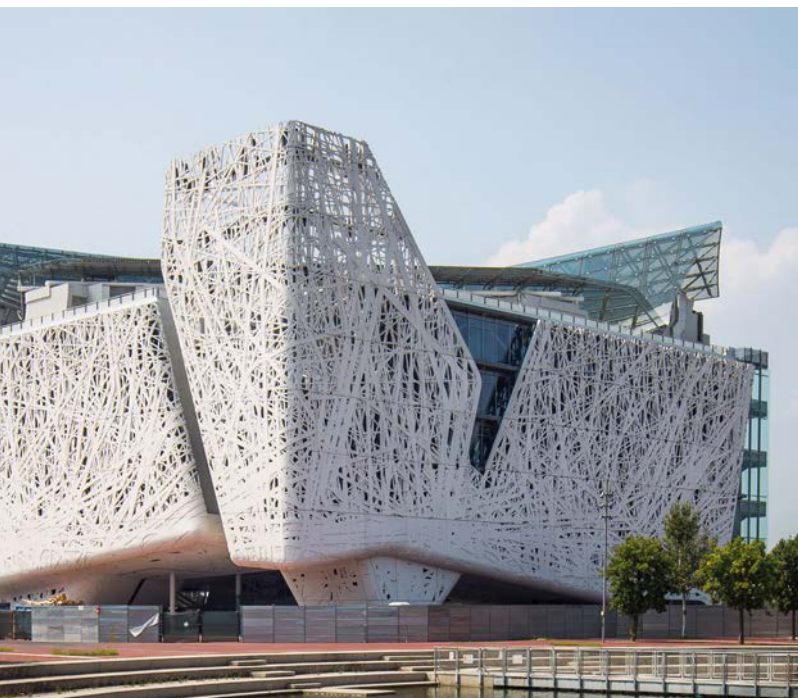
The project, promoted by Lendlease, is based on a number of important principles, including urban innovation, environmental sustainability and smart mobility.



BUILDINGS AND LABORATORIES

In this context, the HT project is definitely central to MIND's development plans and as such its buildings have a high iconic value.

PALAZZO ITALIA



After representing Italy during EXPO 2015, Palazzo Italia is now the institutional headquarters of HT. Designed by the Nemesi firm, the building stands in front of the Tree of Life and has five floors, reaching a total height of 35 metres and covering an area of approximately 18,000 square metres. Its architecture is inspired by the idea of an urban forest with patterns of lines generating light and shade. It was designed according to sustainability principles and conceived as a low-energy building. During EXPO Milano 2015, it hosted exhibition spaces dedicated to the power of beauty and the future to highlight Italy's creativity and potential. At the end of the World Expo, Palazzo Italia underwent intensive renovation work to turn the exhibition areas into spaces capable of accommodating around **400** workstations. Several areas have been retained, including the restaurant area, the auditorium, the panoramic terrace and the inner square.

INCUBATOR LABS



HT's first scientific laboratories were built in the area adjacent to Palazzo Italia and the Tree of Life. They consist of three buildings, of which two occupying two floors, mainly dedicated to laboratories while a third, one-floor building, hosts the support structure of the Cryo-Electron Microscopy Facility, equipped with two microscopes, a sample preparation room and a microscope control room. They house approximately **190** 'wet' workstations, i.e. individual counter spaces for experimental researchers, support desks, support laboratories, instrument rooms, cell cultures, core services (glass-ware washing, kitchen, storage room, etc.) and some offices. The laboratories have been operational since 2021.

NORTH PAVILION

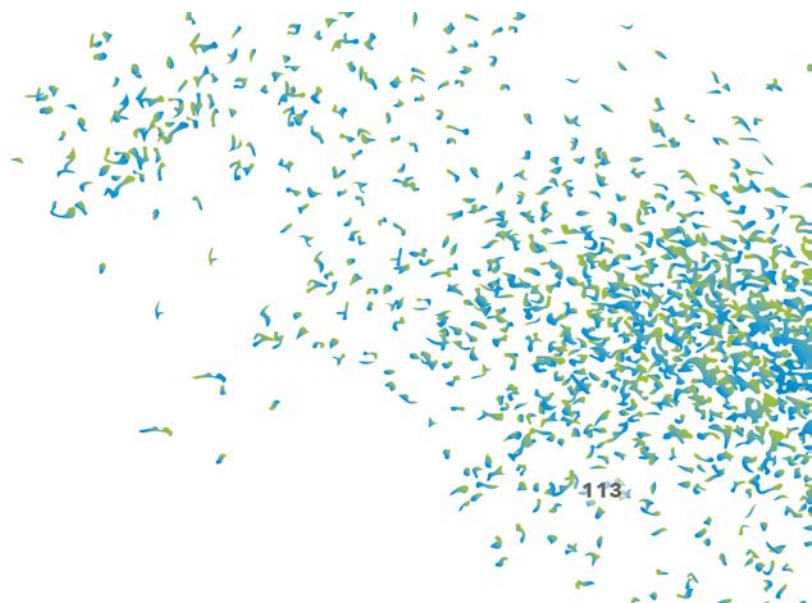


The North Pavilion underwent repurposing work so that it could host imaging facilities with cryo-electron microscopes (Cryo-EM) and optical microscopes (Light Microscopy Imaging). It is equipped with support spaces for sample preparation and offices for the managers of the two facilities. The first floor houses several open space workstations for the Image Analysis Facility staff as well as support workstations for the users of the two Facilities. The building underwent major renovations so that it could house microscopes, which require a stable floor, i.e. one that is not subject to tremors, vibrations or the slightest oscillations, and able to support their weight. The building has been operational since 2021.

SOUTH PAVILION



The South Pavilion was renovated in 2021 and, after plant and civil engineering additions, it has been housing the new experimental research laboratories for the various Centres and additional Facilities, as well as office space, since July 2023.



PROPERTY DEVELOPMENT ACTIVITIES, CRITERIA AND PLANS

Campus development plans include three phases:



PHASE 1

This phase started in the second half of 2018 and continued until the first half of 2021. Detailed planning of the Incubator Labs was largely carried out in 2019-20, working closely with the first group of Research Centre Managers and Group Leaders recruited at HT. Palazzo Italia, on the other hand, has been housing the core administrative activities and part of the Foundation's research activities since early 2018. A further round of renovation work on Palazzo Italia was completed in 2021. Further repurposing work began during 2022 and was completed in 2023.



PHASE 2

This phase will last until the end of construction work on the South Building, expected in 2028, and is aimed at consolidating the first core of HT's experimental research and service activities (i.e. the Genomics, Neurogenomics and Structural Biology Research Centres), located in the Incubator Labs, in the North Pavilion and South Pavilion. Since 2021 these spaces have been housing (primary) research laboratories, the first core of HT's basic scientific facilities, as well as other shared common services.



PHASE 3

Subject to completion of the South Building, expected in 2028, the experimental research and service activities that first started in the Incubator Labs, in the North and South Pavilion will be gradually relocated.

Building and infrastructural development activities and programmes in the MIND area are based on the following criteria:

FLEXIBILITY	The ability to adapt, modify and reconfigure spaces over time to meet changing needs and accommodate new lines of research and technology. Besides, this aspect is fundamental to modern life science research and thus also to HT
DURABILITY AND MAINTENANCE	Design and technical solutions are used that can ensure maximum durability, limit the need for routine and extraordinary maintenance, optimise and reduce operating and maintenance costs
INNOVATIVE CONSTRUCTION TECHNOLOGIES	Wherever possible, industrialised construction solutions and the use of advanced materials are prioritised, in line with the principles of modularity and construction efficiency
ENVIRONMENTAL SUSTAINABILITY AND ENERGY EFFICIENCY	Work and installations are designed according to energy-saving and environmentally sustainable criteria, including innovative and technologically advanced components as well as adopting architectural solutions that reduce consumption and produce energy. These include systematic reference to their social and environmental impact, with specific rules, procedures and guidelines based on existing standards and regulations, such as Minimum Environmental Criteria (CAM) for public procurement and the LEED (Leadership in Energy and Environmental Design) green building rating system or Life Cycle Assessment methods for assessing the environmental impact of laboratories and buildings
'COMMON SPACE' CONCEPT	The overall development design of MIND includes buildings with a permeable ground floor ('common space') and the absence of individual, enclosed building lots. The degree of 'openness' of the ground floor of HT's newly constructed buildings is defined by taking into account the needs of the new research centres with regard to internal logistics requirements for scientific activities, the logistical needs (pedestrian and vehicle traffic) of staff, external suppliers and visitors, safety and security issues and the protection of HT's research work

2023 ACTIVITIES AND RESULTS

Consistent with HT's strategic planning, the development and improvement of scientific research infrastructure and space continued in 2023. In particular, the following is pointed out:

1. the completion of the building site for the repurposing of **Palazzo Italia**, which revised the internal distribution of administrative offices and areas for computational research, and created the space for the general warehouse and cryobank in the basement;
2. the completion of the repurposing and fitting out of the **South Pavilion** building for an additional 2,500 square metres of wet and dry laboratories. The building was then activated at the end of July 2023, completing all the first buildings planned for the HT Campus.

From the viewpoint of the ongoing improvement of the infrastructure available to HT and future National Facilities, these are the other most significant activities carried out in 2023. Specifically:

- ▶ the revision of the design of the liquid nitrogen supply line serving Cryo-em laboratories and the future storage area for biological samples (bio-bank) was completed. The subsequent tender was awarded in October 2023 and the service for the supply of technical gases and liquid nitrogen was started pending completion of the works, which is expected in June 2024;
- ▶ the revision of the project for the construction of the new Biosafety Level 3 (**BSL3**) laboratory to be located in the South Pavilion was completed. Work should be completed in July 2024 and will be followed by the authorisation to operate the research lines;
- ▶ the contract for the development of a technical-economic feasibility project (TEFP) to develop an integrated tender for the implementation of a major expansion of **light imaging microscopy in the North Pavilion** was awarded. Implementation will take place in phases and be completed in Q3 2024;

- ▶ the contract for the development of a technical-economic feasibility project (TEFP) to develop an integrated tender for the implementation of a major expansion of **Cryo-EM microscopy in the South Pavilion** was awarded. Construction will require major structural and plant engineering work due to the requirements of microscopes (similar to the instrument fleet already operating in the North Pavilion) and will be completed in 2025;

- ▶ the contract for the development of a technical-economic feasibility project (TEFP) to develop an integrated tender for the construction of an additional **Tape Library** in the basement of Palazzo Italia for the long-term storage of scientific data in support of ICT was awarded. Construction will be completed in Q1 2025.

- ▶ the tender documentation for the assignment of the supply and installation of 2 prefabricated shelter modules for a **new CED HPC cluster** to be temporarily positioned in the technical area of Palazzo Italia for an additional power of 320kW in total was prepared. Delivery is expected to take place by Q1 2025. The option of doubling this infrastructure if the needs of the National Facilities so require is included in the tender. The infrastructure is needed in order to allow the Human Technopole Foundation to complete the fully operational Technological Hub and Data Centre.

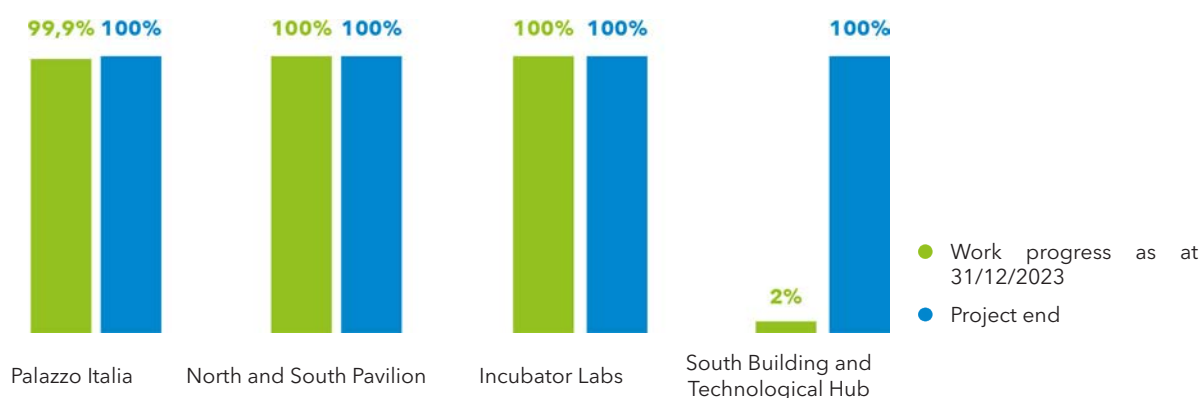
As regards completion of the Campus in the medium term, the final design work for the new building complex consisting of two buildings, the South Building and the Technological Hub, as well as complementary works for an expected total works of approximately €249,800,000, were completed. The project was approved by the Supervisory Body on 2 February 2023 and the preparatory activities for the Services Conference to obtain the building permit are under way. Executive design should be completed by June 2024, to be followed by the tendering of the works within the year with the support of an auxiliary contracting authority that is currently being defined.

At the same time, in February 2023 HT completed the purchase of the land necessary to complete HT's perimeter, as envisaged in the MIND Area Integrated Intervention Plan (IIP). In terms of Facility Management services, in 2023 HT gradually ceased to outsource cleaning, concierge and maintenance services to third-party providers and started to directly manage the same following their acquisition by joining the Consip FM4 Convention. This activity will continue in 2024,

incorporating also the management of the armed security service at the Campus.

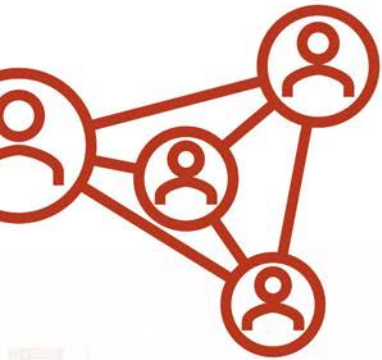
The chart below shows the progress of construction and renovation work on the buildings at the end of 2023:

% PROGRESS IN INFRASTRUCTURE DEVELOPMENT PROJECTS



The following tables show the percentage of square metres allocated to research for the HT Campus buildings, at the end of 2023:

DETAILS OF HT SQM		PERCENTAGE OF LABORATORIES AND OFFICES AND SERVICES IN 2023
SOUTH PAVILION		
Laboratories	2,765	
NORTH PAVILION		
Laboratories	1,158	
INCUBATOR LABS		
Laboratories	3,298	41%
PALAZZO ITALIA		
Laboratories	1,067	
Offices and Services	11,916	59%
DETAILS OF FORECAST SQM		
SOUTH BUILDING (FORECAST 2024-2028)		
LABORATORIES		15,460
SERVICES		11,004
OFFICES		3,914



2.2.4 RELATIONAL CAPITAL

Institutions and relations within and between communities, groups of stakeholders, and the ability to share information to improve individual and collective wellbeing.

Social and relational capital includes:

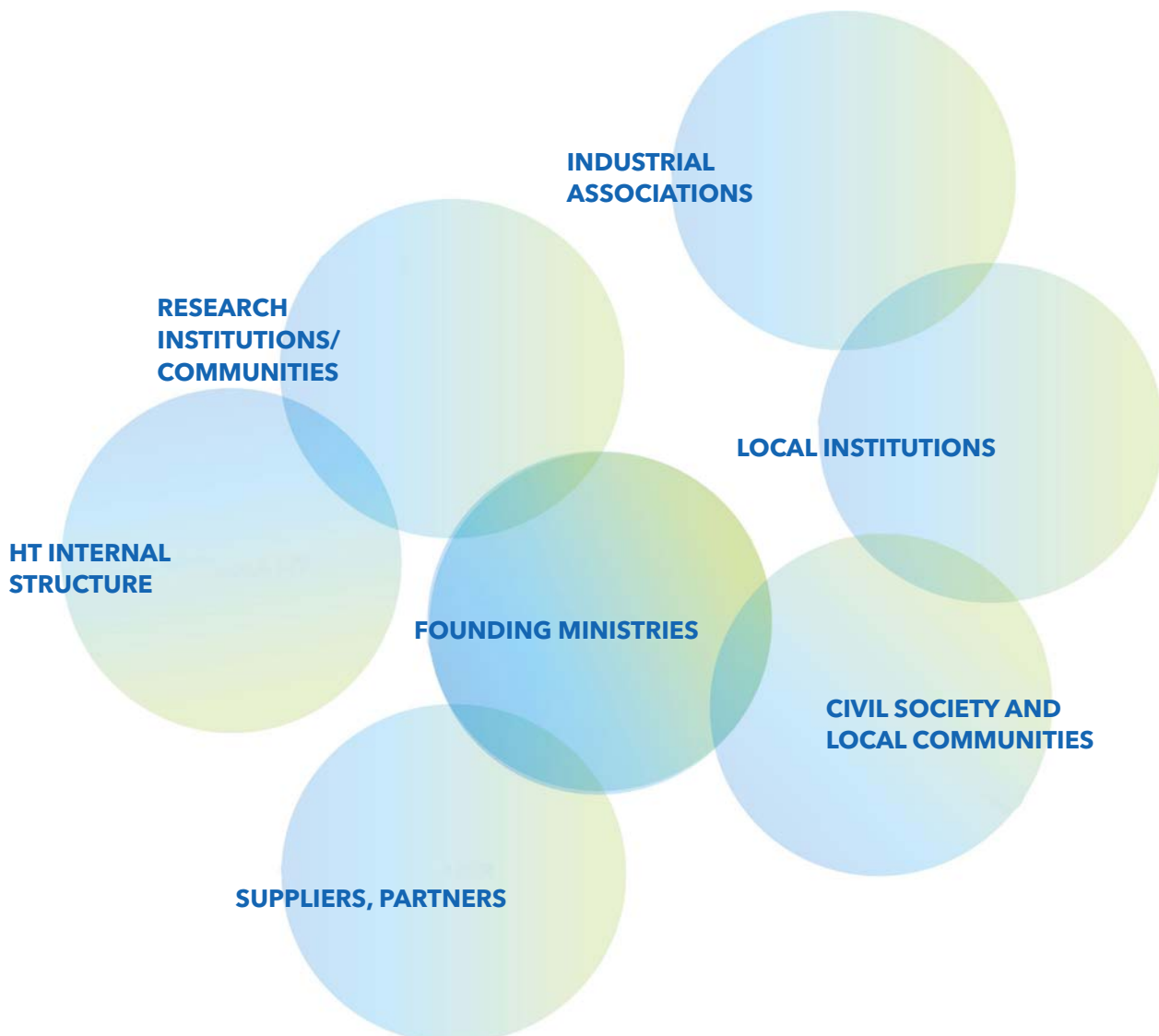
- ▶ Shared norms, values and common behaviours
- ▶ Key stakeholder relationships, the trust and willingness to engage that an organisation has developed and strives to build and protect with external stakeholders
- ▶ Intangible assets associated with the brand and reputation that an organisation has developed
- ▶ An organisation's social licence to operate

OUR STAKEHOLDERS

The Human Technopole Foundation maintains an inclusive approach to its stakeholders, establishing strong relationships through transparent and effective communications. HT has ensured this approach through a series of structured engagements (interviews, institutional and scientific initiatives,

surveys) with its stakeholders. Underlying such engagement activities is a stakeholder mapping process that involves all HT's internal structures. The approach to stakeholder engagement is discussed in detail in subchapter 2.1 '*Stakeholder engagement and the materiality matrix*' of this document.

The Human Technopole Foundation's key stakeholders are shown below:



HT is aware of the importance of people and of the territory in which it operates. It is constantly committed to implementing specific scientific and institutional initiatives, also aimed at the economic, social and cultural development of the areas in which the Human Technopole Foundation is located.

Major stakeholder engagement initiatives include, for example, collaborations, partnerships and institutional initiatives.

SCIENTIFIC PARTNERSHIPS AND COLLABORATIONS

HT creates ties and participates in consortia and collaborative research activities at European and international level. Some of these initiatives are:

► **LifeTime**, of which HT is an associate partner, is a pan-European research initiative that aims to

revolutionise healthcare by understanding and monitoring human disease at single cell resolution to transform patient care and the sustainability of healthcare systems. The LifeTime consortium brings together more than 120 leading scientists from over 90 European research institutes.

The University of Milan is the official partner of the consortium, while other Italian associate partners include the European Institute of Oncology, the FIRC Foundation Institute of Molecular Oncology, the Institute of Biomedical Technologies and the Institute of Photonics and Nanotechnologies of the National Research Council, as well as several leading Italian universities;

► **Human Cell Atlas** represents a global effort that brings together expertise in biology, medicine, genomics, technology development and computation with the goal of creating a comprehensive collection of cell maps, characterising each of the thousands of cell types present in the human body. A systematic study of the molecular mechanisms underlying the production, function and combined activity of different cell types would be an incredibly valuable resource for the global research community;

► **The Cancer Dependency Map** is a partnership between the Broad Institute (USA) and the Wellcome Sanger Institute (UK) that brings together expertise, data and computational tools to systematically identify the genetic and pharmacological dependencies of cancer and the biomarkers that predict them.

► **Fantom** is a consortium initially set up at the Riken Institute (Japan) to assign functional annotations to full-length cDNAs, which has since developed and expanded over time to

encompass the fields of transcriptome analysis. The goal of FANTOM is to move steadily up the layers in the system of life, thus progressing from an understanding of the 'elements' - the transcripts - to an understanding of the 'system' - the transcriptional regulatory network, in other words the 'system' of an individual life form. The current edition of FANTOM, which HT has joined, is dedicated to the functional analysis of non-coding RNA.

► **The Human Pangenome Reference Consortium** (HPRC) aims to create a more sophisticated and complete human reference genome with a graph-based, telomere-to-telomere representation of global genomic diversity. It will leverage innovations in technology, study design and global partnerships with the goal of constructing the highest-possible quality human pangenome reference. The goal is to improve data representation and streamline analyses to enable routine assembly of complete diploid genomes.

For more detailed information on further scientific partnerships and collaborations, please refer to sub-chapter 2.3.7 'Strategy', section 'Partnerships, networking and stakeholder engagement', as well as sub-chapter 2.4.2 'Responsible and sustainable approach', section 'Development of partnerships and collaborations with universities and research institutes on scientific research projects'.

INSTITUTIONAL INITIATIVES

HT's institutional activities contribute to the development and monitoring of relations with national and local government bodies, European and international institutions, companies and employer

associations, the players at MIND (Milan Innovation District) and the stakeholders that are relevant to HT, in order to promote, consolidate and defend its interests.

2023 INITIATIVES AND RESULTS

WITH **17** SCIENTIFIC INSTITUTIONS AND ORGANISATIONS
18 PARTNERSHIPS



National Research
Council



Monasterio Foundation
Scuola Superiore
Sant'Anna



Wellcome Sanger
Institute



Astra Zeneca SpA



IIT Foundation



Humanitas SpA
Foundation Institute of
Molecular Oncology



University College
London



ULSS5 Rovigo



National Research
Council



Erasmus University
Medical Center



University
of Turin



University of
Cambridge



Wellcome Sanger
Institute



Monzino
IRCCS



Ca' Granda Ospedale
Maggiore Policlinico IRCCS
Foundation



Ca' Granda Ospedale
Maggiore Policlinico
SR-Tiget IRCCS Foundation



C. Besta
Istituto Neurologico IRCCS
Foundation



IIT Foundation

INSTITUTIONAL AND COMMUNICATION INITIATIVES IN 2023

During 2023, President Gianmario Verona and Director Marino Zerial participated as speakers at many events on research, innovation and health.

The Human Technopole Foundation's senior management also met various national, local and international institutional representatives, as well as scientific, industrial and civil society stakeholders, in order to raise awareness of HT's activities and their impact on the country's economy.

HT also took part in a number of events and initiatives organised by MIND partners, representing and telling about HT's activities.

In 2023, communication activities continued steadily by enhancing the institute's key messages of excellence and interdisciplinarity in science, the attraction of talent from abroad, and openness to the scientific community. The most important events included: the appointment and arrival of new Director Prof. Zerial, the award of 3 ERC Consolidator Grants, HT's participation in the European iCA-RE4CVD consortium for the prevention of cardiovascular diseases, and a publication on the SARS-CoV-2 virus in collaboration with Prof. Antonella Viola's group at the University of Padua.

In terms of educational & outreach activities, HT participated in the Social Innovation Campus and MIND Education initiatives, in addition to its regular participation in the Rome Science Festival. Lastly the Communications team joined for the first year the school-to-work alternation programme, allowing a young student to join the team's activities in June.

With regard to internal communications, new communication tools were introduced to facilitate the dissemination of information and key messages within the HT community. In spring, HT's first podcast was launched to share updates and highlights on research conducted at the institute. In the autumn of 2023, a new newsletter format - Five o'clock news - was introduced to tell employees about upcoming

opportunities, initiatives and deadlines. Finally, with the arrival of the new Director, the scheduling of monthly Faculty meetings to share strategic and operational updates with group leaders and managers was introduced. The minutes of Faculty meetings are then made available to all staff via the institutional intranet. Various community building activities were organised, including an Easter Egg Hunt, the HTalent show and the second edition of the Shout Out programme.

Lastly, in 2023 the Human Technopole Foundation organised about **150** events for a total of **2,500** participating guests. The main initiatives organised included: eight training opportunities for young researchers, the first edition of the EU Cancer DepMap Symposium, two symposia on gender equality and the 'Future Trends in Translational Medicine' conference, in collaboration with Nature Italy. As part of the Human Technopole Foundation's commercial activities, a dozen initiatives of external companies and organisations were hosted, including the inauguration of the Milan University in the MIND Area, with the laying of the foundation stone.



+150 EVENTS
2.500 PARTICIPATING GUESTS

MEDIA AND SOCIAL NETWORK PERFORMANCE IN 2023

HT is actively engaged in communications in order to expand its visibility as a cutting-edge research centre and to consolidate its reputation as an attractive location for global scientific talent, offering high-level knowledge.

Furthermore, an integral part of HT's mission is to educate the public on the importance of scientific research and to promote science outreach to a wide range of scientific and non-scientific stakeholders.

HT maintained a constant and significant presence throughout the year in the main Italian media, including the press, television and online. 2023 saw a slight decrease in the number of new followers on all platforms compared to the previous year; in any event, HT constantly launched communication initiatives aimed at fostering dialogue and actively engaging HT's social account followers.

In 2023, the total number of mentions in newspapers and on the web, radio and TV was **1348**. Of these, **463** were the result of proactive media activity, divided into:

- ▶ **16** national newspapers
- ▶ **9** national TV stations
- ▶ **4** national radio stations
- ▶ **3** local radio stations
- ▶ **364** web news
- ▶ **5** local editions of national newspapers
- ▶ **15** local newspapers
- ▶ **5** local TV stations
- ▶ **42** news agencies

The articles and radio/TV reports in which HT is mentioned spontaneously relate to two macro-themes in particular:

- ▶ **HT and the Life Sciences ecosystem in Italy:** HT is mentioned as one of the most promising research institutes in the field of life sciences;
- ▶ **HT as a protagonist of the MIND district:** the Institute is described as one of the partners of the innovation district.

Finally, in general terms there was a significant increase in digital activity on all platforms in 2023, as detailed below:

PLATFORM	TOTAL FOLLOWERS AS AT 31.12.2023	GROWTH COMPARED TO PREVIOUS YEAR
X (FORMERLY TWITTER)	8,361	+13.28%
LINKEDIN	29,307	+30.66%
INSTAGRAM	2,745	+17.91%
FACEBOOK	2,918	+6.91%
YOUTUBE	419	+104.76%
NEWSLETTER	1246	+15.69%

HT's website and social channels were constantly updated and enriched with audiovisual content to describe the work of researchers and commemorate international science days. A new way of sending

the institutional newsletter was introduced, creating two separate channels: one for scientific updates and one for training activities and events.



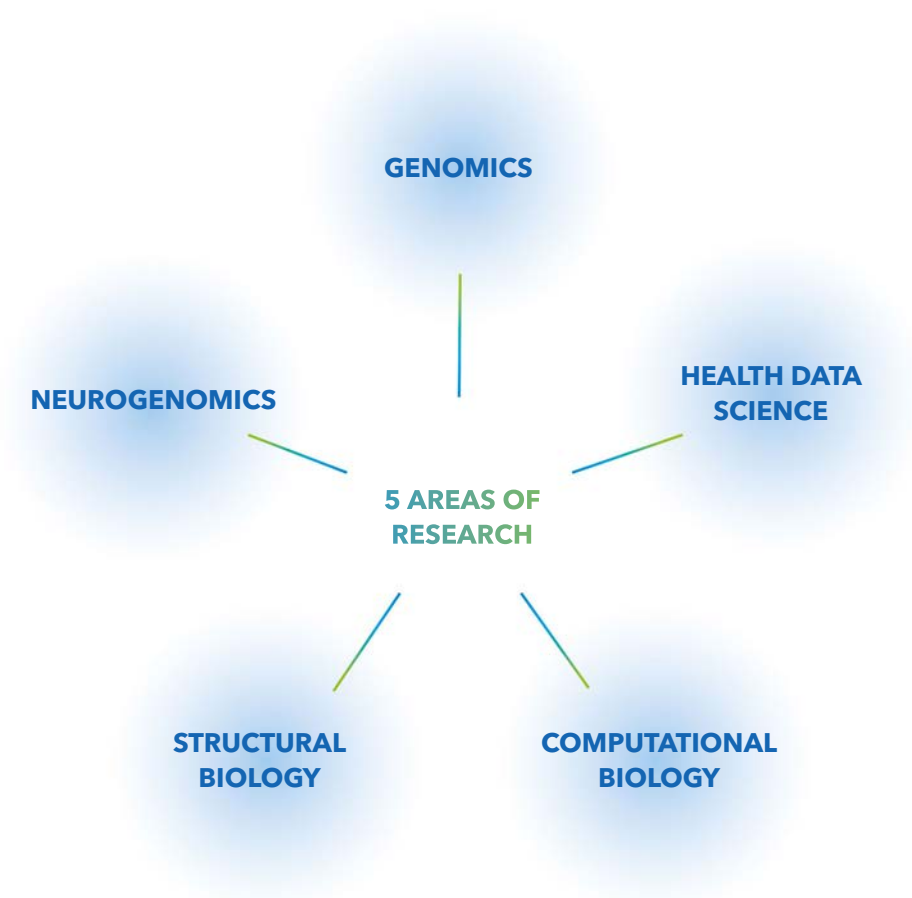


2.2.5 INTELLECTUAL CAPITAL

Organisational and knowledge-based intangibles, including:

- ▶ Copyrights, software, rights and licences
- ▶ 'Organisational capital' as tacit knowledge, systems, procedures and protocols

HT's research activities are organised in five different areas, each of which is supported by a Research Centre:



HT's research is interdisciplinary and includes biologists, bioinformaticians, chemists, engineers, physicists and mathematicians. The benefit of this broad range of expertise, however, can only be reaped if scientists work together across different disciplines in order to exploit the synergies between their different skills.

The Human Technopole Foundation promotes and encourages interdisciplinary collaboration through, for example: the dual appointment of

group leaders in more than one research centre, joint interdisciplinary doctoral and/or postdoctoral projects between centres, and the funding of jointly supervised pre- or postdoctoral fellowships.

In addition, HT research is carried out in a barrier-free environment and adopts a collegial management approach, which fosters an inclusive and open culture, with extensive collaboration between the different teams, the sharing of laboratories and collaboration between different Centres.

2023 RESULTS

In 2023, HT-affiliated researchers achieved numerous significant scientific results in their respective fields of study, resulting in a total of **122**

publications in renowned international journals. Details of these publications by research centre are given below.

GENOMICS CENTRE

TITLE	AUTHORS	JOURNAL
Enhancers dysfunction in the 3D genome of cancer cells	G. Della Chiara, C. Jiménez, M. Virdi, N. Crosetto, M. Bienko	<i>Front Cell Dev Biol</i>
Deficiency of the Heterogeneous Nuclear Ribonucleoprotein U locus leads to delayed hindbrain neurogenesis	F. Mastropasqua, M. Oksanen, C. Soldini, S. Alatar, A. Arora, R. Ballarino, M. Molinari, F. Agostini, A. Poulet, M. Watts,..., N. Crosetto, M. Bienko , E. Santini, A. Borgkvist, S. Bölte, K. Tammimies	<i>Biol Open.</i>
How Hi-C ignited the era of 3D genome biology	M. Bienko	<i>Nat Rev Genet.</i>
A GC-centered view of 3D genome organization	B. Am Bouwman, N. Crosetto, M. Bienko	<i>Curr Opin Genet Dev.</i>
Compromised nonsense-mediated RNA decay results in truncated RNA-binding protein production upon DUX4 expression	A. E. Campbell, M.C. Dyle, R. Albanese , T. Matheny, K. Sudheendran, M. A. Cortázar, T. Forman, R. Fu, A. E. Gillen, M. H. Caruthers, S. N. Floor, L. Calviello , S. Jagannathan	<i>Cell Reports</i>
Piwil2 (Mili) sustains neurogenesis and prevents cellular senescence in the postnatal hippocampus	C. Gasperini, K. Tuntevski, S. Beatini, R. Pelizzoli, A. Lo Van, D. Mangoni, R. M. Cossu, G. Pascarella, P. Bianchini, P. Bielefeld M. Scarpato, M. Pons-Espinal, R. Sanges, A. Diaspro, C. P. Fitzsimons, P. Carninci , S. Gustincich, D. De Pietri Tonelli	<i>EMBO Reports</i>
Capture-seq protocol and TereX pipeline guidelines for detection of recombination of repeat elements in short-and long-DNA reads libraries	G. Pascarella, L. Straniero, M. Frith, P. Carninci	<i>STAR Protocols</i>
Prediction of the cell-type-specific transcription of non-coding RNAs from genome sequences via machine learning	M. Koido, C. Hon, S. Koyama, H. Kawaji, Y. Murakawa, K. Ishigaki, K. Ito, J. Sese, N. F. Parrish, Y. Kamatani, P. Carninci , C. Terao	<i>Nature Biomedical Engineering</i>
Long non-coding RNAs: definitions, functions, challenges and recommendations	J. S. Mattick, P. P. Amaral, P. Carninci , S. Carpenter, H. Y. Chang, L. Chen, R. Chen, C. Dean, M. E. Dinger, K. A. Fitzgerald, T. R. Gingeras, M. Guttman, T. Hirose, M. Huarte, R. Johnson, C. Kanduri, P. Kapranov, J. B. Lawrence, J. T. Lee, J. T. Mendell, T. R. Mercer, K. J. Moore, S. Nakagawa, J. L. Rinn, D. L. Spector, I. Ulitsky, Y. Wan, J. E. Wilusz, M. Wu	<i>Nature Reviews Molecular Cell Biology</i>

TITLE	AUTHORS	JOURNAL
SINEUP non-coding RNA activity depends on specific N6-methyladenosine nucleotides	B. Pierattini, S. D'Agostino, C. Bon, O. Peruzzo, A. Alendar, A. Codino, G. Ros, F. Persichetti, R. Sanges, P. Carninci , C. Santoro, S. Espinoza, P. Valentini, L. Pandolfini, S. Gustinchich	<i>Mol Ther Nucleic Acids</i>
ZENBU-Reports: a graphical web-portal builder for interactive visualization and dissemination of genome-scale data	J. Severin, S. Agrawal, J. A. Ramilowski, R. Deviatiiarov, J. W Shin, P. Carninci , M. de Hoon	<i>NAR Genomics and Bioinformatics</i>
Gut microbial carbohydrate metabolism contributes to insulin resistance	T. Takeuchi, T. Kubota, Y. Nakanishi, Hi. Tsugawa, W. Suda, A. Tae-Jun Kwon, J. Yazaki, K. Ikeda, S. Nemoto, Y. Mochizuki, ..., P. Carninci , O. Ohara, M. Arita, M. Hattori, S. Koyasu, H. Ohno	<i>Nature</i>
The status of the human gene catalogue	P. Amaral, S. Carbonell-Sala, F. M. De La Vega, T. Faial, A. Frankish, T. Gingeras, R. Guigo, J. L. Harrow, A. G. Hatzigeorgiou, R. Johnson, ..., P. Carninci , S. L. Salzberg	<i>Nature</i>
A new layer of complexity in the human genome: Somatic recombination of repeat elements	G. Pascarella, M. Frith, P. Carninci	<i>Clinical and Translational Medicine</i>
Whole Genome Classification of Pre-Malignant B-Cells Disorder of the Explored Study	P. Robbe, K. Ridout, N. Appleby, G. Ciuban, G. Batth, H. Dreau, T. Wenban-Smith, M. Kormandy, G. Gafencu, P. Carninci , C. Freestone, D. McAleese, D. Vavoulis, A. Schuh	<i>Blood</i>
Perivascular niche cells sense thrombocytopenia and activate hematopoietic stem cells in an IL-1 dependent manner	T. C. Luis, N. Barkas, J. Carrelha, A. Giustacchini , S. Mazzi, R. Norfo, B. Wu, A. Aliouat, J. A. Guerrero, A. Rodriguez-Meira, et al.	<i>Nature Communications</i>
An automatic entropy method to efficiently mask histology whole-slide images	Y. Song, F. Cisternino, J.M. Mekke, G. J. de Borst, D. P.V. de Kleijn, G. Pasterkamp, A. Vink, C. A. Glastonbury , S. W. van der Laan, C. L. Miller	<i>Scientific Reports</i>
GWAS of genetic factors affecting white blood cell morphological parameters in Sardinians uncovers influence of chromosome 11 innate immunity gene cluster on eosinophil morphology	M. Marongiu, G. Pérez-Mejías, V. Orrù, M. Steri, C. Sidore, A. Díaz-Quintana, A. Mulas, F. Busonero, A. Maschio, K. Walter, M. Tardaguila, P. Akbari, N. Soranzo , E. Fiorillo, M. Gorospe, D. Schlessinger, I. Díaz-Moreno, F. Cucca, M. Zoledziowska	<i>Hum Mol Genet</i>
An atlas of genetic scores to predict multi-omic traits	Y. Xu, S. C. Ritchie, Y. Liang, P. R. H. J. Timmers, M. Pietzner, L. Lannelongue, S. A. Lambert, U. A. Tahir, S. May-Wilson, C. Foguet, ..., N. Soranzo , E. Di Angelantonio , N. Pirastu, E. Shyong Tai, R. M. van Dam, H. Parkinson, E. E Davenport, et al.	<i>Nature</i>
Methods and Insights from Single-Cell Expression Quantitative Trait Loci	J. B. Kang, A. Raveane , A. Nathan, N. Soranzo , S. Raychaudhuri	<i>Annu Rev Genomics Hum Genet</i>
A genome-wide association study of blood cell morphology identifies cellular proteins implicated in disease aetiology	P. Akbari, D. Vuckovic, L. Stefanucci, T. Jiang, K. Kundu, R. Kreuzhuber, E. L. Bao, J. H. Collins, K. Downes, L.Grassi,..., E. Di Angelantonio , V. G. Sankaran, M. Frontini, S. Burgess, T. Kuijpers, J. E. Peters, A. S. Butterworth, W. H. Ouwehand, N. Soranzo , W. J. Astle	<i>Nat Commun</i>

TITLE	AUTHORS	JOURNAL
Cross-disorder genetic analysis of immune diseases reveals distinct gene associations that converge on common pathways	P. Demela, N. Pirastu, B. Soskic	<i>Nature Communications</i>
Flavours of Convolution for Un-supervised Aspect Extraction and Aspect-based Sentiment Analysis	S. Chatterjee , S. Prakash, A. Nürnberger	<i>Proceedings of the Seventh Workshop on Natural Language for Artificial Intelligence (NL4AI 2023)</i>
Liver segmentation using Turbolift learning for CT and cone-beam C-arm perfusion imaging	H. Haseljić, S. Chatterjee , R. Frysck, V. Kulvait, V. Semshchikov, B. Hensen, F. Wacker, I. Brusch, T. Werncke, O. Speck, A. Nürnberger, G. Rose	<i>Computers in Biology and Medicine</i>
Sinogram upsampling using Primal-Dual UNet for under-sampled CT and radial MRI reconstruction	P. Ernst, S. Chatterjee , G. Rose, O. Speck, A. Nürnberger	<i>Neural Networks</i>
MICDIR: Multi-scale inverse-consistent deformable image registration using UNetMSS with self-constructing graph latent	S. Chatterjee , H. Bajaj, I. H. Siddiquee, N. B. Subbarayappa, S. Simon, S. Bangalore Shashidhar, O. Speck, A. Nürnberger	<i>Computerized Medical Imaging and Graphics</i>
XPF interacts with TOP2B for R-loop processing and DNA looping on actively transcribed genes	G. Chatzinikolaou, K. Stratigi, A. Siametis, E. Goulielmaki, A. Akalestou-Clocher, I. Tsamardinos, P. Topalis, C. Austin, B. A. M. Bouwman, N. Crosetto , J. Altmüller, G. A. Garinis	<i>Science Advances</i>
Spatial resolution of cellular senescence dynamics in human colorectal liver metastasis	O. Garbarino, L. Lambroia, G. Basso, V. Marrella, B. Franceschini, C. Soldani, F. Pasqualini, D. Giuliano, G. Costa, C. Peano , D. Barbarossa, D. An-narita, A. Salvati, L. Terracciano, G. Torzilli, M. Donadon, F. Faggioli	<i>Aging Cell</i>
Patterns of item nonresponse behaviour to survey questionnaires are systematic and associated with genetic loci	G. Mignogna, C. E. Carey, R. Wedow, N. Baya, M. Cordioli, N. Pirastu , R. Bellocco, K. Fiuza Malerbi, M. G. Nivard, B. M. Neale, R. K. Walters, A. Ganna	<i>Nat Hum Behav.</i>
Participation bias in the UK Biobank distorts genetic associations and downstream analyses	T. Schoeler, D. Speed, E. Porcu, N. Pirastu , J. Pingault, Z. Kutalik	<i>Nat Hum Behav.</i>
Mendelian randomisation identifies priority groups for prophylactic EBV vaccination	M. D. Muckian, J. F. Wilson, G. S. Taylor, H. R. Stagg, N. Pirastu	<i>BMC Infect Dis.</i>
CHARR efficiently estimates contamination from DNA sequencing data.	W. Lu, L. D. Gauthier, T. Poterba, E. Giacomuzzi , J. K. Goodrich, C. R. Stevens, D. King, M. J. Daly, B. M. Neale, K. J. Karczewski	<i>AJHG</i>
Structural and non-coding variants increase the diagnostic yield of clinical whole genome sequencing for rare diseases	A. T. Pagnamenta, C. Camps, E. Giacomuzzi , J. M. Taylor, M. Hashim, E. Calpena, P.J. Kaisaki, A. Hashimoto, J. Yu, E. Sanders, et al.	<i>Genome Med</i>

TITLE	AUTHORS	JOURNAL
Assessing the recovery of Y chromosome microsatellites with population genomic data using Papio and Theropithecus genomes	Mutti G, Oteo-Garcia G, Caldon M, da Silva MJF, Minhós T, Cowlishaw G, Gottelli D, Huchard E, Carter A, Martinez FI, Raveane A , Capelli C.	<i>Sci Rep</i>
The multifaceted genomic history of Ashaninka from Amazonian Peru.	Capodiferro MR, Chero Osorio AM, Rambaldi Migliore N, Tineo Tineo DH, Raveane A , Xavier C, Bodner M, Simão F, Ongaro L, Montinaro F, Lindo J, Huerta-Sanchez E, Politis G, Barbieri C, Parson W, Gusmão L, Achilli A.	<i>Curr. Biol</i>
Recombination between heterologous human acrocentric chromosomes	Andrea Guarracino , Silvia Buonaiuto, Leonardo Gomes de Lima, Tamara Potapova, Arang Rhie, Sergey Koren, Boris Rubinstein, s Christian Fischer, Human Pangenome Reference Consortium, Jennifer L. Gerton, Adam M. Phillippy, Vincenza Colonna & Erik Garrison	<i>Nature</i>
A super-pangenome of the North American wild grape species	Cochetel N, Minio A, Guarracino A , Garcia JF, Figueroa-Balderas R, Massonnet M, Kasuga T, Londo JP, Garrison E, Gaut BS, Cantu D.	<i>Genome Biol.</i>
Pangenome graphs in infectious disease: a comprehensive genetic variation analysis of <i>Neisseria meningitidis</i> leveraging Oxford Nanopore long reads	Yang Z, Guarracino A , Biggs PJ, Black MA, Ismail N, Wold JR, Merriman TR, Prins P, Garrison E, de Ligt J.	<i>Front Genet</i>
The complete sequence of a human Y chromosome.	Arang Rhie, Sergey Nurk, Monika Cechova, Savannah J. Hoyt, Dylan J. Taylor, Nicolas Altemose, Paul W. Hook, Sergey Koren, Mikko Rautiainen, Ivan A. Alexandrov, Jamie Allen, Mobin Asri, Andrey V. Bzikadze, Nae-Chyun Chen, Chen-Shan Chin, Mark Diekhans, Paul Flicek, Giulio Formenti, Arkarachai Fungtammasan, Carlos Garcia Giron, Erik Garrison, Ariel Gershman, Jennifer L. Gerton, Patrick G. S. Grady, Andrea Guarracino , Leanne Haggerty, Reza Halabian, Nancy F. Hansen, Robert Harris, Gabrielle A. Hartley, William T. Harvey, Marina Haukness, Jakob Heinz, Thibaut Hourlier, Robert M. Hubley, Sarah E. Hunt, Stephen Hwang, Miten Jain, Rupesh K. Kesharwani, Alexandra P. Lewis, Heng Li, Glennis A. Logsdon, Julian K. Lucas, Wojciech Makalowski, Christopher Markovic, Fergal J. Martin, Ann M. Mc Cartney, Rajiv C. McCoy, Jennifer McDaniel, Brandy M. McNulty, Paul Medvedev, Alla Mikheenko, Katherine M. Munson, Terence D. Murphy, Hugh E. Olsen, Nathan D. Olson, Luis F. Paulin, David Porubsky, Tamara Potapova, Fedor Ryabov, Steven L. Salzberg, Michael E. G. Sauria, Fritz J. Sedlazeck, Kishwar Shafin, Valery A. Shepelev, Alaina Shumate, Jessica M. Storer, Likhitha Surapaneni, Angela M. Taravella Oill, Françoise Thibaud-Nissen, Winston Timp, Marta Tomaszewicz, Mitchell R. Vollger, Brian P. Walenz, Allison C. Watwood, Matthias H. Weissensteiner, Aaron M. Wenger, Melissa A. Wilson, Samantha Zarate, Yiming Zhu, Justin W. Zook, Evan E. Eichler, Rachel J. O'Neill, Michael C. Schatz, Karen H. Miga, Kateryna D. Makova & Adam M. Phillippy	<i>Nature</i>

TITLE	AUTHORS	JOURNAL
A draft human pangenome reference.	Wen-Wei Liao, Mobin Asri, Jana Ebler, Daniel Doerr, Marina Haukness, Glenn Hickey, Shuangjia Lu, Julian K. Lucas, Jean Monlong, Haley J. Abel, Silvia Buonaio, Xian H. Chang, Haoyu Cheng, Justin Chu, Vincenza Colonna, Jordan M. Eizenga, Xiaowen Feng, Christian Fischer, Robert S. Fulton, Shilpa Garg, Cristian Groza, Andrea Guarracino , William T. Harvey, Simon Heumos, Kerstin Howe, Miten Jain, Tsung-Yu Lu, Charles Markello, Fergal J. Martin, Matthew W. Mitchell, Katherine M. Munson, Moses Njagi Mwaniki, Adam M. Novak, Hugh E. Olsen, Trevor Pesout, David Porubsky, Pjotr Prins, Jonas A. Sibbesen, Jouni Sirén, Chad Tomlinson, Flavia Villani, Mitchell R. Vollger, Lucinda L. Antonacci-Fulton, Gunjan Baid, Carl A. Baker, Anastasiya Belyaeva, Konstantinos Billis, Andrew Carroll, Pi-Chuan Chang, Sarah Cody, Daniel E. Cook, Robert M. Cook-Deegan, Omar E. Cornejo, Mark Diekhans, Peter Ebert, Susan Fairley, Olivier Fedrigo, Adam L. Felsenfeld, Giulio Formenti, Adam Frankish, Yan Gao, Nanibaa' A. Garrison, Carlos Garcia Giron, Richard E. Green, Leanne Haggerty, Kendra Hoekzema, Thibaut Hourlier, Hanlee P. Ji, Eimear E. Kenny, Barbara A. Koenig, Alexey Kolesnikov, Jan O. Korbel, Jennifer Kordosky, Sergey Koren, HoJoon Lee, Alexandra P. Lewis, Hugo Magalhães, Santiago Marco-Sola, Pierre Marijon, Ann McCartney, Jennifer McDaniel, Jacquelyn Mountcastle, Maria Nattestad, Sergey Nurk, Nathan D. Olson, Alice B. Popejoy, Daniela Puiu, Mikko Rautiainen, Allison A. Regier, Arang Rhie, Samuel Sacco, Ashley D. Sanders, Valerie A. Schneider, Baergen I. Schultz, Kishwar Shafin, Michael W. Smith, Heidi J. Sofia, Ahmad N. Abou Tayoun, Françoise Thibaud-Nissen, Francesca Floriana Tricomi, Justin Wagner, Brian Walenz, Jonathan M. D. Wood, Aleksey V. Zimin, Guillaume Bourque, Mark J. P. Chaisson, Paul Flicek, Adam M. Phillippy, Justin M. Zook, Evan E. Eichler, David Haussler, Ting Wang, Erich D. Jarvis, Karen H. Miga, Erik Garrison, Tobias Marschall, Ira M. Hall, Heng Li & Benedict Paten	Nature
Optimal gap-affine alignment in $O(s)$ space	Marco-Sola S, Eizenga JM, Guarracino A , Paten B, Garrison E, Moreto M.	Bioinformatics
Unbiased pangenome graphs	E. Garrison, A. Guarracino ,	Bioinformatics

NEUROGENOMICS CENTRE

TITLE	AUTHORS	JOURNAL
Systematic investigation of allelic regulatory activity of schizophrenia-associated common variants	J. C. McAfee, S. Lee, J. Lee, J. L. Bell, O. Krupa, J. Davis, K. Insigne, M. L. Bond, N. Zhao, A. P. Boyle, D. H. Phanstiel, M. I. Love, J. L. Stein, W. B. Ruzicka, J. Davila-Velderrain , S. Kosuri, H. Won	<i>Cell Genomics</i>
Lateral mammillary body neurons in mouse brain are disproportionately vulnerable in Alzheimer's disease	Huang WC, Peng Z, Murdock MH, Liu L, Mathys H, Davila-Velderrain J , Jiang X, Chen M, Ng AP, Kim T, Abdurrob F	<i>Science Translational Medicine</i>
Uncovering the particularities of the dynamical interaction between cancer-related Epithelial-Mesenchymal Transition and the Mammalian Cell Cycle	Juárez-Ramiro L, Dávila-Velderrain J , Soria-López A, Álvarez-Buylla ER, Martínez-García JC	<i>Proceedings of the International Conference on Bioinformatics and Computational Biology (BICOB-2023)</i>
Clarifying the biological nature of the interaction between the systems-based epigenetic landscape and the epigenome	Caldú-Primo JL, Dávila-Velderrain J , Martínez-García JC, Álvarez-Buylla ER	<i>Proceedings of the International Conference on Bioinformatics and Computational Biology (BICOB-2023)</i>
Encephalitis and poor neuronal death-mediated control of herpes simplex virus in human inherited RIPK3 deficiency	Z. Liu, E. J. Garcia Reino, O. Harschnitz , H. Guo, Y. Chan, N. V. Khobreakar, M. L. Hasek, K. Dobbs, D. Rinchai, M. Materna, et al.	<i>Science Immunology</i>
DOT1L activity affects neural stem cell division mode and reduces differentiation and ASNS expression	B. Appiah, C. L. Fullio, C. Ossola, I. Bertani, E. Restelli , A. Cheffer, M. Polenghi , C. Haffner, M. Garcia-Miralles, P. Zeis, M. Treppner, P. Bovio, L. Schlichtholz, A. Mas-Sanchez, L. Zografidou, J. Winter, H. Binder, D. Grün, N. Kalebic, E. Taverna , T. Vogel	<i>EMBO Reports</i>
Intracellular traffic and polarity in brain development	M. Polenghi, E. Taverna	<i>Front Neurosci.</i>
RAGE engagement by SARS-CoV-2 enables monocyte infection and underlies COVID-19 severity	R. Angioni, M. Bonfanti, N. Caporale , R. Sanchez-Rodriguez, Fabio Munari, A. Savino, S. Pasqualato , D. Buratto, I. Pagani, N. Bertoldi, C. Zanon, P. Ferrari, E. Ricciardelli , C. Putaggio, S. Ghezzi, F. Elli , L. Rotta, A. Scardua, J. Weber, V. Cecatiello, F. Iorio, F. Zonta , A. M. Cattelan, E. Vicenzi, A. Vannini , B. Molon, C. E. Villa , A. Viola and G. Testa	<i>Cell Reports Medicine</i>
Chromatin remodeler Activity-Dependent Neuroprotective Protein (ADNP) contributes to syndromic autism	C. P. D'Incal, K. E. Van Rossem, K. De Man, A. Konings, A. Van Dijck, L. Rizzuti, A. Vitriolo, G. Testa , I. Gozes, W. V. Berghe, R. F. Kooy	<i>Clin Epigenetics</i>
GTF2I dosage regulates neuronal differentiation and social behavior in 7q11.23 neurodevelopmental disorders	A. López-Tobón, R. Shyti, C. E. Villa, C. Cheroni , P. Fuentes-Bravo, S. Trattaro, N. Caporale, F. Troglio , E. Tenderini, M. Mihailovich , A. Skaros, W. T. Gibson, A. Cuomo, T. Bonaldi, C. Mercurio, M. Varasi, L. Osborne, G. Testa	<i>Science Advances</i>
Curation of causal interactions mediated by genes associated with autism accelerates the understanding of gene-phenotype relationships underlying neurodevelopmental disorders	M. Iannuccelli, A. Vitriolo , L. Licata, P. Lo Surdo, S. Contino, C. Cheroni, D. Capocefalo , L. Castagnoli, G. Testa , G. Cesareni, L. Perfetto	<i>Mol Psychiatry</i>

STRUCTURAL BIOLOGY CENTRE

TITLE	AUTHORS	JOURNAL
The yeast RNA methylation complex consists of conserved yet reconfigured components with m6A-dependent and independent roles	I. Ensink, A. Maman, W. S. Albihlal, M. Lassandro , G. Salzano , T. Sideri, S. A Howell, E. Calvani, H. Patel, G. Bushkin, M. Ralser, A. P. Snijders, M. Skehel, A. Casañal , S. Schwartz., F. J. van Werven	<i>Elife</i>
The length of FOXE1 polyalanine tract in congenital hypothyroidism: Evidence for a pathogenic role from familial, molecular and cohort studies	E. Stellaria Grassi, G. Rurale, T. de Filippis, D. Gentilini, E. Carbone, F. Coscia , S. Uraghi, M. Bullock, R. J. Clifton-Bligh, A. K. Gupta, L. Persani	<i>Front Endocrinol</i>
Multishot tomography for high-resolution in situ subtomogram averaging	S. Khavnekar, W. Wan, P. Majumder, W. Wietrzynski, P. S. Erdmann , J. M. Plitzko	<i>J Struct Biol</i>
Recent advances in plant endomembraneresearch and new microscopical techniques	Y. Zeng, Z. Liang, Z. Liu1, B. Li1, Y. Cui, C. Gao, J. Shen, X. Wang, Q. Zhao, X. Zhuang, P. S. Erdmann , K. Wong and L. Jiang	<i>New Phytologist</i>
TOMOMAN: Streamlining Cryo-electron Tomography and Subtomogram Averaging Workflows Using TOMOgram MANager	S. Khavnekar, P. S. Erdmann , W. Wan	<i>Microsc Microanal</i>
The molecular structure of IFT-A and IFT-B in anterograde intraflagellar transport trains	S. E. Lacey , H. E. Foster , G. Pigino	<i>Nat Struct Mol Biol</i>
Efficient precision editing of endogenous Chlamydomonas reinhardtii genes with CRISPR-Cas	A. P. Nievergelt, D. R. Diener, A. Bogdanova, T. Brown, G. Pigino	<i>Cell Rep Methods</i>
An In-depth Guide to the Ultrastructural Expansion Microscopy (U-ExM) of Chlamydomonas reinhardtii	N. Klena , G. Maltinti , U. Batman, G. Pigino , P. Guichard, V. Hamel	<i>Bio Protocol</i>
Protocol for precision editing of endogenous Chlamydomonas reinhardtii genes with CRISPR-Cas	A. P. Nievergelt , D. R. Diener, A. Bogdanova, T. Brown, G. Pigino	<i>STAR Protocol</i>
Structural insights into the DNA recognition mechanism by the bacterial transcription factor PdxR	I. Freda, C. Exertier, A. Barile, A. Chaves-Sanjuan, M. Vivoli Vega, M. N. Isupov, N. J. Harmer, E. Gugole, P. Swuec , M. Bolognesi, A. Scipioni, C. Savino, M. L. Di Salvo, R. Contestabile, B. Vallone, A. Tramonti, L. Celeste Montemiglio	<i>Nucleic Acids Res</i>

COMPUTATIONAL BIOLOGY CENTRE

TITLE	AUTHORS	JOURNAL
A heuristic algorithm solving the mutual-exclusivity-sorting problem	A. Vinceti, L. Trastulla, U. Perron, A. Raiconi, F. Iorio	<i>Bioinformatics</i>
An interactive web application for processing, correcting, and visualizing genome-wide pooled CRISPR-Cas9 screens	A. Vinceti, R. R. De Lucia, P. Cremaschi, U. Perron, E. Karakoc, L. Mauri, C. Fernandez, K. H. Kluczynski, D. S. Anderson, F. Iorio	<i>Cell Reports Methods</i>
μSplit: efficient image decomposition for microscopy data	A. Ashesh, A. Krull, M. Di Sante, F. S. Pasqualini, F. Jug	<i>Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2116221172</i>
Using AI in bioimage analysis to elevate the rate of scientific discovery as a community	D. Dalle Nogare, M. Hartley, J. Deschamps, J. Ellenberg and F. Jug	<i>Nature Methods</i>
Better research software tools to elevate the rate of scientific discovery or why we need to invest in research software engineering	J. Deschamps, D. Dalle Nogare, F. Jug	<i>Frontiers in Bioinformatics</i>
Community-developed checklists for publishing images and image analyses	C. Schmied, M. S. Nelson, S. Avilov, G. Bakker, C. Bertocchi, J. Bischof, ..., F. Jug, et al.	<i>Nature Methods</i>
DeepContrast: Deep Tissue Contrast Enhancement using Synthetic Data Degradations and OOD Model Predictions	N. P. Martins, Y. Kalaidzidis, M. Zerial, F. Jug	<i>Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 3828-3837</i>
N2V2-fixing noise2void checkerboard artifacts with modified sampling strategies and a tweaked network architecture	E. Höck, T.O. Buchholz, A. Brachmann, F. Jug, A. Freytag	<i>Computer Vision–ECCV 2022 Workshops: Tel Aviv, Israel</i>
Zyxin contributes to coupling between cell junctions and contractile actomyosin networks during apical constriction	M. M. Slabodnick, S. C. Tintori, M. Prakash, P. Zhang, C. D. Higgins, A. H. Chen, T. D. Cupp, T. Wong, E. Bowie, F. Jug, B. Goldstein	<i>PloS Genetics</i>
Nanog organizes transcription bodies	K. Kuznetsova, N. M. Chabot, M. Ugolini, E. Wu, M. Lalit, H. Oda, Y. Sato, H. Kimura, F. Jug, N. L. Vastenhouw	<i>Current Biology</i>
Immune selection determines tumor antigenicity and influences response to checkpoint inhibitors	L. Zapata, G. Caravagna, M. J. Williams, E. Lakatos, K. AbdulJabbar, B. Werner, D. Chowell, C. James, L. Gourmet, S. Milite, A. Acar, N. Riaz, T. A. Chan, T. A. Graham, A. Sottoriva	<i>Nature Genetics</i>
Contribution of pks+E. coli mutations to colorectal carcinogenesis	B. Chen, D. Ramazzotti, T. Heide, I. Spiteri, J. Fernandez-Mateos, C. James, L. Magnani, T. A. Graham, A. Sottoriva	<i>Nature Communications</i>

TITLE	AUTHORS	JOURNAL
Cancer Evolution: A Multifaceted Affair	G.Ciriello, L. Magnani, S. J. Aitken, L. Akkari, S. Behjati, D. Hanahan, D. A. Landau, N. Lopez-Bigas, D. G. Lupiáñez, J. Marine, A. Martin-Villalba, G. Natoli, A. C. Obenaus, E. Oricchio, P. Scaffidi, A. Sottoriva , A. Swarbrick, G. Tonon, S. Vanharanta, J. Zuber	<i>Cancer Discovery</i>
Phenotypic noise and plasticity in cancer evolution	F. J.H. Whiting, J. Househam, A. Baker, A. Sottoriva , T. A. Graham	<i>Trends in Cell Biology</i>
Evolutionary signatures of human cancers revealed via genomic analysis of over 35,000 patients	D. Fontana, I. Crespiatico, V. Crippa, F. Malighetti, M. Villa, F. Angaroni , L. De Sano, A. Aroldi, M. Antonioti, G. Caravagna, R. Piazza, A. Graudenzi, L. Mologni and D. Ramazzotti	<i>Nature Communications</i>
Unity is strength: Improving the detection of adversarial examples with ensemble approaches	F. Craighero, F. Angaroni , F. Stella, C. Damiani, M. Antonioti, A. Graudenzi	<i>Neurocomputing</i>

HEALTH DATA SCIENCE

TITLE	AUTHORS	JOURNAL
2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes: Developed by the task force on the management of cardiovascular disease in patients with diabetes of the European Society of Cardiology (ESC).	Marx N, Federici M, Schütt K, Müller-Wieland D, Ajjan RA, Antunes MJ, Christodorescu RM, Crawford C, Di Angelantonio E , Eliasson B, Espinola-Klein C, Fauchier L, Halle M, Herrington WG, Kautzky-Willer A, Lambrinou E, Lesiak M, Lettino M, McGuire DK, Mullens W, Rocca B, Sattar N; ESC Scientific Document Group	<i>European Heart Journal</i>
The effects of pathogenic and likely pathogenic variants for inherited hemostasis disorders in 140 214 UK Biobank participants	Stefanucci L, Collins J, Sims MC, Barrio-Hernandez I, Sun L, Burren OS, Perfetto L, Bender I, Callahan TJ, Fleming K, Guerrero JA, Hermjakob H, Martin MJ, Stephenson J, Paneerselvam K, Petrovski S, Porras P, Robinson PN, Wang Q, Watkins X, Frontini M, Laskowski RA, Beltrao P, Di Angelantonio E , Gomez K, Laffan M, Ouwehand WH, Mumford AD, Freson K, Carss K, Downes K, Gleadall N, Megy K, Bruford E, Vuckovic D	<i>Blood</i>
Genetically predicted androgenic profiles and adverse cardiac markers: a sex-specific Mendelian randomization study.	Chen JY, Ardissino M, Reddy RK, Mason AM, Raisi-Estabragh Z, Di Angelantonio E , Burgess S, Ng FS	<i>ESC Heart Failure</i>
The effects of pathogenic and likely pathogenic variants for inherited hemostasis disorders in 140 214 UK Biobank participants.	Stefanucci L, Collins J, Sims MC, Barrio-Hernandez I, Sun L, Burren OS, Perfetto L, Bender I, Callahan TJ, Fleming K, Guerrero JA, Hermjakob H, Martin MJ, Stephenson J, Paneerselvam K, Petrovski S, Porras P, Robinson PN, Wang Q, Watkins X, Frontini M, Laskowski RA, Beltrao P, Di Angelantonio E , Keith Gomez, Laffan M, Ouwehand WH, Mumford AD, Freson K, Carss K, Downes K, Gleadall N, Megy K, Bruford E, Vuckovic D	<i>Blood</i>
Prioritising cardiovascular disease risk assessment to high risk individuals based on primary care records	Chung R, Xu Z, Arnold M, Stevens D, Keogh R, Barrett J, Harrison H, Pennells L, Kim LG, Di Angelantonio E , Paige E, Usher-Smith JA, Wood AM	<i>PLoS One</i>

TITLE	AUTHORS	JOURNAL
Genetically predicted plasma cortisol and common chronic diseases: A Mendelian randomization study.	Lee WH, Larsson SC, Wood A, Di Angelantonio E , Butterworth AS, Burgess S, Allara E	<i>Clin Endocrinol (Oxf).</i>
A genome-wide association study of blood cell morphology identifies cellular proteins implicated in disease aetiology.	Akbari P, Vuckovic D, Stefanucci L, Jiang T, Kundu K, Kreuzhuber R, Bao EL, Collins JH, Downes K, Grassi L, Guerrero JA, Kaptoge S, Knight JC, Meacham S, Sambrook J, Seyres D, Stegle O, Verboon J, Walter K, Watkins N A, Danesh J, Roberts DJ, Di Angelantonio E , Sankaran VG, Frontini M, Burgess S, Kuipers T, Peters JE, Butterworth AS, Ouwehand WH, Soranzo N, Astle W J.	<i>Nat Commun</i>
The relevance of competing risk adjustment in cardiovascular risk prediction models for clinical practice.	Hageman SH, Dorresteijn JA, Pennells L, van Smeden M, Bots ML, Di Angelantonio E , Visseren FL	<i>European Journal of Preventive Cardiology</i>
Risk Factors of Secondary Cardiovascular Events in a Multi-Ethnic Asian Population with Acute Myocardial Infarction: A Retrospective Cohort Study from Malaysia.	Ismail SR, Mohammad MSF, Butterworth AS, Chowdhury R, Danesh J, Di Angelantonio E , Griffin SJ, Pennells L, Wood AM, Md Noh MF, Shah SA	<i>Journal of Cardiovascular Development and Disease</i>
Improving 10-year cardiovascular risk prediction in apparently healthy people: flexible addition of risk modifiers on top of SCORE2.	Hageman SH, Petitjaen C, Pennells L, Kaptoge S, Pajouheshnia R, Tillmann T, Blaha MJ, McClelland RL, Matsushita K, Nambi V, Klungel OH, Souverein PC, van der Schouw TY, Verschuren WMM, Lehmann N, Erbel R, Jöckel KH, Di Angelantonio E , Visseren FLJ, Dorresteijn JAN	<i>European Journal of Preventive Cardiology</i>
SCORE2-Diabetes: 10-year cardiovascular risk estimation in type 2 diabetes in Europe	Pennells L, Kaptoge S, Østergaard HB, Read SH, Carinci F, Franch-Nadal J, Petitjean C, Taylor O, Hageman SH, Xu Z, Shi F, Spackman S, Gualdi S, Holman N, Bebbiano Da Providencia E Costa R, Bonnet F, Brenner H, Gillum RF, Kiechl S, Lawlor DA, Potier L, Schöttker B, Sofat R, Völzke H, Willeit J, Baltane Z, Fava S, Janos S, Lavens A, Pildava S, Poljicanin T, Pristas I, Rossing P, Sascha R, Scheidt-Nave C, Stotl I, Tibor G, Urbančič-Rovan V, Vanherwegen AS, Vistisen D, Du Y, Walker MR, Willeit P, Ference B, De Bacquer D, Halle M, Huculeci R, McEvoy JW, Timmis A, Vardas P, Dorresteijn JAN, Graham I, Wood A, Eliasson B, Herrington W, Danesh J, Mauricio D, Benedetti M M, Sattar N, Visseren FLJ, Wild S, Di Angelantonio E , Balkau B, Bonnet F, Fumeron F, Stocker H, Hollecsek B, Schipf S, Schmidt CO, Dörr M, Tilg H, Leitner C, Notdurfter M, Taylor J, Dale C, Prieto-Merino D, Gillum RF, Lavens A, Vanherwegen AS, Poljicanin T, Pristas I, Buble T, Ivanko P, Rossing P, Carstensen B, Heidemann C, Du Y, Scheidt-Nave C, Gall T, Sandor J, Baltane Z, Pildava S, Lepiksone J, Magri CJ, Azzopardi J, Stotl I, Real J, Vlachos B, Mata-Cases M.	<i>European Heart Journal</i>
Impact of a post-donation hemoglobin testing strategy on efficiency and safety of whole blood donation in England: A modeling study.	Kim LG, Bolton T, Sweeting MJ, Bell S, Fahle S, McMahon A, Walker M, Ferguson E, Mifflin G, Roberts DJ, Di Angelantonio E	<i>Transfusion</i>
Evaluation of interventions to prevent vasovagal reactions among whole blood donors: rationale and design of a large cluster randomised trial.	McMahon A, Kaptoge S, Walker M, Mehenny S, Gilchrist PT, Sambrook J, Akhtar N, Sweeting M, Wood AM, Stirrups K, Chung R, Fahle S, Johnson E, Cullen D, Godfrey R, Duthie S, Allen L, Harvey P, Berkson M, Allen E, Watkins NA, Bradley JR, Kingston N, Mifflin G, Armitage J, Roberts DJ, Danesh J, Di Angelantonio E	<i>Trials</i>

TITLE	AUTHORS	JOURNAL
Association of Longer Leukocyte Telomere Length With Cardiac Size, Function, and Heart Failure	Aung N, Wang Q, van Duijvenboden S, Burns R, Stoma S, Raisi-Estabragh Z, Ahmet S, Allara E, Wood A, Di Angelantonio E , Danesh J, Munroe PB, Young A, Harvey NC, Codd V, Nelson CP, Petersen SE, Samani NJ	<i>JAMA Cardiol</i>
Using Polygenic Risk Scores for Prioritizing Individuals at Greatest Need of a Cardiovascular Disease Risk Assessment.	Chung R, Xu Z, Arnold M, Ip S, Harrison H, Barrett J, Pennells L, Kim LG, Di Angelantonio E , Paige E, Ritchie SC, Inouye M, Usher-Smith JA, Wood AM	<i>J Am Heart Assoc</i>
An atlas of genetic scores to predict multi-omic traits	Xu Y, Ritchie SC, Liang Y, Timmers PRHJ, Pietzner M, Lannelongue L, Lambert SA, Tahir UA, May-Wilson S, Foguet C, Johansson Å, Surendran P, Nath AP, Persyn E, Peters JE, Oliver-Williams C, Deng S, Prins B, Luan J, Bombá L, Soranzo N, Di Angelantonio E , Pirastu N, Tai ES, van Dam RM, Parkinson H, Davenport EE, Paul DS, Yau C, Gerszten RE, Mälarstig A, Danesh J, Sim X, Langenberg C, Wilson JF, Butterworth AS, Inouye M	<i>Nature</i>
Estimating individual lifetime risk of incident cardiovascular events in adults with Type 2 diabetes: an update and geographical calibration of the DIAbetes Lifetime perspective model (DIAL2).	Østergaard HB, Hageman SHJ, Read SH, Taylor O, Pennells L, Kaptoge S, Petitjean C, Xu Z, Shi F, McEvoy JW, Herrington W, Visseren FLJ, Wood A, Eliasson B, Sattar N, Wild S, Di Angelantonio E , Dorresteijn JAN	<i>Eur J Prev Cardiol</i>
Including measures of chronic kidney disease to improve cardiovascular risk prediction by SCORE2 and SCORE2-OP	Matsushita K, Kaptoge S, Hageman SHJ, Sang Y, Ballew SH, Grams ME, Surapaneni A, Sun L, Arnlov J, Bozic M, Brenner H, Brunskill NJ, Chang AR, Chinnadurai R, Cirillo M, Correa A, Ebert N, Eckardt KU, Gansevoort RT, Gutierrez O, Hadaegh F, He J, Hwang SJ, Jafar TH, Jassal SK, Kayama T, Kovesdy CP, Landman GW, Levey AS, Lloyd-Jones DM, Major RW, Miura K, Muntner P, Nadkarni GN, Nowak C, Ohkubo T, Pena MJ, Polkinghorne KR, Sairenchi T, Schaeffner E, Schneider MP, Shalev V, Shlipak MG, Solbu MD, Stempniewicz N, Tollitt J, Valdivielso JM, van der Leeuw J, Wang AY, Wen CP, Woodward M, Yamagishi K, Yatsuya H, Zhang L, Dorresteijn JAN, Di Angelantonio E , Visseren FLJ, Pennells L, Coresh J	<i>European Journal of Preventive Cardiology</i>
Comparison of the Reproducibility of Ultrasound Calliper Placement Methods in Abdominal Aortic Diameter Measurements: A Systematic Review and Meta-Analysis of Diagnostic Test Accuracy Studies	D. Bissacco, T. J. Mandigers, L. Savaré, M. Domanin, M. D'Oria, F. Ieva , J. A. Van Herwaarden, K. Mani, A. Wanhainen, S. Trimarchi	<i>European Journal of Vascular and Endovascular Surgery</i>
Radiomic Analysis of Intrahepatic Cholangiocarcinoma: Non-Invasive Prediction of Pathology Data: A Multicenter Study to Develop a Clinical-Radiomic Model	F. Fiz, N. Rossi, S. Langella, A. Ruzzenente, M. Serenari, F. Ardito, A. Cucchetti, T. Gallo, G. Zamboni, C. Mosconi, ..., F. Ieva , L. Vigano	<i>Cancers</i>
Learning high-order interactions for polygenic risk prediction	M. C. Massi, N. R. Franco, A. Manzoni, A. M. Paganoni, H. A. Park, M. Hoffmeister, H. Brenner, J. Chang-Claude, F. Ieva , and P. Zunino,	<i>Plos One</i>
Radiomics-Based Inter-Lesion Relation Network to Describe [18F]FMCH PET/ CT Imaging Phenotypes in Prostate Cancer	L. Cavinato, M. Sollini, A. Ragni, F. Bartoli, R. Zanca, F. Pasqualetti, A. Marciano, F. Ieva , P. A. Erba	<i>Cancers</i>

TITLE	AUTHORS	JOURNAL
Dual adversarial deconfounding autoencoder for joint batch-effects removal from multi-center and multi-scanner radiomics data	L. Cavinato, M. C. Massi, M. Sollini, M. Kirienko and F. Ieva	<i>Scientific Reports</i>
Capturing the variety of clinical pathways in patients with schizophrenic disorders through state sequences analysis	L. Savaré, F. Ieva , G. Corrao, A. Lora	<i>BMC Med Res Methodol.</i>
Mapping Tumor Heterogeneity via Local Entropy Assessment: Making Biomarkers Visible	G. Costa, L. Cavinato, F. Fiz, M. Sollini, A. Chiti, G. Torzilli, F. Ieva , L. Viganò	<i>J Digit Imaging</i>
Explainable domain transfer of distant supervised cancer subtyping model via imaging-based rules extraction	L. Cavinato, N. Gozzi, M. Sollini, M. Kirienko, C. Carlo-Stella, C. Rusconi, A. Chiti, F. Ieva	<i>Artif Intell Med.</i>
Detecting early signals of COVID-19 outbreaks in 2020 in small areas by monitoring healthcare utilisation databases: first lessons learned from the Italian Alert_CoV project	I. Merlo, M. Crea, P. Berta, F. Ieva , F. Carle, F. Rea, G. Porcu, L. Savaré, R. De Maio, M. Villa, ..., Italian Alert_CoV Project group	<i>Euro Surveill.</i>
The impact of public transport on the diffusion of COVID-19 pandemic in Lombardy during 2020	G. Galliani, P. Secchi, F. Ieva	<i>Medical Research Archives</i>
Scaling survival analysis in healthcare with federated survival forests: A comparative study on heart failure and breast cancer genomics	A. Archetti, F. Ieva , M. Matteucci	<i>Future Generation Computer Systems</i>
A general framework for penalized mixed-effects multitask learning with application on DNAm biomarkers creation	A. Cappozzo, F. Ieva , G. Fiorito	<i>Annals of Applied Statistics</i>
Patients' radiation exposure during endovascular abdominal aortic aneurysm repair	Mandigers, T.J., Fulgheri, I., Pugliese, G., Bissacco, D., Savaré, L., Ieva, F., Campoleoni, M., van Herwaarden, J.A., Trimarchi, S., Domanin, M.	<i>Annals of Vascular Surgery.</i> doi: 10.1016/j.avsg.2023.06.014
A propensity score matching analysis comparing vascular patients in two different COVID-19 waves: results from the Vascular Surgery Group of Regione Lombardia (VSG-RL) registry	Bissacco, D., Bellosta, R., Domanin, M., Primo, R., Mandigers, T., Savaré, L., Ieva, F. , Piffaretti, G., Trimarchi, S.	<i>Italian Journal of Vascular and Endovascular Surgery</i>
Ask Your Data - Supporting Data Science Processes by Combining AutoML and Conversational Interfaces	Pidò, S., Pinoli, P., Crovari, P., Ieva, F. , Garzotto, F., Ceri, S.	<i>IEEE Access</i>

TITLE	AUTHORS	JOURNAL
Partial Identification of the Average Causal Effect in Multiple Study Populations: The Challenge of Combining Mendelian Randomization Studies	E. W. Diemer, L. Zuccolo , S. A. Swanson	<i>Epidemiology</i>
Bounding the average causal effect in Mendelian randomisation studies with multiple proposed instruments: An application to prenatal alcohol exposure and attention deficit hyperactivity disorder	E. W. Diemer, A. Havdahl, O. A. Andreassen, M. R. Munafò, P. R. Njolstad, H. Tiemeier, L. Zuccolo , S. A. Swanson	<i>Paediatr Perinat Epidemiol</i>
Vaccine effectiveness for prevention of covid-19 related hospital admission during pregnancy in England during the alpha and delta variant dominant periods of the SARS-CoV-2 pandemic: population-based cohort study	M. L. Bosworth, R. Schofield, D. Ayoubkhani, L. Charlton, V. Nafilyan, K. Khunti., F. Zaccardi, C. Gillies, A. Akbari., M. Knight., R. Wood., P. Hardelid, L. Zuccolo , C. Harrison	<i>BMJ Med</i>
COVID-19 vaccination in pregnancy: the impact of multimorbidity and smoking status on vaccine hesitancy, a cohort study of 25,111 women in Wales, UK	M. Mhereeg, H. Jones, J. Kennedy, M. Seaborne, M. Parker, N. Kennedy, A. Akbari, L. Zuccolo , A. Azcoaga-Lorenzo, A. Davies, K. Nirantharakumar, S. Brophy	<i>BMC Infectious Diseases</i>
Maternal caffeine consumption during pregnancy and offspring cord blood DNA methylation: an epigenome-wide association study meta-analysis	L. Schellhas, G. S. Monasso, J. F. Felix, V. Wv Jaddoe, P. Huang, S. Fernández-Barrés, M. Vrijheid, G. Pesce, I. Annesi-Maesano, C. M. Page, A. Brantsæter, M. Bekkhus, S. E Håberg, Stephanie J. London, M. R. Munafò, L. Zuccolo , G. C. Sharp	<i>Epigenomics</i>
Evaluating Messaging on Prenatal Health Behaviors Using Social Media Data: Systematic Review	N. F. Frennesson, C. McQuire, S. A. Khan, J. Barnett, L. Zuccolo	<i>J Med Internet Res</i>
Cluster analysis of angiotensin biomarkers to identify antihypertensive drug treatment in population studies	Arisido, MW. , Foco, L., Shoemaker, R., Melotti, R., Delles, C., Gögele, M., ... & Pattaro, C	<i>BMC Medical Research Methodology</i>
Capturing the variety of clinical pathways in patients with schizophrenic disorders through state sequences analysis	L. Savaré, F. Ieva , G. Corrao, A. Lora	<i>BMC Med Res Methodol.</i>
Genome-wide association analysis and Mendelian randomization proteomics identify drug targets for heart failure	D. Rasooly, G.M. Peloso, A.C. Pereira, H. Dashti, C. Giambartolomei , E. Wheeler, N. Aung, B.R. Ferolito, M. Pietzner, E.H. Farber-Eger, et al.	<i>Nat Commun.</i>
The PENGUIN approach to reconstruct protein interactions at enhancer-promoter regions and its application to prostate cancer	A. Armaos, F. Serra, I. Núñez-Carpintero, J. Seo, S. C. Baca, S. Gustincich, A. Valencia, M. L. Freedman, D. Cirillo, C. Giambartolomei , and G. G. Tartaglia	<i>Nat Commun.</i>

* These publications include reviews and peer-reviewed research articles.

In 2023, there were also 53 cohort studies (research projects in which groups of people are studied over a specific period of time) and 37 new experimental methods and protocols developed with the participation of HT-affiliated researchers, details of which are given below

COHORT STUDIES

TITLE	AUTHORS	JOURNAL
GWAS of genetic factors affecting white blood cell morphological parameters in Sardinians uncovers influence of chromosome 11 innate immunity gene cluster on eosinophil morphology	M. Marongiu, G. Pérez-Mejías, V. Orrù, M. Steri, C. Sidore, A. Díaz-Quintana, A. Mulas, F. Busonero, A. Maschio, K. Walter, M. Tardaguila, P. Akbari, N. Soranzo , E. Fiorillo, M. Gorospe, D. Schlessinger, I. Díaz-Moreno, F. Cucca, M. Zoledziewska	<i>Hum Mol Genet</i>
An atlas of genetic scores to predict multi-omic traits	Y. Xu, S. C. Ritchie, Y. Liang, P. R. H. J. Timmers, M. Pietzner, L. Lannelongue, S. A. Lambert, U. A. Tahir, S. May-Wilson, C. Foguet, ..., N. Soranzo , E. Di Angelantonio , N. Pirastu, E Shyong Tai, R. M. van Dam, H. Parkinson, E. E Davenport, et al.	<i>Nature</i>
A genome-wide association study of blood cell morphology identifies cellular proteins implicated in disease aetiology	P. Akbari, D. Vuckovic, L. Stefanucci, T. Jiang, K. Kundu, R. Kreuzhuber, E. L. Bao, J. H. Collins, K. Downes, L. Grassi, ..., E. Di Angelantonio , V. G. Sankaran, M. Frontini, S. Burgess, T. Kuijpers, J. E. Peters, A. S. Butterworth, W. H. Ouwehand, N. Soranzo , W. J. Astle	<i>Nat Commun</i>
Cross-disorder genetic analysis of immune diseases reveals distinct gene associations that converge on common pathways	P. Demela , N. Pirastu , B. Soskic	<i>Nature Communications</i>
Spatial resolution of cellular senescence dynamics in human colorectal liver metastasis	O. Garbarino, L. Lambroia, G. Basso, V. Marrella, B. Franceschini, C. Soldani, F. Pasqualini, D. Giuliano, G. Costa, C. Peano , D. Barbarossa, D. Annarita, A. Salvati, L. Terracciano, G. Torzilli, M. Donadon, F. Faggioli	<i>Aging Cell</i>
Patterns of item nonresponse behaviour to survey questionnaires are systematic and associated with genetic loci	G. Mignogna, C. E. Carey, R. Wedow, N. Baya, M. Cordioli, N. Pirastu , R. Bellocco, K. Fiuza Malerbi, M. G. Nivard, B. M. Neale, R. K. Walters, A. Ganna	<i>Nat Hum Behav.</i>
Participation bias in the UK Biobank distorts genetic associations and downstream analyses	T. Schoeler, D. Speed, E. Porcu, N. Pirastu , J. Pingault, Z. Kutalik	<i>Nat Hum Behav.</i>
Mendelian randomisation identifies priority groups for prophylactic EBV vaccination	M. D. Muckian, J. F. Wilson, G. S. Taylor, H. R. Stagg, N. Pirastu	<i>BMC Infect Dis.</i>

TITLE	AUTHORS	JOURNAL
Structural and non-coding variants increase the diagnostic yield of clinical whole genome sequencing for rare diseases.	A. T. Pagnamenta, C. Camps, E. Giacomuzzi , J. M. Taylor, M. Hashim, E. Calpena, P.J. Kaisaki, A. Hashimoto, J. Yu, E. Sanders, et al.	<i>Genome Med</i>
A draft human pangenome reference.	Wen-Wei Liao, Mobin Asri, Jana Ebler, Daniel Doerr, Marina Haukness, Glenn Hickey, Shuangjia Lu, Julian K. Lucas, Jean Monlong, Haley J. Abel, Silvia Buonaiuto, Xian H. Chang, Haoyu Cheng, Justin Chu, Vincenza Colonna, Jordan M. Eizenga, Xiaowen Feng, Christian Fischer, Robert S. Fulton, Shilpa Garg, Cristian Groza, Andrea Guarracino , William T. Harvey, Simon Heumos, Kerstin Howe, Miten Jain, Tsung-Yu Lu, Charles Markello, Fergal J. Martin, Matthew W. Mitchell, Katherine M. Munson, Moses Njagi Mwaniki, Adam M. Novak, Hugh E. Olsen, Trevor Pesout, David Porubsky, Pjotr Prins, Jonas A. Sibbesen, Jouni Sirén, Chad Tomlinson, Flavia Villani, Mitchell R. Vollger, Lucinda L. Antonacci-Fulton, Gunjan Baid, Carl A. Baker, Anastasiya Belyaeva, Konstantinos Billis, Andrew Carroll, Pi-Chuan Chang, Sarah Cody, Daniel E. Cook, Robert M. Cook-Deegan, Omar E. Cornejo, Mark Diekhans, Peter Ebert, Susan Fairley, Olivier Fedrigo, Adam L. Felsenfeld, Giulio Formenti, Adam Frankish, Yan Gao, Nanibaa' A. Garrison, Carlos Garcia Giron, Richard E. Green, Leanne Haggerty, Kendra Hoekzema, Thibaut Hourlier, Hanlee P. Ji, Eimear E. Kenny, Barbara A. Koenig, Alexey Kolesnikov, Jan O. Korbel, Jennifer Kordosky, Sergey Koren, HoJoon Lee, Alexandra P. Lewis, Hugo Magalhães, Santiago Marco-Sola, Pierre Marijon, Ann McCartney, Jennifer McDaniel, Jacquelyn Mountcastle, Maria Nattestad, Sergey Nurk, Nathan D. Olson, Alice B. Popejoy, Daniela Puiu, Mikko Rautiainen, Allison A. Regier, Arang Rhie, Samuel Sacco, Ashley D. Sanders, Valerie A. Schneider, Baergen I. Schultz, Kishwar Shafin, Michael W. Smith, Heidi J. Sofia, Ahmad N. Abou Tayoun, Françoise Thibaud-Nissen, Francesca Floriana Tricomi, Justin Wagner, Brian Walenz, Jonathan M. D. Wood, Aleksey V. Zimin, Guillaume Bourque, Mark J. P. Chaisson, Paul Flicek, Adam M. Phillippy, Justin M. Zook, Evan E. Eichler, David Haussler, Ting Wang, Erich D. Jarvis, Karen H. Miga, Erik Garrison, Tobias Marschall, Ira M. Hall, Heng Li & Benedict Paten	<i>Nature</i>
Lateral mammillary body neurons in mouse brain are disproportionately vulnerable in Alzheimer's disease	Huang WC, Peng Z, Murdock MH, Liu L, Mathys H, Davila-Velderrain J , Jiang X, Chen M, Ng AP, Kim T, Abdurrob F	<i>Science Translational Medicine</i>
RAGE engagement by SARS-CoV-2 enables monocyte infection and underlies COVID-19 severity	R. Angioni, M. Bonfanti , N. Caporale , R. Sanchez-Rodriguez, Fabio Munari, A. Savino , S. Pasqualato , D. Buratto, I. Pagani, N. Bertoldi, C. Zanon, P. Ferrari , E. Ricciardelli , C. Putaggio, S. Ghezzi, F. Elli , L. Rotta, A. Scardua , J. Weber , V. Cecatiello , F. Iorio , F. Zonta, A. M. Cattelan, E. Vicenzi, A. Vannini , B. Molon, C. E. Villa, A. Viola and G. Testa	<i>Cell Reports Medicine</i>
GTF2I dosage regulates neuronal differentiation and social behavior in 7q11.23 neurodevelopmental disorders	A. López-Tobón , R. Shyti , C. E. Villa , C. Cheroni , P. Fuentes-Bravo, S. Trattaro , N. Caporale , F. Troglio , E. Tenderini, M. Mihailovich , A. Skaros, W. T. Gibson, A. Cuomo, T. Bonaldi 1, C. Mercurio, M. Varasi, L. Osborne, G. Testa	<i>Science Advances</i>
The length of FOXE1 polyalanine tract in congenital hypothyroidism: Evidence for a pathogenic role from familial, molecular and cohort studies	E. Stellaria Grassi, G. Rurale, T. de Filippis, D. Gentilini, E. Carbone, F. Coscia , S. Uraghi, M. Bullock, R. J. Clifton-Bligh, A. K. Gupta, L. Persani	<i>Front Endocrinol</i>

TITLE	AUTHORS	JOURNAL
Immune selection determines tumor antigenicity and influences response to checkpoint inhibitors	L. Zapata, G. Caravagna, M. J. Williams, E. Lakatos, K. AbdulJabbar, B. Werner, D. Chowell, C. James , L. Gourmet, S. Milite , A. Acar, N. Riaz, T. A. Chan, T. A. Graham, A. Sottoriva	<i>Nature Genetics</i>
Contribution of pks+E. coli mutations to colorectal carcinogenesis	B. Chen, D. Ramazzotti, T. Heide , I. Spiteri, J. Fernandez-Mateos, C. James , L. Magnani, T. A. Graham, A. Sottoriva	<i>Nature Communications</i>
Evolutionary signatures of human cancers revealed via genomic analysis of over 35,000 patients	D. Fontana, I. Crespiatico, V. Crippa, F. Malighetti, M. Villa, F. Angaroni , L. De Sano, A. Aroldi, M. Antoniotti, G. Caravagna, R. Piazza, A. Graudenzi, L. Mologni and D. Ramazzotti	<i>Nature Communications</i>
Unity is strength: Improving the detection of adversarial examples with ensemble approaches	F. Craighero, F. Angaroni , F. Stella, C. Damiani, M. Antoniotti, A. Graudenzi	<i>Neurocomputing</i>
The effects of pathogenic and likely pathogenic variants for inherited hemostasis disorders in 140 214 UK Biobank participants	Stefanucci L, Collins J, Sims MC, Barrio-Hernandez I, Sun L, Burren OS, Perfetto L, Bender I, Callahan TJ, Fleming K, Guerrero JA, Hermjakob H, Martin MJ, Stephenson J, Paneerselvam K, Petrovski S, Porras P, Robinson PN, Wang Q, Watkins X, Frontini M, Laskowski RA, Beltrao P, Di Angelantonio E , Gomez K, Laffan M, Ouwehand WH, Mumford AD, Freson K, Carss K, Downes K, Gleadall N, Megy K, Bruford E, Vuckovic D	<i>Blood</i>
Genetically predicted androgenic profiles and adverse cardiac markers: a sex-specific Mendelian randomization study.	Chen JY, Ardissino M, Reddy RK, Mason AM, Raisi-Estabragh Z, Di Angelantonio E , Burgess S, Ng FS	<i>ESC Heart Failure</i>
The effects of pathogenic and likely pathogenic variants for inherited hemostasis disorders in 140 214 UK Biobank participants.	Stefanucci L, Collins J, Sims MC, Barrio-Hernandez I, Sun L, Burren OS, Perfetto L, Bender I, Callahan TJ, Fleming K, Guerrero JA, Hermjakob H, Martin MJ, Stephenson J, Paneerselvam K, Petrovski S, Porras P, Robinson PN, Wang Q, Watkins X, Frontini M, Laskowski RA, Beltrao P, Di Angelantonio E , Keith Gomez, Laffan M, Ouwehand WH, Mumford AD, Freson K, Carss K, Downes K, Gleadall N, Megy K, Bruford E, Vuckovic D	<i>Blood</i>
Prioritising cardiovascular disease risk assessment to high risk individuals based on primary care records	Chung R, Xu Z, Arnold M, Stevens D, Keogh R, Barrett J, Harrison H, Pennells L, Kim LG, Di Angelantonio E , Paige E, Usher-Smith JA, Wood AM	<i>PLoS One</i>
Genetically predicted plasma cortisol and common chronic diseases: A Mendelian randomization study.	Lee WH, Larsson SC, Wood A, Di Angelantonio E , Butterworth AS, Burgess S, Allara E	<i>Clin Endocrinol (Oxf)</i>
A genome-wide association study of blood cell morphology identifies cellular proteins implicated in disease aetiology.	Akbari P, Vuckovic D, Stefanucci L, Jiang T, Kundu K, Kreuzhuber R, Bao EL, Collins JH, Downes K, Grassi L, Guerrero JA, Kaptoge S, Knight JC, Meacham S, Sambrook J, Seyres D, Stegle O, Verboon J, Walter K, Watkins N A, Danesh J, Roberts DJ, Di Angelantonio E , Sankaran VG, Frontini M, Burgess S, Kuijpers T, Peters JE, Butterworth AS, Ouwehand WH, Soranzo N, Astle W J.	<i>Nat Commun</i>
The relevance of competing risk adjustment in cardiovascular risk prediction models for clinical practice.	Hageman SH, Dorresteijn JA, Pennells L, van Smeden M, Bots ML, Di Angelantonio E , Visseren FL	<i>European Journal of Preventive Cardiology</i>
Risk Factors of Secondary Cardiovascular Events in a Multi-Ethnic Asian Population with Acute Myocardial Infarction: A Retrospective Cohort Study from Malaysia.	Ismail SR, Mohammad MSF, Butterworth AS, Chowdhury R, Danesh J, Di Angelantonio E , Griffin SJ, Pennells L, Wood AM, Md Noh MF, Shah SA	<i>Journal of Cardiovascular Development and Disease</i>

TITLE	AUTHORS	JOURNAL
Improving 10-year cardiovascular risk prediction in apparently healthy people: flexible addition of risk modifiers on top of SCORE2.	Hageman SH, Petitjaen C, Pennells L, Kaptoge S, Pajouheshnia R, Tillmann T, Blaha MJ, McClelland RL, Matsushita K, Nambi V, Klungel OH, Souverein PC, van der Schouw TY, Verschuren WMM, Lehmann N, Erbel R, Jöckel KH, Di Angelantonio E , Visseren FLJ, Dorresteijn JAN	<i>European Journal of Preventive Cardiology</i>
SCORE2-Diabetes: 10-year cardiovascular risk estimation in type 2 diabetes in Europe	Pennells L, Kaptoge S, Østergaard HB, Read SH, Carinci F, Franch-Nadal J, Petitjean C, Taylor O, Hageman SH, Xu Z, Shi F, Spackman S, Gualdi S, Holman N, Bebianio Da Providencia E Costa R, Bonnet F, Brenner H, Gillum RF, Kiechl S, Lawlor DA, Potier L, Schöttker B, Sofat R, Völzke H, Willeit J, Baltane Z, Fava S, Janos S, Lavens A, Pildava S, Poljicanin T, Pristas I, Rossing P, Sascha R, Scheidt-Nave C, Stotl I, Tibor G, Urbančič-Rovan V, Vanherwegen AS, Vistisen D, Du Y, Walker MR, Willeit P, Ference B, De Bacquer D, Halle M, Huculeci R, McEvoy JW, Timmis A, Vardas P, Dorresteijn JAN, Graham I, Wood A, Eliasson B, Herrington W, Danesh J, Mauricio D, Benedetti M M, Sattar N, Visseren FLJ, Wild S, Di Angelantonio E , Balkau B, Bonnet F, Fumeron F, Stocker H, Hollecsek B, Schipf S, Schmidt CO, Dörr M, Tilg H, Leitner C, Notdurfter M, Taylor J, Dale C, Prieto-Merino D, Gillum RF, Lavens A, Vanherwegen AS, Poljicanin T, Pristas I, Buble T, Ivanko P, Rossing P, Carstensen B, Heidemann C, Du Y, Scheidt-Nave C, Gall T, Sandor J, Baltane Z, Pildava S, Lepiksone J, Magri CJ, Azzopardi J, Stotl I, Real J, Vlachos M, Mata-Cases M.	<i>European Heart Journal</i>
Impact of a post-donation hemoglobin testing strategy on efficiency and safety of whole blood donation in England: A modeling study.	Kim LG, Bolton T, Sweeting MJ, Bell S, Fahle S, McMahon A, Walker M, Ferguson E, Mifflin G, Roberts DJ, Di Angelantonio E	<i>Transfusion</i>
Evaluation of interventions to prevent vasovagal reactions among whole blood donors: rationale and design of a large cluster randomised trial.	McMahon A, Kaptoge S, Walker M, Mehenny S, Gilchrist PT, Sambrook J, Akhtar N, Sweeting M, Wood AM, Stirrups K, Chung R, Fahle S, Johnson E, Cullen D, Godfrey R, Duthie S, Allen L, Harvey P, Berkson M, Allen E, Watkins NA, Bradley JR, Kingston N, Mifflin G, Armitage J, Roberts DJ, Danesh J, Di Angelantonio E	<i>Trials</i>
Association of Longer Leukocyte Telomere Length With Cardiac Size, Function, and Heart Failure	Aung N, Wang Q, van Duijvenboden S, Burns R, Stoma S, Raisi-Estabragh Z, Ahmet S, Allara E, Wood A, Di Angelantonio E , Danesh J, Munroe PB, Young A, Harvey NC, Codd V, Nelson CP, Petersen SE, Samani NJ	<i>JAMA Cardiol</i>
Using Polygenic Risk Scores for Prioritizing Individuals at Greatest Need of a Cardiovascular Disease Risk Assessment.	Chung R, Xu Z, Arnold M, Ip S, Harrison H, Barrett J, Pennells L, Kim LG, Di Angelantonio E , Paige E, Ritchie SC, Inouye M, Usher-Smith JA, Wood AM	<i>J Am Heart Assoc</i>
An atlas of genetic scores to predict multi-omic traits	Xu Y, Ritchie SC, Liang Y, Timmers PRHJ, Pietzner M, Lannelongue L, Lambert SA, Tahir UA, May-Wilson S, Foguet C, Johansson Å, Surendran P, Nath AP, Persyn E, Peters JE, Oliver-Williams C, Deng S, Prins B, Luan J, Bombá L, Soranzo N, Di Angelantonio E , Pirastu N, Tai ES, van Dam RM, Parkinson H, Davenport EE, Paul DS, Yau C, Gerszten RE, Mälarstig A, Danesh J, Sim X, Langenberg C, Wilson JF, Butterworth AS, Inouye M	<i>Nature</i>
Estimating individual lifetime risk of incident cardiovascular events in adults with Type 2 diabetes: an update and geographical calibration of the DIABetes Lifetime perspective model (DIAL2).	Østergaard HB, Hageman SHJ, Read SH, Taylor O, Pennells L, Kaptoge S, Petitjean C, Xu Z, Shi F, McEvoy JW, Herrington W, Visseren FLJ, Wood A, Eliasson B, Sattar N, Wild S, Di Angelantonio E , Dorresteijn JAN	<i>Eur J Prev Cardiol</i>

TITLE	AUTHORS	JOURNAL
Including measures of chronic kidney disease to improve cardiovascular risk prediction by SCORE2 and SCORE2-OP	Matsushita K, Kaptoge S, Hageman SHJ, Sang Y, Ballew SH, Grams ME, Surapaneni A, Sun L, Arnlov J, Bozic M, Brenner H, Brunskill NJ, Chang AR, Chinnadurai R, Cirillo M, Correa A, Ebert N, Eckardt KU, Gansevoort RT, Gutierrez O, Hadaegh F, He J, Hwang SJ, Jafar TH, Jassal SK, Kayama T, Kovesdy CP, Landman GW, Levey AS, Lloyd-Jones DM, Major RW, Miura K, Muntner P, Nadkarni GN, Nowak C, Ohkubo T, Pena MJ, Polkinghorne KR, Sairenchi T, Schaeffner E, Schneider MP, Shalev V, Shlipak MG, Solbu MD, Stempniewicz N, Tollitt J, Valdivielso JM, van der Leeuw J, Wang AY, Wen CP, Woodward M, Yamagishi K, Yatsuya H, Zhang L, Dorresteijn JAN, Di Angelantonio E , Visseren FLJ, Pennells L, Coresh J	<i>European Journal of Preventive Cardiology</i>
Radiomic Analysis of Intrahepatic Cholangiocarcinoma: Non-Invasive Prediction of Pathology Data: A Multicenter Study to Develop a Clinical-Radiomic Model	F. Fiz, N. Rossi, S. Langella, A. Ruzzenente, M. Serenari, F. Ardito, A. Cucchetti, T. Gallo, G. Zamboni, C. Mosconi, ..., F. Ieva , L. Viganò	<i>Cancers</i>
Learning high-order interactions for polygenic risk prediction	M. C. Massi, N. R. Franco, A. Manzoni, A. M. Paganoni, H. A. Park, M. Hoffmeister, H. Brenner, J. Chang-Claude, F. Ieva , and P. Zunino,	<i>Plos One</i>
Radiomics-Based Inter-Lesion Relation Network to Describe [18F]FMCH PET/CT Imaging Phenotypes in Prostate Cancer	L. Cavinato, M. Sollini, A. Ragni, F. Bartoli, R. Zanca, F. Pasqualetti, A. Marciano, F. Ieva , P. A. Erba	<i>Cancers</i>
Dual adversarial deconfounding autoencoder for joint batch-effects removal from multi-center and multi-scanner radiomics data	L. Cavinato, M. C. Massi, M. Sollini, M. Kirienko and F. Ieva	<i>Scientific Reports</i>
Capturing the variety of clinical pathways in patients with schizophrenic disorders through state sequences analysis	L. Savaré, F. Ieva , G. Corrao, A. Lora	<i>BMC Med Res Methodol.</i>
Mapping Tumor Heterogeneity via Local Entropy Assessment: Making Biomarkers Visible	G. Costa, L. Cavinato, F. Fiz, M. Sollini, A. Chiti, G. Torzilli, F. Ieva , L. Viganò	<i>J Digit Imaging</i>
Detecting early signals of COVID-19 outbreaks in 2020 in small areas by monitoring healthcare utilisation databases: first lessons learned from the Italian Alert_CoV project	I. Merlo, M. Crea, P. Berta, F. Ieva , F. Carle, F. Rea, G. Porcu, L. Savaré, R. De Maio, M. Villa, ..., Italian Alert_CoV Project group	<i>Euro Surveill.</i>
Scaling survival analysis in healthcare with federated survival forests: A comparative study on heart failure and breast cancer genomics	A. Archetti, F. Ieva , M. Matteucci	<i>Future Generation Computer Systems</i> , 149: 343-358 doi: https://doi.org/10.1016/j.future.2023.07.036

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A propensity score matching analysis comparing vascular patients in two different COVID-19 waves: results from the Vascular Surgery Group of Regione Lombardia (VSG-RL) registry	Bissacco, D., Bellosta, R., Domanin, M., Primo, R., Mandigers, T., Savaré, L., Ieva, F. , Piffaretti, G., Trimarchi, S.	<i>Italian Journal of Vascular and Endovascular Surgery</i>
Ask Your Data - Supporting Data Science Processes by Combining AutoML and Conversational Interfaces	Pidò, S., Pinoli, P., Crovari, P., Ieva, F. , Garzotto, F., Ceri, S.	<i>IEEE Access</i>
Partial Identification of the Average Causal Effect in Multiple Study Populations: The Challenge of Combining Mendelian Randomization Studies	E. W. Diemer, L. Zuccolo , S. A. Swanson	<i>Epidemiology</i>
Bounding the average causal effect in Mendelian randomisation studies with multiple proposed instruments: An application to prenatal alcohol exposure and attention deficit hyperactivity disorder	E. W. Diemer, A. Havdahl, O. A. Andreassen, M. R. Munafò, P. R. Njolstad, H. Tiemeier, L. Zuccolo , S. A. Swanson	<i>Paediatr Perinat Epidemiol</i>
Vaccine effectiveness for prevention of covid-19 related hospital admission during pregnancy in England during the alpha and delta variant dominant periods of the SARS-CoV-2 pandemic: population based cohort study	M. L. Bosworth, R. Schofield, D. Ayoubkhani, L. Charlton, V. Nafilyan, K. Khunti., F. Zaccardi, C. Gillies, A. Akbari., M. Knight., R. Wood., P. Hardeid, L. Zuccolo , C. Harrison	<i>BMJ Med</i>
COVID-19 vaccination in pregnancy: the impact of multimorbidity and smoking status on vaccine hesitancy, a cohort study of 25,111 women in Wales, UK	M. Mhereeg, H. Jones, J. Kennedy, M. Seaborne, M. Parker, N. Kennedy, A. Akbari, L. Zuccolo , A. Azcoaga-Lorenzo, A. Davies, K. Nirantharakumar, S. Brophy	<i>BMC Infectious Diseases</i>
Maternal caffeine consumption during pregnancy and offspring cord blood DNA methylation: an epigenome-wide association study meta-analysis	L. Schellhas, G. S. Monasso, J. F. Felix, V. Wv Jaddoe, P. Huang, S. Fernández-Barrés, M. Vrijheid, G. Pesce, I. Annesi-Maesano, C. M. Page, A. Brantsæter, M. Bekkhus, S. E Håberg, Stephanie J. London, M. R. Munafò, L. Zuccolo , G. C. Sharp	<i>Epigenomics</i>
Detecting early signals of COVID-19 outbreaks in 2020 in small areas by monitoring healthcare utilisation databases: first lessons learned from the Italian Alert_CoV project	I. Merlo, M. Crea, P. Berta, F. Ieva , F. Carle, F. Rea, G. Porcu, L. Savaré , R. De Maio, M. Villa, ..., Italian Alert_CoV Project group	<i>Euro Surveill.</i>
Genome-wide association analysis and Mendelian randomization proteomics identify drug targets for heart failure	D. Rasooly, G.M. Peloso, A.C. Pereira, H. Dashti, C. Giambartolomei , E. Wheeler, N. Aung, B.R. Ferolito, M. Pietzner, E.H. Farber-Eger, et al.	<i>Nat Commun.</i>
The PENGUIN approach to reconstruct protein interactions at enhancer-promoter regions and its application to prostate cancer	A. Armaos, F. Serra, I. Núñez-Carpintero, J. Seo, S. C. Baca, S. Gustincich, A. Valencia, M. L. Freedman, D. Cirillo, C. Giambartolomei , and G. G. Tartaglia	<i>Nat Commun.</i>

NEW EXPERIMENTAL METHODS AND PROTOCOLS

TITLE	AUTHORS	DESCRIPTION
Capture-seq protocol and TE-reX pipeline guidelines for detection of recombination of repeat elements in short-and long-DNA reads libraries	G. Pascarella, L. Straniero, M. Frith, P. Carninci	Protocol to prepare libraries enriched for repeat elements starting from the genomic DNA of any species
Prediction of the cell-type-specific transcription of non-coding RNAs from genome sequences via machine learning	M. Koido, C. Hon, S. Koyama, H. Kawaji, Y. Murakawa, K. Ishigaki, K. Ito, J. Sese, N. F. Parrish, Y. Kamatani, P. Carninci , C. Terao	Development and utility of a machine-learning model (MENTR) that reliably links genome sequence and ncRNA expression at the cell type level
ZENBU-Reports: a graphical web-portal builder for interactive visualization and dissemination of genome-scale data	J. Severin, S. Agrawal, J. A. Ramilowski, R. Deviatiiarov, J. W Shin, P. Carninci , M. de Hoon	Web application to create interactive scientific web portals by using graphical interfaces while providing storage and secured collaborative sharing for data uploaded by users
An automatic entropy method to efficiently mask histology whole-slide images	Y. Song, F. Cisternino, J.M. Mekke, G. J. de Borst, D. P.V. de Kleijn, G. Pasterkamp, A. Vink, C. A. Glastonbury , S. W. van der Laan, C. L. Miller	Development of a unique approach called 'EntropyMasker' based on image entropy to tackle the fore- and background segmentation (masking) task in histology whole-slide images (WSI)
An atlas of genetic scores to predict multi-omic traits	Y. Xu, S. C. Ritchie, Y. Liang, P. R. H. J. Timmers, M. Pietzner, L. Lannelongue, S. A. Lambert, U. A. Tahir, S. May-Wilson, C. Foguet, ..., N. Soranzo , E. Di Angelantonio , N. Pirastu, E Shyong Tai, R. M. van Dam, H. Parkinson, E. E Davenport, et al.	Development of a portal (https://www.omicspred.org/) to facilitate public access to all genetic scores and validation results, as well as to serve as a platform for future extensions and enhancements of multi-omic genetic scores.
Liver segmentation using Turbolift learning for CT and cone-beam C-arm perfusion imaging	H. Haseljić, S. Chatterjee , R. Frysck, V. Kulvait, V. Semshchikov, B. Hensen, F. Wacker, I. Brusch, T. Werncke, O. Speck, A. Nürnberger, G. Rose	Development of Turbolift learning, which trains a modified version of the multi-scale Attention UNet on different liver segmentation tasks serially
Sinogram upsampling using Primal- Dual UNet for undersampled CT and radial MRI reconstruction	P. Ernst, S. Chatterjee , G. Rose, O. Speck, A. Nürnberger	Primal-Dual UNet, which improves the Primal-Dual network in terms of accuracy and reconstruction speed.
MICDIR: Multi-scale inverse-consistent deformable image registration using UNetMSS with self-constructing graph latent	S. Chatterjee , H. Bajaj, I. H. Siddiquee, N. B. Subbarayappa, S. Simon, S. Bangalore Shashidhar, O. Speck, A. Nürnberger	Extension of the Voxelmorph approach for complex medical image processing
CHARR efficiently estimates contamination from DNA sequencing data.	W. Lu, L. D. Gauthier, T. Poterba, E. Giacomuzzi , J. K. Goodrich, C. R. Stevens, D. King, M. J. Daly, B. M. Neale, K. J. Karczewski	A new metric to estimate DNA sample contamination from variant-level whole genome and exome sequence data, CHARR, Contamination from Homozygous Alternate Reference Reads, which leverages the infiltration of reference reads within homozygous alternate variant calls.
Pangenome graphs in infectious disease: a comprehensive genetic variation analysis of <i>Neisseria meningitidis</i> leveraging Oxford Nanopore long reads	Yang Z, Guarracino A , Biggs PJ, Black MA, Ismail N, Wold JR, Merriman TR, Prins P, Garrison E, de Ligt J.	A practical bioinformatics pipeline that employs the PanGenome Graph Builder and the Variation Graph toolkit to build pangenomes from assembled genomes, align whole genome sequencing data and call variants against a graph reference.

TITLE	AUTHORS	DESCRIPTION
Optimal gap-affine alignment in O(s) space	Marco-Sola S, Eizenga JM, Guarracino A , Paten B, Garrison E, Moreto M.	Development of bidirectional WFA algorithm, the first gap-affine algorithm capable of computing optimal alignments in O(s) memory while retaining WFA's time complexity of O(s).
Unbiased pangenome graphs	E. Garrison, A. Guarracino ,	Design of the seqwish algorithm to build pangenome graphs.
Multishot tomography for high-resolution in situ subtomogram averaging	S. Khavnekar, W. Wan, P. Majumder, W. Wietrzynski, P. S. Erdmann , J. M. Plitzko	A fast, multi-position tomographic acquisition scheme based on beam-tilt corrected beam-shift imaging along the tilt axis, which yields sub-nanometer in situ STA averages.
TOMOMAN: Streamlining Cryo-electron Tomography and Subtomogram Averaging Workflows Using TOMOgram MANager	S. Khavnekar, P. S. Erdmann , W. Wan	Description of Tomogram Manager (TOMOMAN), a MATLAB-based modular package developed to reduce this complexity and streamline the process of resolving structures by subtomogram averaging
Efficient precision editing of endogenous Chlamydomonas reinhardtii genes with CRISPR-Cas	A. P. Nievergelt , D. R. Diener, A. Bogdanova, T. Brown, G. Pigino	Homology-directed method for knockin mutagenesis in Chlamydomonas by delivering CRISPR-Cas ribonucleoproteins and a linear double-stranded DNA (dsDNA) donor into cells by electroporation.
An In-depth Guide to the Ultrastructural Expansion Microscopy (U-ExM) of Chlamydomonas reinhardtii	N. Klena , G. Maltinti , U. Batman, G. Pigino , P.Guichard, V. Hamel	Journal Cover - Application of ultrastructure expansion microscopy (U-ExM) to investigate the 3D organisation of the green algae Chlamydomonas reinhardtii cellular ultrastructure
Protocol for precision editing of endogenous Chlamydomonas reinhardtii genes with CRISPR-Cas	A. P. Nievergelt , D. R. Diener, A. Bogdanova, T. Brown, G. Pigino	Protocol for scarless integration of fusion tags and sequence modifications of almost all Chlamydomonas reinhardtii proteins without the need for a preceding mutant line.
A heuristic algorithm solving the mutual-exclusivity-sorting problem	A. Vinceti , L. Trastulla , U. Perron , A. Raiconi, F. Iorio	Description of MutExMatSorting: an R package implementing a computationally efficient algorithm able to sort rows and columns of a binary matrix to highlight mutual-exclusivity patterns.
An interactive web application for processing, correcting, and visualizing genome-wide pooled CRISPR-Cas9 screens	A. Vinceti , R. R. De Lucia , P. Cremaschi , U. Perron , E. Karakoc, L. Mauri , C. Fernandez , K. H. Kluczynski , D. S. Anderson , F. Iorio	Description of CRISPRcleanR WebApp , a web application enabling access to CRISPRcleanR through an intuitive interface.
μSplit: efficient image decomposition for microscopy data	A. Ashesh , A. Krull, M. Di Sante, F. S. Pasqualini, F. Jug	A dedicated approach for trained image decomposition in the context of fluorescence microscopy images.
Community-developed checklists for publishing images and image analyses	C. Schmied , M. S. Nelson, S. Avilov, G. Bakker, C. Bertocchi, J. Bischof, ..., F. Jug , et al.	Community-developed checklists for preparing light microscopy images and describing image analyses for publications.
N2V2-fixing noise2void checkerboard artifacts with modified sampling strategies and a tweaked network architecture	E. Höck, T.O. Buchholz, A. Brachmann, F. Jug , A. Freytag	Description of two modifications to the vanilla N2V setup that both help to reduce the unwanted artifacts considerably.

TITLE	AUTHORS	DESCRIPTION
Immune selection determines tumor antigenicity and influences response to checkpoint inhibitors	L. Zapata, G. Caravagna, M. J. Williams, E. Lakatos, K. AbdulJabbar, B. Werner, D. Chowell, C. James , L. Gourmet, S. Milite , A. Acar, N. Riaz, T. A. Chan, T. A. Graham, A. Sottoriva	Development of SOPRANO (selection on protein annotated regions), an algorithm that calculates trinucleotide context corrected dN/dS inside (ON target or ON-dN/dS) and outside (OFF target or OFF-dN/dS) any target genomic region.
Evolutionary signatures of human cancers revealed via genomic analysis of over 35,000 patients	D. Fontana, I. Crespiatico, V. Crippa, F. Malighetti, M. Villa, F. Angaroni , L. De Sano, A. Aroldi, M. Antoniotti, G. Caravagna, R. Piazza, A. Graudenzi, L. Mologni and D. Ramazzotti	Description of ASCETIC (Agony-baSed Cancer EvoluTion InferenCe), a framework to extract such signatures from sequencing experiments generated by different technologies such as bulk and single-cell sequencing data
Unity is strength: Improving the detection of adversarial examples with ensemble approaches	F. Craighero, F. Angaroni , F. Stella, C. Damiani, M. Antoniotti, A. Graudenzi	ENsemble Adversarial Detector (ENAD) framework integrates scoring functions from state-of-the-art detectors based on Mahalanobis distance, Local Intrinsic Dimensionality, and One-Class Support Vector Machines, which process the hidden features of deep neural networks. ENAD is designed to ensure high standardization and reproducibility to the computational workflow.
Prioritising cardiovascular disease risk assessment to high risk individuals based on primary care records	Chung R, Xu Z, Arnold M, Stevens D, Keogh R, Barrett J, Harrison H, Pennells L, Kim LG, Di Angelantonio E , Paige E, Usher-Smith JA, Wood AM	To provide quantitative evidence for systematically prioritising individuals for full formal cardiovascular disease (CVD) risk assessment using primary care records with a novel tool (eHEART) with age- and sex-specific risk thresholds.
SCORE2-Diabetes: 10-year cardiovascular risk estimation in type 2 diabetes in Europe	Pennells L, Kaptoge S, Østergaard HB, Read SH, Carinci F, Franch-Nadal J, Petitjean C, Taylor O, Hageman SH, Xu Z, Shi F, Spackman S, Gualdi S, Holman N, Bebianio Da Providencia E, Costa R, Bonnet F, Brenner H, Gillum RF, Kiechl S, Lawlor DA, Potier L, Schöttker B, Sofat R, Völzke H, Willeit J, Baltane Z, Fava S, Janos S, Lavens A, Pildava S, Poljicanin T, Pristas I, Rossing P, Sascha R, Scheidt-Nave C, Stotl I, Tibor G, Urbančič-Rovan V, Vanherwegen AS, Vistisen D, Du Y, Walker MR, Willeit P, Ference B, De Bacquer D, Halle M, Huculeci R, McEvoy JW, Timmis A, Vardas P, Dorresteijn JAN, Graham I, Wood A, Eliasson B, Herrington W, Danesh J, Mauricio D, Benedetti M M, Sattar N, Visseren FLJ, Wild S, Di Angelantonio E , Balkau B, Bonnet F, Fumeron F, Stocker H, Holleczeck B, Schipf S, Schmidt CO, Dörr M, Tilg H, Leitner C, Notdurfter M, Taylor J, Dale C, Prieto-Merino D, Gillum RF, Lavens A, Vanherwegen AS, Poljicanin T, Pristas I, Buble T, Ivanko P, Rossing P, Carstensen B, Heidemann C, Du Y, Scheidt-Nave C, Gall T, Sandor J, Baltane Z, Pildava S, Lepiksone J, Magri CJ, Azzopardi J, Stotl I, Real J, Vlachos B, Mata-Cases M.	SCORE2-Diabetes, a new algorithm developed, calibrated, and validated to predict 10-year risk of CVD in individuals with type 2 diabetes, enhances identification of individuals at higher risk of developing CVD across Europe

TITLE	AUTHORS	DESCRIPTION
Estimating individual lifetime risk of incident cardiovascular events in adults with Type 2 diabetes: an update and geographical calibration of the DIAbetes Lifetime perspective model (DIAL2).	Østergaard HB, Hageman SHJ, Read SH, Taylor O, Pennells L, Kaptoge S, Petitjean C, Xu Z, Shi F, McEvoy JW, Herrington W, Visseren FLJ, Wood A, Eliasson B, Sattar N, Wild S, Di Angelantonio E , Dorresteijn JAN	The recalibrated DIAL2 model provides a useful tool for the prediction of Cardio Vascular Disease (CVD)-free life expectancy and lifetime CVD risk for people with Type 2 diabetes without previous CVD in the European low- and moderate-risk regions.
Including measures of chronic kidney disease to improve cardiovascular risk prediction by SCORE2 and SCORE2-OP	Matsushita K, Kaptoge S, Hageman SHJ, Sang Y, Ballew SH, Grams ME, Surapaneni A, Sun L, Arnlöv J, Bozic M, Brenner H, Brunskill NJ, Chang AR, Chinnadurai R, Cirillo M, Correa A, Ebert N, Eckardt KU, Gansevoort RT, Gutierrez O, Hadaegh F, He J, Hwang SJ, Jafar TH, Jassal SK, Kayama T, Kovesdy CP, Landman GW, Levey AS, Lloyd-Jones DM, Major RW, Miura K, Muntner P, Nadkarni GN, Nowak C, Ohkubo T, Pena MJ, Polkinghorne KR, Sairenchi T, Schaeffner E, Schneider MP, Shalev V, Shlipak MG, Solbu MD, Stempniewicz N, Tollitt J, Valdivielso JM, van der Leeuw J, Wang AY, Wen CP, Woodward M, Yamagishi K, Yatsuya H, Zhang L, Dorresteijn JAN, Di Angelantonio E , Visseren FLJ, Pennells L, Coresh J	Development and validation of a Chronic kidney disease (CKD) Add-on for systemic coronary risk estimation 2 (SCORE2) and SCORE2 in older persons (SCORE2-OP) using data from the CKD Prognosis Consortium (CKD-PC)
Learning high-order interactions for polygenic risk prediction	M. C. Massi, N. R. Franco, A. Manzoni, A. M. Paganoni, H. A. Park, M. Hoffmeister, H. Brenner, J. Chang-Claude, F. Ieva , and P. Zunino,	Description of a novel Polygenic Risk Scores (PRS) approach, called High-order Interactions-aware Polygenic Risk Score (hiPRS), that incorporates high-order interactions in modeling polygenic risk.

TITLE	AUTHORS	DESCRIPTION
Dual adversarial deconfounding autoencoder for joint batch-effects removal from multi-center and multi-scanner radiomics data	L. Cavinato, M. C. Massi, M. Sollini, M. Kirienko and F. Ieva	Description of a deconfusion algorithm to harmonize the imaging information of patients affected by Hodgkin Lymphoma in a multi-center setting.
Explainable domain transfer of distant supervised cancer subtyping model via imaging-based rules extraction	L. Cavinato, N. Gozzi, M. Sollini, M. Kirienko, C. Carlo-Stella, C. Rusconi, A. Chiti, F. Ieva	Random Forest-based Explainable Transfer Model for testing the domain-invariance of imaging biomarkers extracted from retrospective cancer subtyping.
Scaling survival analysis in healthcare with federated survival forests: A comparative study on heart failure and breast cancer genomics	A. Archetti, F. Ieva , M. Matteucci	Extension of the Federated Survival Forest algorithm, called FedSurF++. This federated ensemble method constructs random survival forests in heterogeneous federations.
A general framework for penalized mixed-effects multitask learning with application on DNAm biomarkers creation	A. Cappozzo, F. Ieva , G. Fiorito	Description of a general framework for mixed-effects multitask learning in presence of high-dimensional predictors to develop a multivariate DNAm biomarker from a multicenter study.
Ask Your Data - Supporting Data Science Processes by Combining AutoML and Conversational Interfaces	Pidò, S., Pinoli, P., Crovari, P., Ieva, F. , Garzotto, F., Ceri, S.	Introducing DSBot, an assistant that can analyze the user data and produce answers by mastering several Data Science techniques.
Cluster analysis of angiotensin biomarkers to identify antihypertensive drug treatment in population studies	Arisido, MW. , Foco, L., Shoemaker, R., Melotti, R., Delles, C., Gögele, M., ... & Pattaro, C	Machine learning clustering technique to determine the potential of measured RAAS biomarkers for the identification of undertaken treatments in the general population.
The PENGUIN approach to reconstruct protein interactions at enhancer-promoter regions and its application to prostate cancer	A. Armaos, F. Serra, I. Núñez-Carpintero, J. Seo, S. C. Baca, S. Gustincich, A. Valencia, M. L. Freedman, D. Cirillo, C. Giambartolomei , and G. G. Tartaglia	Description of Promoter-Enhancer-Guided Interaction Networks (PENGUIN), a method for studying protein-protein interaction (PPI) networks within enhancer-promoter interactions.

2.3 Strategy

OUTLINE OF THE NEW 2024-2028 STRATEGIC PLAN

A DYNAMIC AND EVOLVING STRATEGIC PLAN

The 2024-2028 Strategic Plan provides an overview of HT's activities over the next five years. Since research and discoveries are, by definition, unpredictable and plans evolve in response to new ideas and opportunities, the Strategic Plan will be regularly reviewed and updated. Therefore, it must be seen as a 'dynamic and evolving' plan to shape the future of the institute. In the course of its development, plans for HT will have to be supplemented, refined or improved to adapt to the changing landscape of biomedical research.

HT will do its best to involve internal and external stakeholders, who will play a key role in the implementation and evolution of the Strategic Plan.

SCIENTIFIC RESEARCH ACTIVITY

Leveraging the cutting-edge expertise and thematic orientation of each Research Centre, HT will enter a new phase in its development, refining and extending its research vision. Over the next five years, HT intends to pursue flagship, interdisciplinary and cross-centre research programmes aimed at clarifying the fundamental molecular mechanisms underlying various pathophysiological processes.

Such flagship research programmes are based on the work of HT's research groups, which will be organised into lines of activity and expertise in order to achieve shared objectives.

This reorganisation will offer several advantages:

- ▶ it will go beyond the boundaries between research areas and traditional disciplines, promoting interdisciplinary research and enhancing collaboration;
- ▶ it will identify clear objectives that call for different competences to be achieved, thus increasing the research ambition of the institute as a whole;
- ▶ it will offer the freedom to work on basic mechanisms, while also providing the opportunity to contribute to research on human health and disease;
- ▶ it will identify gaps in knowledge and technology that require new skills or collaboration with external partners;
- ▶ it will promote interactions and collaborations with academic partners.

To realise this new vision, HT also plans to introduce new broad research areas to complement its existing Research Centres and achieve critical mass. In addition, new skills and approaches will be incorporated through the recruitment of new groups, particularly in the areas of Molecular Cell Biology and Biophysical Modelling and Simulation.

SCIENTIFIC INFRASTRUCTURE AND SERVICES

HT's ambition to become a reference institute for life sciences is also mirrored in its second objective, namely the creation and management of shared research infrastructures that meet the needs of the Italian life sciences research community in the omics, imaging, structural biology, data management and analysis areas.

The first two objectives of HT are distinct though closely related. Indeed, the complexity of the molecular mechanisms that regulate life and their interactions calls for a wide range of skills and tools to collect, manage, analyse and interpret data in an unbiased manner.

The National Facilities are another unique feature of HT at national level, and Italian researchers will have access to state-of-the-art equipment, tools and technologies to carry out their projects and receive high-quality scientific training.

ADVANCED SCIENTIFIC TRAINING

The third objective of HT is to provide advanced scientific training, particularly to young scientists, in order to train the next generation of top researchers. Scientific training will be offered both to HT scientists and to the national and international scientific community.



COOPERATION WITH INDUSTRY AND TECHNOLOGY TRANSFER

HT's fourth objective is to disseminate the skills, knowledge and technologies available or developed within other research institutes or industry, in order to turn scientific results into new products and services for the benefit of society.

HT will promote networking between its research facilities, (inter)national research institutes and industry in order to accelerate technology transfer in the life sciences, an area where the path from 'discovery' to 'market' is particularly long (several years/decades).

The National Facilities will also serve as open platforms facilitating interactions between the Italian research community, technology providers and industry with the aim of promoting technology transfer.

HT IN THE LIFE SCIENCES ECOSYSTEM AND POTENTIAL OPPORTUNITIES AND EXTERNAL COLLABORATIONS FOR ITS DEVELOPMENT

HT is complementary and synergetic with similar publicly founded private institutions within the national research ecosystem. HT aims to become an 'interaction hub', facilitating and coordinating interconnection and cooperation between the Italian research community, which will benefit from the complementary goals and expertise of these institutions. With its vocation for life sciences research, the development of biomedical research technologies and the provision of services through its facilities, the Human Technopole Foundation can be seen as a driving force for advancing science and

the economy. Interactions with external partners, users and collaborators (universities, research institutes, industry, start-ups, technology developers, etc.,...), within the framework of the National Facilities activities, will further boost HT's growth.

REVISION OF HT'S MODEL FOR THE MANAGEMENT AND ADMINISTRATION OF ORGANISATIONS

The complexity of HT's functions, its ambition to become an internationally renowned research institute and the scale of its operations call for an appropriate and overall management and administration system to achieve its objectives. The renewal and refinement of HT's research vision will be complemented by the review and, possibly, re-examination of the institute's internal management and organisation, its structure and administrative processes, with the aim of providing efficient and flexible services, improving cost-effectiveness and creating an optimal working environment for HT's scientists.

HT'S CULTURE AND CORE VALUES

Through its scientific activities, HT will actively promote open science, research integrity and the application of the rules of good scientific practice, widely sharing its results, data and software and establishing a culture of honesty, transparency and openness in research planning and conduct, data management and analysis, and scientific communications.

In general, in carrying out all its activities, both internally and externally, HT will strive to promote a culture of research and innovation based on a set

of core values:

- ▶ **Integrity:** all HT's activities must be carried out in line with international best practice and in compliance with ethical values, ethical obligations and professional standards.
- ▶ **Inclusion:** HT supports and protects diversity by fostering equity between all genders, ethnicities and cultures. In fact, by promoting equality and integrating diversity, HT favours inclusion so that everyone can feel accepted and valued, while also condemning any form of discrimination or harassment.
- ▶ **Openness and Collaboration:** HT pursues all its activities in an open and collaborative manner, involving academics, clinicians, industry and other stakeholders to promote research and innovation in life sciences.

Highly heterogeneous teams produce the best and most innovative results. HT's working environment is based on collaboration, interdisciplinarity and strong teamwork. In addition, HT engages in activities which benefit the national and international research community, such as offering services through shared facilities, training and career development opportunities and awareness-raising initiatives.

Scientific outreach and communications are also key to implementing HT's mission. These activities boost HT's profile and raise awareness of the importance of basic science in making fundamental discoveries for human health and the progress of society at large.

In addition to establishing transparent operational processes that support HT's responsibility for achieving the scientific objectives described above, the Human Technopole Foundation undertakes in particular to:

1. promote equality, diversity and inclusion at work, in line with the best practices of national and international labour and human rights standards. In 2022, HT developed and published the Gender Equality Plan (GEP), an action plan for the implementation of the equality, diversity and inclusion policy at work. The Sustainability Committee (a committee within the Supervisory Board) and the Gender Equality Team (GET, consisting of HT staff members with different functions and expertise within the institution) guide and monitor the implementation and monitoring of the best workplace practices outlined in HT's GEP.
2. define policies on research ethics and integrity, good research practices and the handling of scientific misconduct allegations.
3. create and maintain an institutional culture based on scientific excellence, integrity, collaboration, inclusiveness and transparency

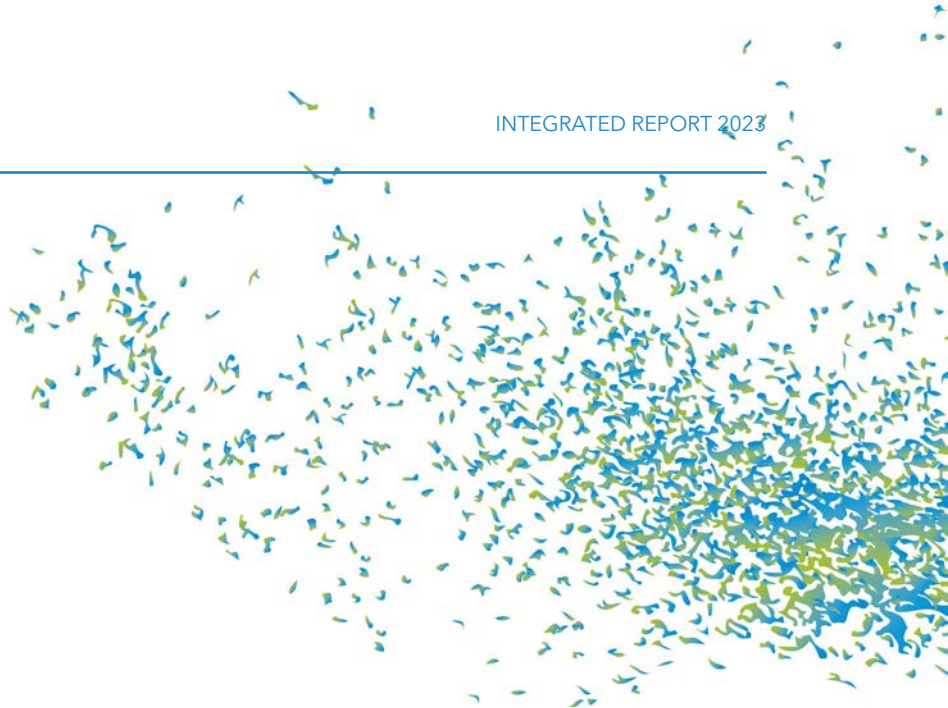
As indicated in the Methodology Note of this document, the Integrated Report 2023 is tied, in the declination of its strategic objectives, to the previous strategic plan in force for 2023. Therefore, please find below a description of HT's eight strategic objectives, related to the 2020-2023 Strategic Plan, represented in the materiality matrix and constituting the value creation model duly illustrated in the dedicated chapter of this document.



2.3.1 INNOVATION AND QUALITY OF RESEARCH IN THE AREAS OF GENOMICS, NEUROGENOMICS, COMPUTATIONAL BIOLOGY, STRUCTURAL BIOLOGY, HEALTH DATA SCIENCE

This strategic objective includes the following steps:

- ▶ Developing scientific research programmes of excellence at national and international level;
- ▶ Developing new approaches to preventive and personalised medicine and new strategies to support public health;
- ▶ Generating innovation through an interdisciplinary approach;
- ▶ Helping to promote the Italian biomedical research system;
- ▶ Producing high-quality scientific publications.

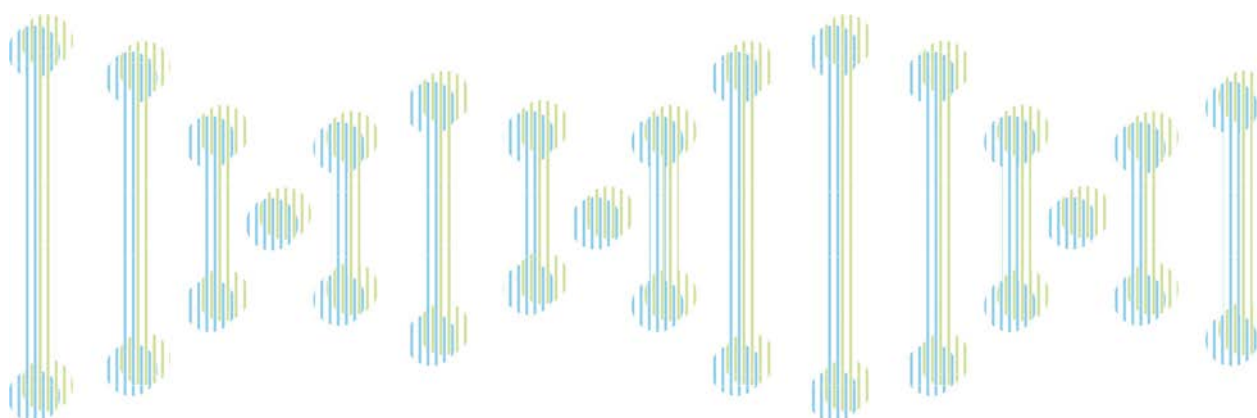


Five large areas, complementary and functional to biomedical and health research, form the basis of HT's research strategy for 2020-2023.

These areas are represented by the five Research Centres implemented by HT in the fields described below.

GENOMICS

Genomics is an essential component of modern biomedicine. In general, research in this field seeks to identify the mechanisms that regulate gene expression and how hereditary genetic information gives rise to differences between individuals that affect their health and wellbeing. Genomics research at HT is developed into and consists of two complementary research programmes: one in functional genomics and the other in medical and population genomics. One of the main objectives of this type of research is to help characterise the genetic variability and unique environment of the Italian population in order to improve our understanding of the genetic causes of various diseases, thus creating additional potential for both research and clinical purposes.



NEUROGENOMICS

Neurogenomics is another very important research area for HT, also in the light of the fact that neurological disorders represent a significant burden on public health. At the same time, neurogenomics is a research area where significant benefits can still be reaped from the integration of genomics, disease modelling and other cutting-edge methods. In particular, the application of new technologies to the study of neurogenomics is bound to integrate and create synergies with high-profile national and European research activities and programmes. HT's research in neurogenomics combines computational and experimental approaches using different systems with the aim of investigating the structure-function and development of the nervous system, paying particular attention to the mechanisms underlying neuropsychiatric and neurodegenerative disorders. Research in this area provides a detailed insight into how molecules work, as well as being a crucial first step in the design of new drugs.

STRUCTURAL BIOLOGY

HT's scientific strategy is strongly focused on structural biology, which is centred around studying the three-dimensional structure of macromolecules. In addition to the importance of these studies, aimed at discovering disease-regulating mechanisms, HT's strategic focus on structural biology is also motivated by the possibility for HT to provide access, through the Cryo-Electron Microscopy facility, to a recent revolutionary technology in structural biology research that is not widely available to scientists in Italy due to its high cost and technical complexity.

COMPUTATIONAL BIOLOGY

Research in the areas described above generates tremendous amounts of data. Hence, close integration with computational biology research, which is absolutely essential to every aspect of modern life science research, is necessary. HT biologists use statistical, computational and bioinformatic approaches to develop solutions for the analysis, management and integration of large-scale data supporting all research areas. In the computational biology area, HT also plans to develop, host and manage software tools and data resources that will be accessible to the wider biomedical community. The aim is both to provide a service to the outside community and to link publicly accessible, international biomolecular data to more limited national medical computer data.

HEALTH DATA SCIENCE

Statistical methods and big data can be used to analyse different types of large-scale information or to analyse and solve public health problems. The primary objective of HT's research in this field is to integrate big data from a variety of sources in order to develop tools supporting the medical system, especially in the areas of precision medicine, health management and health economics. Another HT objective of this type of research is to transfer this knowledge by providing analyses and advice to different stakeholders, but in particular to the legislator. Indeed, the design and implementation of model systems to assess the socio-economic impact on the national health system of the various aspects of precision medicine can be important tools to contribute to the design of policies optimising efforts in the above-mentioned areas.

ACTIVITIES IN 2023

During 2023, the institute continued to build critical mass, counting **25** research groups and a population of about **300** scientific staff in its research centres, facilities and services at the end of the year. During the year, HT scientists achieved many revolutionary scientific results in their respective fields, resulting in **122** peer-reviewed publications in prestigious international journals, as reported in the section '*Intellectual capital*' of this document.

Below are some examples of the projects and initiatives launched by HT scientists during the year:

- ▶ The 'Radialis' research project, which seeks to understand the principles governing genome architecture ([An ERC Consolidator Grant to Human Technopole to study the genome in 3D - Human Technopole](#));
- ▶ Participation in the international public-private consortium **iCARE4CVD** (individual care from early risk of cardiovascular disease to established heart failure) with the aim of tailoring the prevention and treatment of cardiovascular disease using large data sets, a multitude of biomarkers and artificial intelligence. ([Italy joins the iCARE4CVD consortium - Human Technopole](#));
- ▶ Two HT research projects, focusing on the origin and evolution of cancer and coordinated by Francesco Iorio and Andrea Sottoriva, respectively, were awarded an **ERC Consolidator Grant**, a major European research fund for scientists who have already started their independent scientific careers and that is part of the European 'Horizon Europe' research and innovation programme ([ERC is funding two research projects to hunt for weak spots in tumours - Human Technopole](#));

In addition, work continued on some important strategic initiatives launched in previous years, namely:

- ▶ A thyroid function study, which received an ERC Starting Grant, through the 'Thyromol' project, which aims to investigate how the molecular mechanisms of thyroid hormone production, release and storage are mutually regulated to provide the right levels of thyroid hormones to the body, laying a solid foundation for alternative and more targeted strategies to control thyroid hormone synthesis ([Europe rewards Human Technopole's research on thyroid - Human Technopole](#)).
- ▶ Development of a project with Eurac Research, aimed at enriching the content of the CHRIS population study biobank. This study monitors people's health continuously, '*from molecule to disease*'; the population studies designed with this approach are the cornerstone for the medicine of the future: predictive and precision medicine that is based on people's biology ([Shifting the focus from disease to health - Human Technopole](#)).
- ▶ 'NEURO-COV' international research project, focusing on the long-term neurological and psychiatric effects of COVID-19. The five-year project, funded by the European Commission, was developed by HT and the German Centre for Neurodegenerative Diseases (DZNE) and involves ten institutes from seven countries. HT is studying the underlying mechanisms of the disease with a view to developing new therapies. In particular, the study focuses on the molecular mechanisms that are activated within cells in the so-called 'NeuroCOVID' - the set of neurological and neuropsychical disorders related to COVID-19 infection. This new knowledge will help to develop new therapies and approaches to predict the risk of neurological symptoms. Data will be collected through studies on patients of all ages in several European countries that will also involve 'Long COVID' patient communities ([Covid-19: Human Technopole studies neurological and psychiatric effects - Human Technopole](#)).

- ▶ Agreement between the Lombardy Regional Authority and the Human Technopole Foundation to carry out a project called CoV-CVD. The agreement grants HT access to health records to investigate the effect of SARS-CoV-2 infections on the short-, medium- and long-term risk of myocardial infarction, stroke and other cardiovascular events, in order to estimate the extent and impact of these adverse events on the population and identify people at increased risk.
- ▶ Genomic projects aimed at improving understanding of genetic diversity and disease predisposition in Italy - Comprehensive genomic characterisation of participants in the 'Moli-sani' study conducted by the Neuromed IRCCS Mediterranean Neurological Institute;
- ▶ High-throughput brain organoid longitudinal profiling for neurodevelopmental disease deconvolution of cohorts from the Associazione Oasi Maria Santissima IRCCS in Troina, Sicily.

HT's scientific activities are regularly monitored and evaluated to ensure scientific excellence in line with international research best practices and standards. In terms of assessing the scientific activities of its Research Centres and Facilities, in July 2022 the Human Technopole Foundation approved the '*Internal procedure on the assessment of Human Technopole Research Centres and Core Facilities*'. The document defines the methods to be followed (frequency, panel involved, documentation to be prepared, process, purpose) to assess the scientific activities of HT's Research Centres and Core Facilities. The procedure is intended to provide the Director, the Management Committee and the Supervisory Board of HT with data and information on the performance of individual Group Leaders, Heads of Research Centres and Heads of Core Facilities.





2.3.2 DEVELOPMENT AND PROVISION OF INFRASTRUCTURE AND INNOVATIVE RESEARCH TOOLS

The main aims of this strategic objective are as follows:

- ▶ To provide high quality infrastructure, equipment and services;
- ▶ To ensure high quality in research environments and areas;
- ▶ To provide accessible infrastructure, equipment and services to external and internal researchers.

HT's research is supported by state-of-the-art scientific infrastructure and facilities, which are essential to remain competitive in today's international research scene. HT's plans in the area of user-accessible scientific services are aimed, as far as possible, at meeting the needs of the research community by providing access to equipment and technologies that are not readily available and to which scientists working in Italy, in particular, have limited access. The development, use and access to infrastructure and equipment are, therefore, a fundamental part of HT's strategic vision.

In developing an 'open innovation' strategy, HT will give priority to ensuring transparent and time-effective use of infrastructures by internal and external researchers.

In order to further broaden and facilitate researcher access and to position HT Facilities internationally, the latter will participate in European and other dedicated initiatives and programmes wherever possible. In setting up its Facilities, HT has invested and continues to invest in innovative technologies, with the aim of offering state-of-the-art equipment and expertise.

An important aspect is the need to recruit highly qualified professionals (e.g. senior technical staff) who are familiar with the technologies offered and can support researchers in their experiments, as well as to promote the dissemination of crucial resources, methods and skills in specific areas of technology relevant to HT's research. HT Facilities also play an active role in training, intended for both 'biomedical users' and more specialised technical personnel from other national and international institutions.

A concrete step taken with this strategic objective in mind was the conclusion of the Agreement, introduced by Article 1, paragraph 275 of Law No. 160 of 27 December 2019, between HT and the Italian Founding Ministries. The Agreement is aimed at enhancing HT's mission in its specific role as an infrastructural scientific hub supporting national scientific research. The scope of the Agreement is precisely the identification, implementation and management of new infrastructural facilities known as 'National Facilities', i.e. facilities, resources and services that can be used by the scientific community to conduct high-quality research in their respective fields.

For more details about National Facilities, please refer to subchapter 2.4.7 'Responsible and sustainable approach' in the section '*Development and sharing of sustainable and innovative buildings and infrastructures (National Facilities)*'.



2.3.3 TALENT ATTRACTION AND TRAINING, AND RESEARCH OUTPUT SHARING

This strategic objective includes the following steps:

- ▶ **Attracting internationally renowned researchers;**
- ▶ **Sharing knowledge and encouraging the exchange and sharing of knowledge and experiences;**
- ▶ **Training the future generation of researchers;**
- ▶ **Promoting the mobility and exchange of outstanding researchers between research institutes and organisations.**

With its synergetic missions, HT contributes to improving the national research system in the life sciences sector. At the same time, HT seeks to become a key partner for other international institutes of excellence in the field.

By joining and promoting scientific networks with important partners, including international ones, HT aims to give greater visibility to Italian biomedical research, helping to raise its profile.

Since 2018, the Human Technopole Foundation has been part of the joint PhD programme in Data Analytics and Decision Sciences (DADS) with the Politecnico di Milano; this HT/PoliMi collaboration involves three departments - Electronics, Information and Bioengineering (DEIB), Management, Economics and Industrial Engineering (DIG) and Mathematics (DMAT) - and the Analysis, Decisions and Society Centre (now Health Data Science).

The programme aims to train highly-qualified data analysts and data managers who will be able to carry out important research for the health system and healthcare at universities, clinical research centres, hospitals, health authorities, international institutes, financial institutions, technology companies, regulatory authorities and other public bodies.

In 2019, HT joined the four-year PhD programme in Systems Medicine of the European School of Molecular Medicine (SEMM) as a host institute. SEMM, resulting from the collaboration between several Italian life science research institutes, the University of Milan and the 'Federico II' University

of Naples, is a private foundation that promotes training and combines basic, translational and clinical research in emerging fields of biomedicine. In this context, SEMM's PhD programme in Systems Medicine offers PhD courses in Molecular Oncology, Human Genetics, Computational Biology and Medical Humanities, as well as comprehensive training courses, mainly taught by the faculty of SEMM's host institutions, in areas relevant to and focused on these different fields of biomedicine.

In 2021, HT was admitted as a host institute to the national PhD programme in Artificial Intelligence (AI), coordinated by the National Research Council (CNR) and consisting of five PhD courses involving 61 universities and research institutes. HT has also joined the 'AI & Health and Life Sciences' doctoral course as a host institute, whose lead university is the Campus Bio-Medico University in Rome. HT's participation is considered to be of great strategic value, both in terms of attracting outstanding young computational scientists and in terms of bringing in expertise to help shape activities in the field of AI at national level.

In 2021, HT signed a memorandum of understanding with the International School for Advanced Studies (SISSA), the 'Federico II' University of Naples and the University of Turin. These agreements not only lay the foundations for scientific partnerships with these academic institutions, but also offer the possibility of organising joint training initiatives.

In 2022, a further doctoral agreement was signed under which HT will be a host institute for the PhD programme in 'Theoretical and Scientific Data Science' at the International School for Advanced Studies (SISSA).

During 2023, a number of opportunities were offered to young researchers, such as:

- ▶ Marie Skłodowska-Curie Action postdoctoral scholarships;
- ▶ 2 PhDs, through DADS, on Health Data Science or Population and Medical Genomics projects;
- ▶ 21 PhD scholarships through SEMM;
- ▶ 1 PhD scholarship in Artificial Intelligence;

Many activities were carried out also in the area of advanced scientific training, targeting both internal scientists and the external life science research community. The number of HT doctoral and post-doctoral students continued to increase in 2023, reaching **59** and **35** students, respectively. HT's PhD and postdoctoral communities were an important target for the numerous internal training and career development events organised for HT scientists during the year. Also, **23** internal training courses and workshops were offered, covering topics ranging from technical skills (flow cytometry, high-performance computing, statistics, optical microscopy, etc.) to soft skills (e.g. leadership, research writing, etc.)

These training opportunities were complemented by the organisation at HT of almost **100** seminars, held by HT scientists and high-profile external scientists.

Another very important project for HT, linked to the goal of attracting and training new talent, concerns the organisation of mentoring programmes. In particular, in 2022 HT approved its 'Supervision and Mentorship Guidelines'. The document is intended to provide a general picture of the principles and best practices to be followed by Group Leaders and their supervised researchers, as well as by mentors (i.e. the people chosen by the individual researcher who can offer career advice and opportunities to reflect and be challenged, especially with regard to soft skills) and their mentees.

A further initiative, closely linked to this strategic objective, is the Early Career Fellowship (ECF) Programme, which was launched as early as 2020 with the first edition of the programme, aimed at supporting the professional growth of talented researchers, helping them to set up their own independent research activity in Italy.

Thanks to the ECF programme, in 2021 five young researchers returned from abroad with a scholarship worth €200,000 per annum over five years to set up their own research laboratories in institutes throughout the country. In October 2021, selection began for the 2021 ECF and in 2022 the assessment of the applications received in response to this second call was completed. Two brilliant scientists were thus awarded a scholarship worth €1 million over five years to develop their innovative research projects in the life science field. These other two scholarships are in addition to the first five awarded in 2021, bringing the total number of ECF grant holders funded by HT to a total of seven.

In addition to interactions with the outside world, interactions within HT, particularly within its research groups, are also of great importance. Indeed, HT believes that scientific and social interactions are essential to build a collaborative environment and promote discussion within a research group and/or between members of different teams. In this regard, HT has approved an internal procedure for the organisation and management of 'scientific retreats', i.e. off-campus meetings involving one or more research groups, members of facilities or support units, or an external consultant with expertise in one of the topics being discussed.

HT views retreats as a chance to break the daily scientific routine and to discuss science and science-related topics without distractions and time constraints in a more informal setting.

In order to effectively support the 'Talent attraction and training, and research output sharing' objective, also from an operational point of view, great support from HT's administrative area is also required. In this respect an important role is played by the International Desk service of the Human Resources area. The International Desk, in fact, assists Italian and foreign staff by starting and managing the immigration and relocation processes, providing support in obtaining the necessary permits to stay in Italy. The International Desk collaborates with colleagues from the entire Human Resources area, intervening right from the time the job offer is made to the candidate, and acting as a point of reference for all matters related to immigration, relocation, tax benefits and the application of institutional policies.

Matters handled cover a wide range of processes and documents, including application for an entry permit, help with obtaining visas and residence permits, and the issuance of the documents necessary for colleagues and their accompanying family members to stay in Italy.

With reference to relocation, which is equally a very delicate phase and involves not only the professional but also the private life of colleagues from abroad, the International Desk helps with the integration process so that employees can deal with the move from their home country to Italy with utmost peace of mind.

Support includes an experimental project that has been launched to put the family members of colleagues arriving from abroad in touch with each other by creating a network ('HT Club House'), which can grow and remain active over time, becoming a first point of reference and guidance for those who have chosen to come to Italy with a family member and who feel the need to receive support from those who have already gone through the same experience.

In January 2023, the International Desk Page was also presented, i.e. an intranet page dedicated to all colleagues needing a guide that can illustrate, as clearly as possible, not only the immigration procedures for entry into Italy, but also all aspects related to applying for and obtaining the Italian documents necessary for a regular stay in the country. With the intention of reinforcing the welcome and conveying a sense of hospitality towards new colleagues, the page has been enriched with a section containing a brief presentation of the Italian regions and what is unique about Italy.

Another important tool made available by the Human Technopole Foundation to bridge the cultural gap and help foreign colleagues fit in more easily is the agreement signed with the 'Accademia di Italiano'. This agreement grants HT staff and their families a discounted rate to attend Italian language courses.



2.3.4 SCIENTIFIC REPUTATION AND DISSEMINATION

This strategic objective includes the following steps:

- ▶ Being a part of the most important international dissemination networks (conferences, associations, etc.) and scientific organisations;
- ▶ Obtaining research grants and awards;
- ▶ Organising/hosting scientific events for expert and non-expert audiences;
- ▶ Promoting scientific literacy and outreach to a wider audience.

It is of paramount importance for HT to be a member of major international networks and to actively participate in scientific collaboration projects. Several framework partnership agreements have already been signed, either for the execution of joint research projects or training programmes, or to promote interactions between industry and academia.

The objective of these initiatives is to strengthen national research and innovation skills in life science sectors, as well as to improve reputation and foster scientific dissemination.

It is therefore important for HT to establish ties with European and international institutes, participating in major research projects, international collaborative consortia, conferences and scientific associations. Participation in all these projects is strategic for HT and cross-cutting, involving scientists from different Centres and Facilities collaborating across various disciplines and research areas.

During 2023, HT's scientists joined many projects of international scientific significance. In particular, HT scientists attended more than **200** meetings and workshops worldwide.

The entire international scientific community has access to seminars held by HT's Group Leaders, as well as to seminars, courses and conferences with international speakers (of the highest level) organised on HT's premises or in other research institutes. HT's scientific staff are also actively involved in external training so as to increase their experience in scientific dissemination.

Another very important goal for HT is the provision of advanced scientific training programmes designed for young scientists.

HT offers specific training opportunities for two purposes: to enhance knowledge and skills in specific research areas, and to contribute to career growth and development in various life science sectors of interest to scientists. Training is intended for all categories of scientists: university trainees, PhD students, post-doctoral researchers, young group leaders and core facility experts/managers.

For example, training programmes for young group leaders include laboratory leadership courses, mentoring programmes and professional growth activities, enabling them to acquire the necessary skills to run a laboratory and establish themselves as leaders in their field.

In 2023, HT's PhD and postdoctoral communities were an important target for numerous internal training and career development events. These included three courses on technical skills (light imaging, high performance computing and scientific image analysis), seven courses on soft skills (e.g. scientific writing, research project management, presentation skills) and two career workshops. These internal training activities and events were supplemented by the launch of a series of internal seminars featuring HT scientists and by the organisation of a series of seminars held by high-profile external scientists at the Human Technopole Foundation.

In 2023, five important training events for the external life science research community took place at HT. These included week-long courses and workshops in the areas of sequencing technologies, omics and image data analysis, as well as the opening scientific symposium of the European Cancer Dependency Map initiative. In total, almost **400** external scientists from national and international institutions attended these events.

In order to encourage mobility and the sharing of expertise, infrastructure and methods with the external research community, in 2023 HT hosted **45** scientific visitors - from **30** different research institutes in Italy and abroad - who spent time at HT to collaborate with Human Technopole Foundation scientists on specific projects in different research areas, or to apply specific technology available at HT to their projects and/or acquire knowledge of its methods.

Also in 2023, HT researchers received prestigious international awards and accolades, including, for example, the election of a HT (Structural Biology) scientist as an EMBO member. Other important awards were obtained by HT researchers from the Genomics, Computational Biology and Health Data Science Research Centres.

HT's commitment to scientific dissemination is also attested by its 'openness' to the outside world, expressed through activities involving non-scientific stakeholders and the general public. HT is constantly engaged in a range of communication, education and outreach activities and plays an active role in communicating science effectively, promoting public understanding of the importance of scientific research and knowledge-based innovation, and stimulating an ongoing and productive dialogue between science and society.

This dialogue does not concern academia only, but also takes the shape of more popular initiatives.

For more information on institutional and communication initiatives in 2023, please refer to the relevant section of *Relational capital*.







2.3.5 INNOVATION THROUGH RESEARCH (TECHNOLOGY TRANSFER)

This strategic objective includes the following steps:

- ▶ **Signing agreements with external organisations and industries to create economic and social value from research findings;**
- ▶ **Developing, filing, registering and protecting patents;**
- ▶ **Establishing start-ups and promoting technology transfer;**
- ▶ **Providing innovative training and mentoring services to Italian (and international) academia.**

The life science sector, including medical technology, biotechnology and pharmaceuticals, is extremely productive and is an area of great interest for innovation.

Contributing to economic and social progress by transferring research findings into applications, therapies and products, is one of HT's main objectives and an additional way for HT to fulfil its mission.

As HT's research activities grow, technology transfer activities will be structured to help turn scientists' discoveries and inventions into tangible applications and marketable products.

The new technologies and scientific methods that might derive from HT's work cover the entire range of life sciences in the broadest sense, including therapeutic and diagnostic strategies, enabling technologies, molecular tools and assays, instrumentation and devices, as well as software applications and databases, to be developed in close cooperation with industrial partners from the pharmaceutical, biotechnology, engineering and IT sectors.

In addition to launching technology transfer activities and in line with HT's commitment to the wider academic community, HT is exploring how it can help improve technology transfer opportunities for Italian researchers.

Besides research expertise, successful technology transfer requires a broad range of business skills and expertise in intellectual property, as well as the ability to identify and attract the interest of business partners with whom to negotiate with a view to developing optimised marketing strategies for individual products and technologies.

In this context, and also pursuant to Article 49-bis of Decree-Law No. 34 of 19 May 2020, converted with amendments by Law No. 77 of 17 July 2020, in July 2021 HT opened a new facility known as the 'Centre for Innovation and Technology Transfer in the Life Science field'. The Centre, endowed with adequate funds, is engaged in promoting innovative processes proposed by public and private entities in the research and innovation system, with a focus on:

- ▶ Supporting patenting and maximising the value of intellectual property;
- ▶ Promoting collaboration between private entities in the innovation system and national and European research institutes;
- ▶ Fostering the dissemination of research findings and knowledge transfer;
- ▶ Encouraging research-based collaborations between companies and start-ups for the development of biotechnologies, artificial intelligence technologies for genetic, proteomic and metabolic analyses, technologies for diagnostics, active surveillance, protection of vulnerable individuals and improvement of quality of life.

In 2023, activities at the Centre for Innovation and Technology Transfer (CITT) focused on three directions:

1. Training young Italian life science researchers through courses aimed at providing them with the basic tools for understanding the technology transfer process. In 2023, CITT offered two courses: a one-day introductory course attended by some **40** young researchers; and a one-week intensive course attended by some **40** researchers and young professionals selected from all over Italy and abroad. The courses were organised in cooperation with Netval (National Association of Technology Transfer Operators) and the University Institute of Advanced Studies (IUSS) in Pavia.

CITT also organised the conference 'Future Trends in Translational Medicine', in collaboration with Nature Italy, with the aim of encouraging researchers to embark on pathways to enhance their research for the benefit of society and of fostering debate on innovation in Italy. About **460** people registered for the conference (it was the event held by Nature with the most registered participants worldwide in 2023) and about **310** people were present in the conference room. The structure of the conference gave **20** European and US speakers, from both academia and industry, the chance to talk about their research projects and experiences throughout their careers, as well as to take stock of the state-of-the-art in some of the most promising areas of research. An institutional round table with representatives

from institutions, industry and life science associations was also held to discuss barriers to translational medicine in Italy. A satellite event was also held at the end of the conference by the network of Italian IRCCSs on technology transfer (PerfeTTO), aimed at selecting and awarding the best technology transfer projects developed within Treatment and Research Hospitals.

2. Supporting the establishment and implementation of a network of technology transfer players. To this end, in 2023 CITT started a dialogue with FITT, the Foundation for Innovation and Technology Transfer mandated by the Lombardy Regional Authority, and the PerfeTTO network, the Italian NRRP-funded network of IRCCS technology transfer offices.

In 2023 CITT also organised **4** meetings with technology transfer officers, both from the Milan area and outside, to discuss topics such as the reform of the Industrial Property Code (discussing in particular the overcoming of what is known as the Professor Privilege), the dynamics of venture capital funds in the life science sector and the Golden Power regulations. About **30** technology transfer officers attended each event, with a total of approximately **100** professionals involved. CITT also participated in the MIND Innovation Week, in partnership with other MIND district players, such as Bio4Dreams (thanks to the start-up Chemicare and the CSO of Bio4Dreams) and the Galeazzi IRCCS, specifically in the event 'The MIND behind: tech transfer dialogues'.

3. International promotion, fostering interaction between the Italian technology transfer system and that of other countries, in order to compare models that can potentially be applied to the Italian system, encourage exchanges between researchers and attract talent and funding towards innovation produced in our country. In June 2023, CITT took part in the Swiss Tech Tour organised by the Embassy of Switzerland in Italy and Swiss Business Hub Milan, in collaboration with Presence Switzerland, bringing along some Italian TTOs with the aim of strengthening relations with the Swiss innovation ecosystem. On that occasion, the group visited a number of prestigious institutes, such as the Ecole Polytechnique Fédérale in Lausanne, the CSEM in Neuchatel, the Novartis Campus in Basel and the Switzerland Innovation Park in Zurich, as well as the Foundation for the Institute for Research in Biomedicine (IRB) and the Institute

for Oncological Research in Bellinzona. In November 2023, CITT organised a Study Tour, also open to some **20** technology transfer officers working at Italian institutes (universities, IRCCS, research centres...), to discover the Austrian innovation ecosystem. The delegation was welcomed by the Italian Ambassador in Vienna for a workshop that provided an in-depth look at the State and regional funding system in Austria thanks to the involvement of representatives from the Austrian agencies invited to illustrate the situation in the area. The delegation then visited the Vienna Biocenter, the Institute of Science and Technology Austria (ISTA) and the Research Centre for Molecular Medicine of the Austrian Academy of Sciences (CeMM), talking to experts in innovation tech transfer and research enhancement projects.



2.3.6 ENVIRONMENTAL, SOCIAL AND ECONOMIC SUSTAINABILITY

The aims of this strategic objective are as follows:

- ▶ **ENVIRONMENTAL SUSTAINABILITY**
Helping to minimise the environmental impact of the MIND site and optimise the environmental efficiency of buildings and laboratories; reducing animal experiments to a minimum;
- ▶ **SOCIAL SUSTAINABILITY**
Promoting gender equality opportunities, improving people's quality of life (health, age, wellbeing), having a positive impact on the area (employment, ancillary activities, etc.), promoting awareness of the importance of science and research within society and the public, becoming a reference player for a new generation of students;
- ▶ **ECONOMIC SUSTAINABILITY**
Attracting investors (including private ones), being resource efficient, ensuring long-term economic-financial balance by recording an operating profit.

With reference to economic sustainability, HT adopts a policy of utmost efficiency in the use of resources, ensuring economic-financial balance also with a view to the long-term.

In addition, HT aims to attract further investments, e.g. grants and funds of international scientific importance. In this respect, in 2023 HT scientists were awarded numerous prestigious grants and scholarships (e.g. from ERC, EC/Horizon, EMBO, AIRC, Telethon, Cariplo, etc.), bringing the total amount of external competitive research grants to about €17 million.

Resources are expected to increase further in coming years through new sources of external research funding from the European Commission, National Institutes of Health (NIH) - which fund some activities outside the United States - or private foundations and non-profit organisations.

Moreover, by consolidating activities that maximise the value of research findings, additional funds are expected to contribute to HT's overall budget through contributions from patent licensing and intellectual property revenues (e.g. royalties), as well as from joint programmes with industry.

Generally speaking, sustainability is an integral and crucial part of HT's activities and the achievement of this objective corresponds at the same time with the pursuit of the 17 UN 2030 Agenda Sustainable Development Goals (SDGs).

HT has defined a system of objectives that supplement the results of its activities with awareness of their social, environmental and economic effects. With the adoption of Integrated Reporting, HT launched a process aimed at assessing and investigating the contribution that HT can make to the achievement of the Sustainable Development Goals (SDGs) defined by the government leaders of the UN's 193 Member States. For further details of the sustainability goals resulting from the identification of the impacts of HT's activities, especially those relating to environmental, social and economic aspects, please refer to sub-chapter 2.4 "Responsible and sustainable approach".



2.3.7 PARTNERSHIPS, NETWORKING AND STAKEHOLDER ENGAGEMENT

The main aims of this strategic objective are as follows:

- ▶ Establishing long-term partnerships with HT's key stakeholders;
- ▶ Contributing to the development and value maximisation of the MIND site, promoting joint projects and synergies with its partners;
- ▶ Promoting stakeholder engagement.

As mentioned above, an important goal for HT is to consolidate its relationship with its stakeholders through scientific collaboration activities, infrastructure sharing and its commitment to organising and hosting scientific training activities and events, both for internal scientists and for external scientists from universities and other research institutes.

In the latter context, HT continues to liaise with various stakeholders in Italy, including universities, scientific institutes and individual hospitals and research institutes, in order to identify areas of particular need.

With reference to interaction with the world of industry, HT believes that public/private partnerships can be one of the best ways to leverage its skills and expertise with a view to stimulating industrial and technological development.

HT's location within the MIND area should help to promote such interaction since many highly innovative companies will move to the area where the HT Campus is located.

As the MIND area develops, it will also become easier to create a space where research findings can take their first steps towards being marketed, either through the creation of start-ups or through joint development with industrial partners.

To achieve these objectives, HT's communication strategy is aimed at building, consolidating and maintaining its prime visibility and reputation, promoting events and projects that establish a positive relationship between HT and its main stakeholders.

In line with HT's objective to establish and develop collaborations with the Italian and international biomedical research community, discussions were held throughout the year on potential areas of collaboration with numerous universities, research centres, clinical research institutes, research networks, associations and companies engaged in life science research both in Italy and abroad. These interactions led to the conclusion of **18** agreements (MoUs, Framework Agreements, Research Collaboration Agreements) concerning

new joint projects with scientists from numerous universities, research hospitals, research institutes and industries worldwide. The universities, research institutes and national research hospitals involved in the above-mentioned collaboration projects include the University of Bari, the University of Turin, the CNR, IFOM, Humanitas, SR-TIGET, HT, Besta IRCCS and Ca' Granda Ospedale Maggiore Policlinico IRCCS, among others.

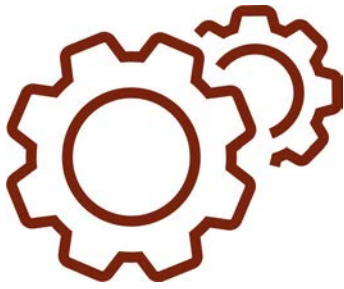
HT's institutional relationship activities also include establishing a network of agreements with outstanding institutional partners such as the National Agency for Regional Health Services (AGENAS) and the Italian Red Cross.

HT also contributed to the work of the Master in Cultural Diplomacy at the Catholic University of Rome.

Particularly important for HT is also the involvement of the younger generation through schools and scientific education programmes, with the aim of raising awareness of the importance of science and promoting careers in life sciences or in biomedical research. Also this year, HT participated in MIND Education activities, now in their fourth year, organised together with partners from Milan's new innovation district.

In addition, in 2023 HT welcomed the first group of secondary school students participating in the School-to-Work Alternation project. HT opened four positions within its Communications, Human Resources and ICT & Digitisation teams so that students could learn more about how administrative and research support areas can promote the work of scientists.

In all the areas described above, from scientific to clinical and industrial relations up to interaction with the general public, HT will continue to work with other national and international organisations. For further details of collaborations, please refer to section 2.4.2 '*Development of partnerships and collaborations with universities and research institutes on scientific research projects*' of subchapter 2.4 '*Responsible and sustainable approach*'.



2.3.8 EFFECTIVENESS AND EFFICIENCY OF OPERATIONAL PROCESSES

HT pursues maximum effectiveness and efficiency in its operations, with specific actions both within its Administration and with regard to science support activities. In particular, the aims of this strategic objective are as follows:

- ▶ Developing technological and digital processes;
- ▶ Creating an attractive environment for non-scientific talents/professionals.

DIGITAL TRANSFORMATION

As for digital transformation, HT is implementing a complex process aimed at acquiring new tools and skills in an administrative digitisation framework so as to ensure efficiency in operational processes as well as transparency and integrity of HT's operating and financial data.

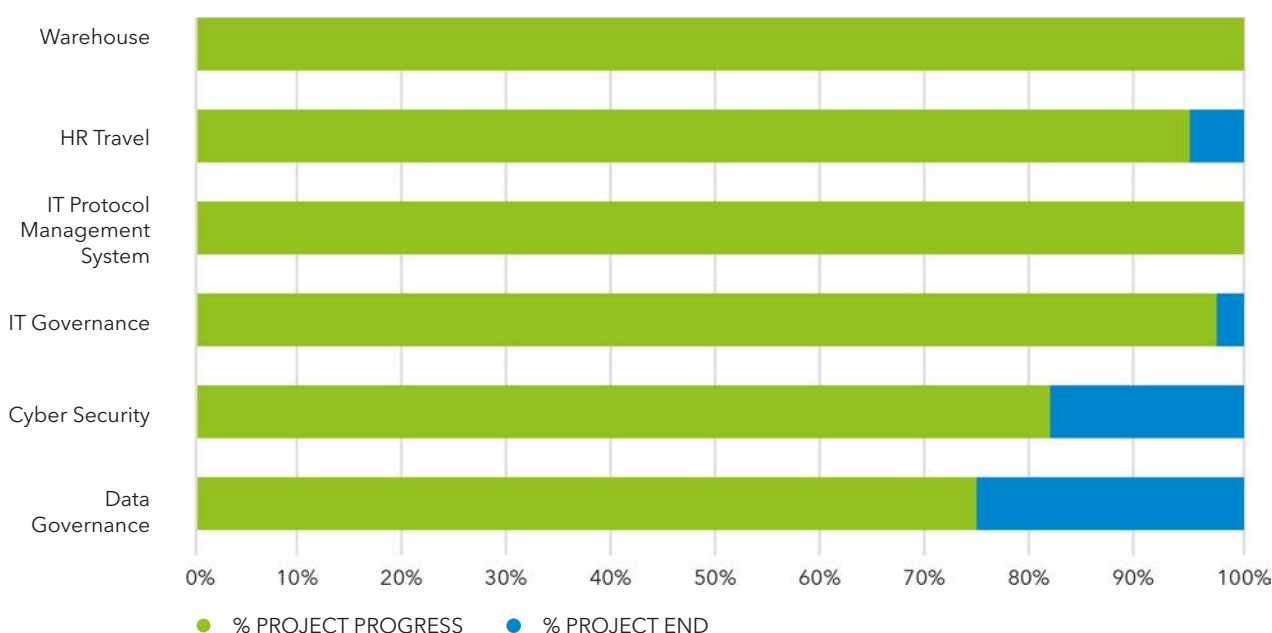
In the course of 2021 and throughout 2022, steps were taken to implement the ERP system provided with a view to covering the operational processes of procurement and administration.

The project has also been extended to other areas, such as human resources, project management and warehouse management.

HT will also focus on developing a new ERP system and a business intelligence platform with the aim of adding further value to administration processes.

The following table shows the progress as at 31.12.2023 of the main digitisation projects mentioned above:

% PROGRESS OF DIGITAL TRANSFORMATION PROJECTS



With reference to the HR Travel project, it should be noted that the implementation project phase has come to an end though, as of 31 December 2023, HT's internal roll-out had not yet been completed. The Data Governance project, which is 75% complete, is being revised in some of its strategic aspects, which is the reason for delays in its full implementation.

PROJECT MANAGEMENT

Along with the development of Digital Transformation projects, in 2021 the Human Technopole Foundation introduced a Project Management scheme to effectively manage the planning, organisation, monitoring and control of the administrative aspect of all projects. This is intended to ensure that projects are completed by deadline and within the estimated budget.

Project Management also provides an overall picture of all HT projects, leveraging synergies between them and ensuring their alignment with corporate strategy.

Through an ongoing resource planning and control process, the PMO (Project Management Office) aims to increase overall project efficacy and ensure greater efficiency, this meaning:

- ▶ Resource optimisation;
- ▶ Risk containment;
- ▶ Cost containment.

PMO's activities were supported by a specific project, completed in 2022, designed to establish a project management culture and implement a set of tools to monitor and coordinate all HT activities in a uniform way.

To achieve this objective, the project included the analysis of HT's current activities and abilities in order to identify and apply a Project Programme Portfolio Management approach/method.

In 2022, the PMO office first implemented the Status Reporting management process, which is intended to regularly monitor project progress. Therefore, ongoing or new projects were mapped (by interviewing project managers/heads of HT departments) and, in an initial project start-up phase, a number of them were chosen (based on their importance and critical nature), which the PMO office began monitoring by holding regular meetings with their managers. This activity continued in 2023 while also bringing some improvements to the collection and handling of information on project progress.

This constant monitoring system also supports possible audits conducted by the Internal Audit & Compliance department on individual projects.

In addition, a handbook has been created, available on the intranet page and accessible to all HT staff, offering practical guidance on how to manage a project from start to finish.

HELP DESK AND TICKETING SYSTEM

In order to ensure a high level of internal assistance in resolving 'incidents' and to improve collaboration between HT's different areas, an internal service called 'Service Now' was introduced in 2022. It is a ticketing and booking system, used by all areas and departments of HT, to request assistance related to ICT & Digitisation, Campus Development & Facility Management, Human Resources, or to book services at certain scientific facilities. As this service develops, Service Now is expected to extend its current scope, becoming a kind of one-stop shop for the centralised management of all in-house corporate needs.

In particular, support requests from the Campus Development & Facility Management area may concern, for example, issues related to buildings, furniture, failure of equipment or freezers or machinery installed in laboratories.

Moreover, during 2022, the Campus Development & Facility Management area implemented and operated a monitoring system called 'Mean Operating Time'. The system is used to analyse and monitor the activities carried out to resolve incidents handled during the year. This monitoring indicates that in 2023 **457** incidents were resolved in more than 55% of cases within 7 days. Approximately 65% of these incidents concerned activities related to the maintenance of buildings used by the Human Technopole Foundation.

Service Now can also be used in the Human Resources area for queries related to employment contracts, guest house services, childcare services for employees' children, wage slip information, relocation services, information and assistance with social security, taxation and welfare, etc., or to solve problems related to the ICT & Digitisation area (hardware, software, cyber security, databases, data management, etc.). In 2024 Service Now will also be extended to services in the finance area (e.g. budget control, accounting and tax information, insurance contract management, etc.).

PREDICTIVE PLANT MAINTENANCE

With the help of an external provider, daily checklists have been implemented to intensify predictive maintenance on certain focal points of buildings. Expert maintenance services are also provided by authorised CATs (Technical Assistance Centres), ensuring both quick repairs in case of failures and continuous assistance to plant operators for ordinary adjustments and support activities.

PERIMETER SECURITY

In view of the increase in the number of people working at HT, the night-time opening of laboratories and the extension of different Campus buildings, an electronic access tracking system has been implemented to ensure personal safety.

As of June 2022, everyone accessing HT premises must use a badge that automatically opens doors in all buildings. The automatic system records entry so that security staff know how many people are in the buildings at any given time and can handle emergencies effectively.

MANAGEMENT CONTROL MODEL

The goal of operational process efficiency and effectiveness also requires efficient project and activity cost monitoring so as to ensure accurate and comprehensive reporting of the resources used. In this regard, in 2021 HT launched a process for the implementation and review of its management control model.

HT's new control model, which was approved in 2023, considers all cost reporting requirements for the activities carried out, consistent with HT's reporting obligations towards its financial backers.

As indicated in the 'Financial capital' section, a distinction should be made between:

- ▶ **Founding Ministries (Economy and Finance, University and Research, Health)** that provide annual funding under Law 232/2016 to support the creation of a scientific and research infrastructure (**Agreement**);
- ▶ **Ministry of Economy and Finance (MEF)** that provides annual funding pursuant to Art. 49-bis, Decree Law. 19 May 2020, No. 34 (Recovery Decree), converted into law by Art. 1, paragraph 1, Law No. 77 of 17 July 2020 (**CITT** - Centre for Innovation and Technology Transfer in the Life Science Field);
- ▶ **Other entities** that fund individual scientific research projects after taking part in specific calls for proposals (e.g. **EU/grants, other contributions**).

Technically speaking, the management control model is a set of activities and tools used to check whether corporate management is in line with the objectives set out in the Strategic Plan and the Annual Budget and is cost-effective.

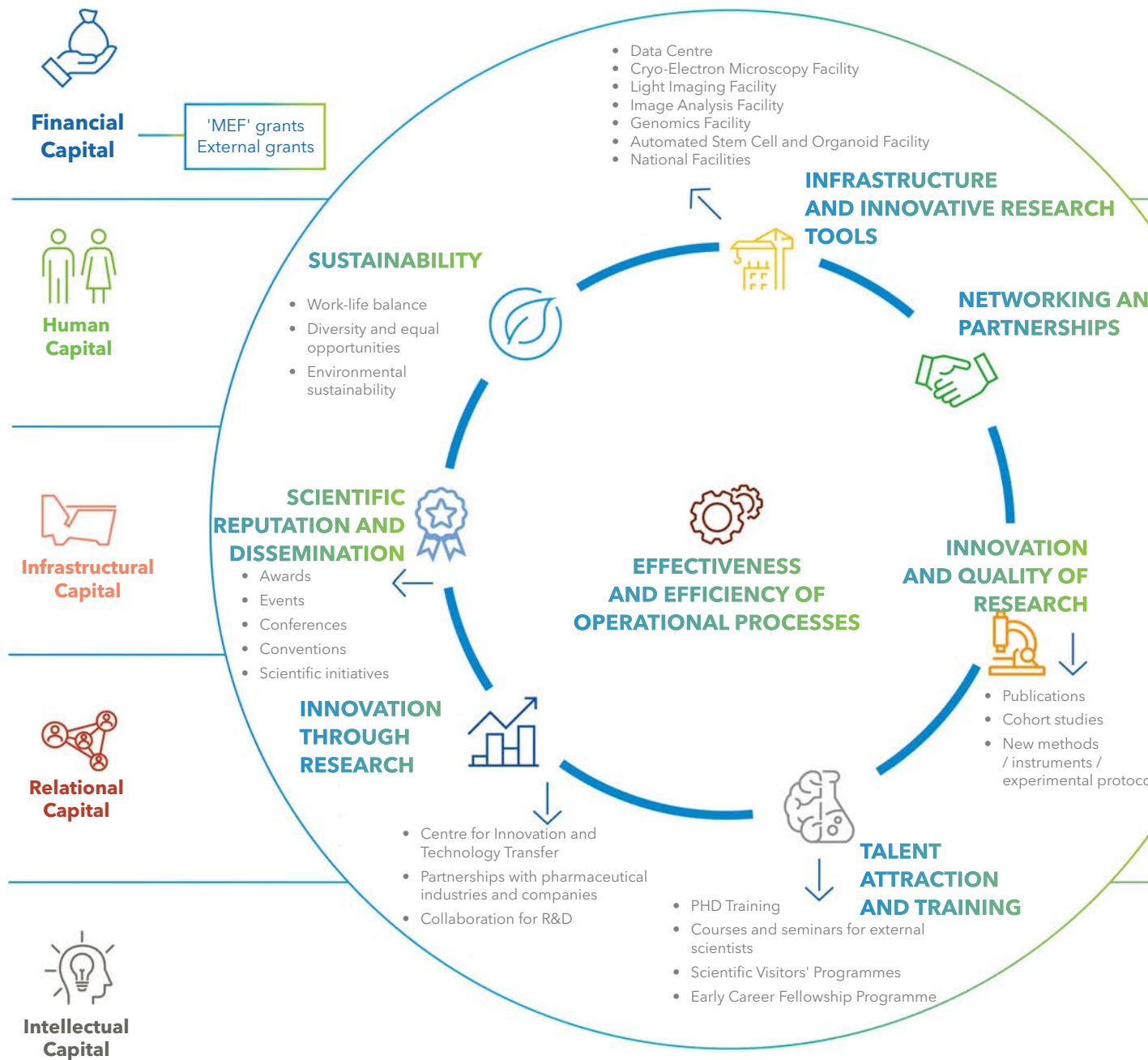
The model is part of the 'Human Technopole Foundation system' regulating the operational tools and processes used to pursue corporate targets, in compliance with the organisational structure.

HT's control model is part of a general framework that includes:

- ▶ **Value Creation Model**, i.e. the set of strategic choices aimed at supporting sustainable growth over time in order to create value across the board for all HT's stakeholders;
- ▶ **Organisation and Processes**, i.e. the set of interrelations generated between production cycle processes (e.g. supply planning, sourcing & procurement, logistics) and economic-financial processes (e.g. Finance) that lead to efficient operational processes;
- ▶ **Information System**, i.e. the set of people, equipment, applications and procedures that enable an organisation to obtain the information needed to make appropriate decisions.

The diagram below shows how HT's management control model integrates with the value creation model:

INPUT



OUTPUT



Scientific discoveries aimed at developing new therapeutic strategies for diseases

Attraction of further funding, including from private sources



Development and career opportunities for the next generation of scientists



Operating scientific services and facilities to be made available to external scientists

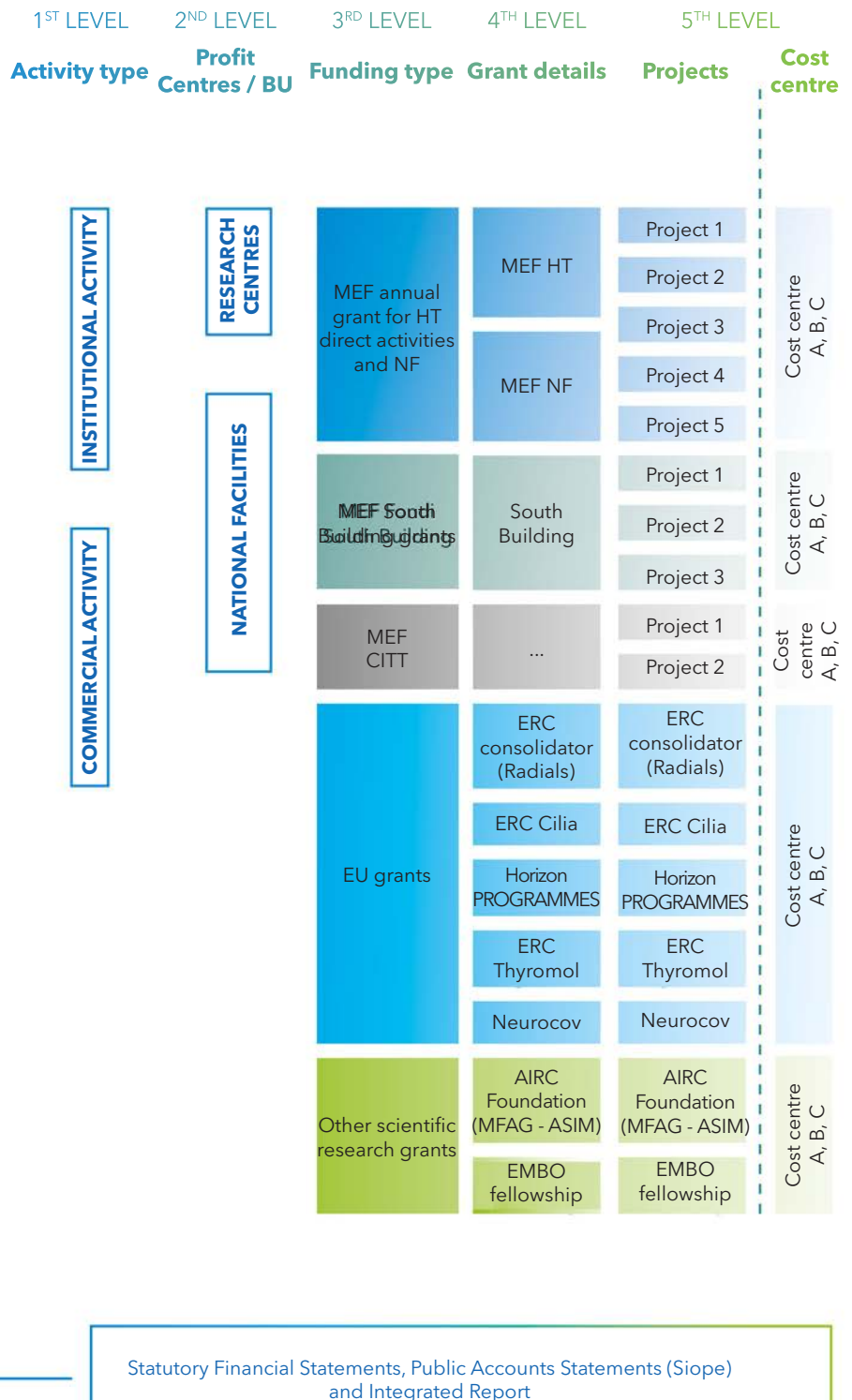


Scientific collaboration, institutional events and initiatives of great relevance



Innovative approaches for personalised and preventive medicine

Awareness of the importance of science and scientific literacy



The control model thus supports value creation within the scientific research activities in which the Human Technopole Foundation operates whilst pursuing its strategic objectives.

As described in the section on the value creation model, **INPUTS** differ according to the type of capital, which may be:

- ▶ **Financial**, i.e. financial resources deriving from 'MEF' grants (Agreement, South Building and CITT grants) and external grants, both institutional and scientific (e.g. EU);
- ▶ **Human**, i.e. skills, experience and excellence of scientific and non-scientific staff;
- ▶ **Infrastructural**, i.e. assets owned by HT, facilities, infrastructure and services;
- ▶ **Relational**, i.e. relations with the stakeholder group and collaboration with research centres and universities;
- ▶ **Intellectual**, i.e. the wealth of knowledge and organisation of the Human Technopole Foundation's scientific research.

OUTPUTS are designed to achieve strategic objectives and are of various types:

- ▶ Innovative approaches for personalised and preventive medicine;
- ▶ Operational scientific services and facilities to be made available to external scientists;

- ▶ Scientific discoveries aimed at developing new therapeutic strategies for diseases;
- ▶ Development and career opportunities for the next generation of scientists;
- ▶ Awareness of the importance of science and scientific literacy;
- ▶ Attraction of further funding, including from private sources;
- ▶ Scientific collaboration, institutional events and initiatives of great relevance.

The aforementioned outputs, within the control model, are then split into **five** separate **levels**:

- ▶ **Activity type (1st level)**, i.e. institutional or commercial activity;
- ▶ **Business Unit - 'BU' (2nd level)**, i.e. Research Centres and National Facilities;
- ▶ **Funding type (3rd level)**, including: MEF grants (Direct research, Agreement and South Building grants), CITT grant, EU grants and other grants;
- ▶ **Grant details (4th level)**, including: HT share, NF share, 'extra MEF' grants;
- ▶ **Research Projects and Cost Centres (5th level)**, with details of individual scientific research and institutional projects and internal cost centres of the Human Technopole Foundation.

TRAINING OPPORTUNITIES IN ADMINISTRATION

With regard to the objective of creating an attractive work environment also for non-scientific talents and professionals, as well as developing and enhancing specific professional skills, HT offers its staff several training opportunities by organising courses on both soft skills and technical subjects of more general interest. The aim is to contribute to improving its employees' professional profiles and promoting their continuous personal and professional growth.

In 2023, on the basis of the training needs analysed at the end of 2022 and the training plan, various training activities were carried out for staff, both of a technical-specialist nature and relating to the development of soft skills. In particular, the main training activities focused on:

1. administration/management and regulatory issues of contracts, IT security, sustainability, strengthening of English language skills and leadership development;
2. specific training for the Single Project Manager and the Contract Execution Director, Project Management;
3. specific training concerning the use of specific management platforms;
4. training in the drafting of administrative acts and documents;
5. courses on leadership, digital skills, communication, wellbeing and inclusion.

Training was delivered according to different types of teaching: e-learning, in the classroom or through workshops and seminars.

Structured tests or assessments were carried out at the end of the various training courses by their providers to verify the skills acquired. In addition, a questionnaire on the effectiveness of training and participants' satisfaction with the same was made available.

The training catalogue was also enriched with asynchronous online courses, particularly related to the development of soft skills and delivered through a platform (LMS) with which different types of courses can be offered to an extensive number of people. The project designed to implement this type of training was carried out in cooperation with the HSE and ICT departments, with a view to making the training system efficient, interdisciplinary and cost-effective.

A leadership and team-building training course was also organised on an experimental basis, involving a number of Line Managers and their team. In view of the results achieved, HT plans to extend this opportunity to all Line Managers or Heads requesting it as from 2024.

In addition, in the last months of 2023, staff training needs were analysed by involving HT's employees, Heads and Line Managers; based on the relevant findings, on the strategic plan and Governance, the Human Technopole Foundation planned and scheduled training courses for the 2024-2025 period.

These courses might be implemented by reaching agreements and conventions with training organisations and companies, so as to ensure the provision of continuous and constantly updated training for the growth and development of all personnel, thus supporting the Human Technopole Foundation in its current and future projects.

2.4 Responsible and sustainable approach

In 2015, UN Member States adopted the 2030 Agenda for Sustainable Development, which provides a shared vision and roadmap for peace and prosperity for people and the planet, now and into the future. At the heart of the 2030 Agenda are the 17 Sustainable Development Goals (SDGs), "which are an urgent call for action by all countries - developed and developing - in a global partnership.

They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth - all while tackling climate change and working to preserve our oceans and forests." ([UN Italy The New 2030 Agenda for Sustainable Development \(unric.org\)](https://www.un.org/sustainabledevelopment/)).

The 17 Sustainable Development Goals are represented below:



Just like in 2022, HT confirmed the previously identified **27** (potential and actual) impacts on the economy, environment and people, generated by its activities. Of the **27** impacts identified, as illustrated in subchapter 2.1 'Stakeholder engagement and materiality matrix' of this document, **17** were positioned above the previously determined materiality threshold. Each impact is linked to an operating activity underlying one or more HT

strategic goals and, likewise, is linked to one or more UN Agenda 2030 sustainable development goals.

This section provides information on the **11** operating activities that generate (or may generate) the **17** impacts positioned above the materiality threshold.

2.4.1 DEVELOPMENT OF SCIENTIFIC RESEARCH PROGRAMMES OF EXCELLENCE



This activity is linked to the 'Innovation and quality of research' strategic objective and falls within the 'Research and Innovation' macro-category.

By developing scientific research programmes of excellence, HT generates positive effects on people's wellbeing and health, thus contributing to the progress of Sustainable Development Goal 3 'Good health and wellbeing'. HT also contributes to the progress of Goal 9 'Industry, innovation and infrastructure', which seeks, among other things, to increase research and development (including scientific research), both in terms of staffing levels and public and private expenditure.

HT's primary mission is to contribute to the promotion of health and wellbeing. Therefore, its main stakeholders include the general public, who can benefit from HT's activities in the long run.

Specifically, HT carries out numerous research and scientific initiatives in the different areas represented by research centres and groups.

At the same time, it establishes partnerships with the Italian and international biomedical research community to work on joint projects.

In some cases, research activities may involve the use of chemical preparations and reagents or produce potentially environmentally-hazardous waste. Through its careful HSE policy, the Human Technopole Foundation endeavours to mitigate the risk of the negative impact caused by its activities, seeking to prevent environmental pollution and eliminate health hazards and risks. In this regard, specific rules for the operational management of potentially hazardous waste produced by research activities have been defined in a special procedure. These rules cover all stages of waste management: production, disposal, handling, transport and storage.

In 2023, the HSE Area performed and completed an environmental assessment of the material environmental impacts associated with HT's processes and activities.

The Environmental Assessment was conducted by the HSE team to:

- ▶ identify internal and external factors and the requirements and expectations of relevant stakeholders that may affect the expected outcomes (Context Analysis);
- ▶ based on a Life Cycle Perspective (LCP) approach, identify and keep up-to-date all environmental aspects connected with the activities and products provided by the Human Technopole Foundation and determine their materiality in order to establish priority actions;
- ▶ identify and update the applicable environmental legislation and, consequently, all compliance obligations, to verify the regulatory compliance of such activities;
- ▶ evaluate how environmental aspects connected with the activities performed are handled and identify areas for possible improvement in environmental performance;
- ▶ obtain an overall assessment of the environmental issues linked to HT's activities, as an objective benchmark for subsequent improvements.

According to the environmental risk assessment, the environmental risk levels for each HT process/activity considered fall, under normal operating conditions, within the range of 4 to 8 (medium risk level) or even 1 to 3 (low risk level), as described for each environmental aspect affected by HT's activities in the 2023 Environmental Assessment Report. Medium risk levels are also recorded for emergency situations.

For each environmental risk rated as medium and/or high, appropriate mitigation actions, procedures and operating instructions have been defined (e.g. waste management in-house procedure, visual management in laboratories, etc.)

As regards environmental impacts that are not directly managed by HT, but over which it can exert control (inbound and outbound logistics, maintenance firms, external suppliers in general), appropriate waste treatment plans are contractually defined, along with operating controls and supervisory activities so as to improve and monitor the environmental performance of external suppliers.

Based on the principles of conduct and protocols defined in HT's Control Model 231, in handling the environmental requirements of specific sensitive activities, the Human Technopole Foundation has defined and continues to strive to define and implement an Environmental Policy and an Environmental Management System (EMS) in accordance with UNI EN ISO 14001:2015.

Therefore, with the future adoption of the Environmental Management System, HT will specify how to:

- ▶ improve its environmental and energy performance;
- ▶ prevent environmental pollution;
- ▶ actually contribute to the implementation of its organisational, management and control model under Decree 231 and prevent environmental offences, thus protecting the Human Technopole Foundation;
- ▶ ensure that operations and activities associated with material environmental impacts, as set out in the Environmental Assessment, are conducted in a planned and controlled manner.

Generally speaking, in addition to environmental aspects, HT's scientific research activities are planned, evaluated, authorised and carried out, from an ethical point of view, in compliance with national and international laws, regulations, principles, guidelines, standards and best practices governing scientific research.

In this regard, in 2023 HT adopted a specific regulation defining the roles, duties and responsibilities of an institutional evaluation body for HT's research ethics and integrity (the Research Ethics Committee).

The Research Ethics Committee will be mainly engaged in:

-
- ▶ evaluating the ethical implications of proposed research projects by issuing, where appropriate, institutional ethical approvals for such projects and activities, generally excluding projects conducted/promoted by external users of HT facilities and not involving HT research staff and funds;
-
- ▶ upon request, providing advice to the HT President, Supervisory Board, Management Committee, Director and Heads of Research Centres on research ethics and integrity issues related to HT's activities;
-
- ▶ upon request, providing advice to the HT President, Supervisory Board, Management Committee, Director and Heads of Research Centres on the handling of alleged research misconduct cases involving HT research staff and/or the use of HT funds and infrastructure;
-
- ▶ evaluating and giving opinions to HT's competent bodies on alleged research misconduct cases involving HT staff, other than cases amounting to disciplinary offences or violations of HT's 'Organisational, Management and Control Model under Legislative Decree no. 231 - 8 June 2001';
-
- ▶ defining the methods, procedures, documents and forms to be used to submit research project proposals to the Committee's review;
-
- ▶ contributing to the development of activities, documents, internal procedures and guidelines aimed at implementing an 'ethics by design' approach in planning/drafting research projects and in HT's scientific activities;
-
- ▶ contributing to the development of research integrity activities, documents, internal procedures and guidelines;
-
- ▶ contributing to the development of ethical activities, documents, internal procedures, guidelines and toolkits on other ethically relevant issues pertaining to HT's activities;
-
- ▶ in cooperation with other HT structures, promoting educational and training activities focusing on research ethics and integrity for HT staff;
-
- ▶ contributing to the definition, where appropriate, of ethical standards, documents and forms required for the use of HT infrastructures by external users of HT's National Facilities.
-

2.4.2 DEVELOPMENT OF PARTNERSHIPS AND COLLABORATIONS WITH UNIVERSITIES AND RESEARCH INSTITUTES ON SCIENTIFIC RESEARCH PROJECTS



This activity is linked to the 'Partnerships, networking and stakeholder engagement' strategic objective and falls within the 'Research and Innovation' macro-category.

By developing partnerships and collaborations, HT generates positive effects on people's wellbeing and health, contributing to the progress of Sustainable Development Goal 3 'Good health and wellbeing'. This activity also has an economic impact, contributing to UN goal 9 'Industry, innovation and infrastructure': creating or being part of a network centred around scientific research projects with other entities, such as universities and research institutes, contributes to an increase in public and private research and development spending (which, as mentioned above, is one of the targets of Sustainable Development Goal 9).

In particular, one of HT's main objectives is to establish and develop partnerships with the Italian and international biomedical research community. In this regard, numerous discussions were conducted also in 2023 with regard to partnerships with universities, research centres, clinical research institutes, scientific societies and research networks both in Italy and abroad. These interactions led to the establishment and/or renewal of formal partnerships and the signing of several research collaboration agreements for joint projects with scientists from different universities, hospitals and research centres. The national universities and research hospitals involved in the above-mentioned collaboration projects include, among others, the Oasi Maria SS IRCSS, the Fondazione Regionale per la Ricerca Biomedica, the Scuola Internazionale Superiore di Studi Avanzati (SISSA),

Eurac, the University of Turin, Cluster Clan & Alisei, the University of Milan, the National Research Council, the Monasterio Foundation, Scuola Superiore Sant'Anna in Pisa.

Details of scientific collaborations and partnerships are constantly updated on HT's website ([Our Scientific Collaborations and Partnerships - Human Technopole](#)). Further information on HT's scientific collaborations can be found in section 2.3.7 'Partnerships, networking and stakeholder engagement' and in section 2.2.4 on 'Relational capital' of this document.

HT's openness to collaborations and partnerships with the biomedical community is crucial, as is their management. Ineffective management of such relationships can give rise to a competitive and reputational risk with potential negative effects on both available resources and HT's attractiveness. HT's commitment to the development and consolidation of external relations is thus continually ongoing.

HT's Organisational Regulations require that the Strategy and Scientific Affairs department, through the Scientific Relations, Partnerships and Collaborations Service, maintain relations with outstanding scientific institutions and organisations, offer new opportunities for scientific partnerships that are strategic to HT's Scientific Leadership, and identify, in coordination with the Legal department, the most appropriate form of legal agreement to support joint scientific projects between HT and external partners/collaborators.

2.4.3 SUPPORT FOR WORK-LIFE BALANCE AND PARENTHOOD



This activity is linked to the 'Sustainability (environmental, social and economic)' strategic objective and falls within the 'Social issues and people' macro-category.

Policies undertaken by HT to help support work-life balance generate positive effects on people's wellbeing, contributing to the progress of Sustainable Development Goal No. 8 'Decent work and economic growth'.

Since its inception, the Human Technopole Foundation has been greatly committed to creating and promoting a work environment that takes the wellbeing and work-life balance of its employees very seriously, enabling them to reconcile their professional and personal commitments.

Here are some of the initiatives promoted in this respect:

- ▶ remote working (up to 2 days per week) for employees with suitable positions/duties, regulated by a specific internal procedure;
- ▶ flexible working hours;
- ▶ training programmes;
- ▶ additional pension schemes;
- ▶ additional private health insurance for senior managers; corporate welfare programmes;
- ▶ extension of parental leave benefits and options in addition to what is usually provided for by national law;

- ▶ education allowances for impatriates whose children attend international schools;
- ▶ special agreements with day-care centres, close to the workplace, for employees with children;
- ▶ guest house services;
- ▶ in-house breastfeeding areas for working mothers;
- ▶ transparent remuneration policy, fully committed to ensuring equal pay for the same positions (see the Gender Equality Plan);
- ▶ support and assistance programmes for employees from abroad;
- ▶ counselling services for people's psychological wellbeing;
- ▶ support with the organisation of 'HT Club Houses', i.e. groups of employees who meet to socialise and pursue common interests (spontaneous initiatives concerning, for example, sport, culture, music, unrelated to their employment contract with HT);
- ▶ help for employees with the flu vaccination campaign;
- ▶ information and dissemination campaigns on healthy and sustainable habits concerning office activities;
- ▶ participation in non-work activities proposed in the MIND area;
- ▶ employee catering agreements including, among others, participation in the 'Zero Impact' service, consisting, through circularity dynamics, in the possibility for employees to have lunch at work in a sustainable manner, by using reusable containers provided by catering companies that have joined the programme.

2.4.4 EDUCATION AND TRAINING PROGRAMMES DEVELOPED FOR SCIENTISTS, INCLUDING BY PROMOTING INITIATIVES FOR THE EXCHANGE OF SCIENTIFIC KNOWLEDGE, RESEARCHER MOBILITY AND THE ORGANISATION OF SCIENTIFIC EVENTS



These activities are linked to the 'Talent attraction and training, and research output sharing' strategic objective as well as to the 'Scientific reputation and dissemination' strategic objective and fall within the 'Social issues and people' macro-category.

The activities undertaken by the Human Technopole Foundation generate positive effects on people, contributing to the progress of Sustainable Development Goal 4 'Quality education'.

During 2023, HT carried out several activities in the area of advanced scientific training, targeting both internal scientists and the external life science community.

Important training events and symposia were held at HT covering single-molecule sequencing technologies and applications, light imaging analysis and technology transfer.

In order to encourage mobility and the sharing of expertise, infrastructure and methods with the external research community, in 2023 HT also played host to more than **40** scientific visitors from thirty different research institutes in Italy and abroad.

For more information on training and education activities and dissemination initiatives, please refer to the appropriate sections of subchapter 2.3 'Strategy'.

2.4.5 EFFECTIVE WASTE MANAGEMENT



This activity is linked to the 'Sustainability (environmental, social and economic)' strategic objective and falls within the 'Environmental protection' macro-category.

Through effective waste management, the Human Technopole Foundation generates positive effects on the environment, contributing to the progress of the following sustainable development goals:

- ▶ 6 'Clean water and sanitation', which is also intended to reduce pollution by eliminating dumping and minimising the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and significantly increasing recycling and safer reuse globally;
- ▶ 11 'Sustainable cities and communities', which is intended, among other things, to reduce the adverse per capita environmental impact of cities, paying particular attention to air quality and municipal and other waste management;
- ▶ 12 'Responsible consumption and production', which includes the aim to substantially reduce waste generation through prevention, reduction, recycling and reuse.

In January 2023, the Human Technopole Foundation introduced a new internal procedure defining the management process for hazardous and non-hazardous waste produced by scientific research activities and the separate collection of waste produced by HT's administrative activities.

The internal procedure is based on the principles of conduct and protocols defined in HT's Organisational, Management and Control Model (Legislative Decree 231/01) that all corporate managers, each one for the aspects falling within their remit, must follow with regard to specific sensitive activities, in order to:

- ▶ prevent the environmental offences regulated by Legislative Decree 231/01 (Art. 25-undecies 'Environmental offences');
- ▶ ensure conditions of fairness and transparency in conducting company business.

Therefore, the approach adopted by HT aims to ensure that all operations and activities related to the material environmental impact of the waste management process, as assessed by the Initial Environmental Assessment (including impacts that might be produced by contractors, external maintenance providers or visitors), are conducted in a planned and controlled manner. These activities are aimed at preventing deviations from HT's procedures, objectives and environmental compliance obligations.

The HSE area has defined how waste produced by the Human Technopole Foundation is to be classified, collected, disposed of, transported and registered, ensuring:

- improved environmental performance;
- ▶ fulfilment of environmental compliance obligations;
- ▶ achievement of environmental objectives;
- ▶ prevention of incidents that may lead to spillages of waste and/or other substances and preparations from storage sites during internal handling prior to sending for disposal.

With regard to HT's activities, as at 31 December 2023, the following types of waste were registered:

EWC CODE	HAZARDOUS (H)/NON-HAZARDOUS (NH) WASTE	DESCRIPTION OF WASTE	WASTE DIRECTED TO RECOVERY (R)/DISPOSAL (D)	ANECO (DISPOSAL ENTITY) DISPOSAL DATA
15.01.10	H	Goods packaging	R13	Incineration with E recovery
18.01.03	H	Research activities in the biological laboratory		
19.09.05	NH	Research activities in the biological laboratory		
16.03.04	NH	Transport of goods	D15	Incineration without E recovery
17.06.03	H	Insulating material		
18.01.06	H	Research activities in the biological laboratory		
18.01.07	NH	Transport of goods	R13	60% materials recovery 40% incineration with E recovery
15.01.06	NH	Goods packaging		
20.03.07	NH	Furniture maintenance and renovation		
16.02.14	NH	Maintenance and renovation	R13	80% materials recovery 20% incineration with E recovery

R13: storage pending treatment.

D15: preliminary deposit.

In compliance with **GRI 306-2020**, details are provided of the waste handled in 2023. It should be noted that the data in the following tables have been drawn from the SOGER waste management system, based on the quantity of each type of waste and how it is handled (recovery or disposal).

HT's waste is sent to what is classified as a temporary storage facility that only performs type R13 (storage pending treatment) and D15 (preliminary deposit) operations, i.e. sorting and separating the quantities that can actually be recycled from those to be sent for disposal (incineration with energy recovery, incineration without recovery, landfill, etc.)

2023

COMPOSITION OF WASTE		UoM	WASTE GENERATED (306-3A)	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE DIRECTED TO DISPOSAL (306-5A)
150106	Mixed material packaging	Kg	1,463.00	877.80	585.20
150110*	Packaging containing residues of or contaminated by hazardous substances	Kg	195.00		195.00
160214	Discarded equipment, other than that mentioned in points 16 02 09 to 16 02 13	Kg	485.00	388.00	97.00
160304	Inorganic wastes other than those mentioned in 16 03 03	Kg	1,435.00		1,435.00
160601*	Lead-acid batteries	Kg	2,400.00	2,400.00	
160306	Organic wastes other than those mentioned in 16 03 05	Kg	0.00		
170603*	Other insulation materials containing or consisting of hazardous substances	Kg	70.00		70.00
180103*	Waste that must be collected and disposed of using special precautions to prevent the spread of infection	Kg	8,147.00		8,147.00
180106*	Hazardous chemicals or chemicals containing hazardous substances	Kg	5,565.00		5,565.00
180107	Chemicals other than those mentioned in 18 01 06	Kg	218.00		218.00
190905	Saturated or exhausted ion exchange resins	Kg	180.00		180.00
200307	Bulky waste	Kg	11,610.00	6,966.00	4,644.00
Total waste - ITALY		Kg	31,768.00	10,631.80	21,136.20

* hazardous substances.

2023

TOTAL WASTE GENERATED		OF WHICH SENT TO LANDFILL					
WASTE GENERATED	QUANTITY (KG)	QUANTITY (KG)	RECOVERY OPERATIONS			WHERE RECOVERY TAKES PLACE	
			WASTE PREPARED FOR REUSE	WASTE FOR RECYCLING	WASTE FOR OTHER RECOVERY OPERATIONS	ONSITE	OFFSITE
HAZARDOUS WASTE	16,377.00	2,400.00					
150110*	195.00	-					
160601*	2,400.00	2,400.00		Yes			Yes
170603*	70.00	-					
180103*	8,147.00	-					
180106*	5,565.00	-					
NON- HAZARDOUS WASTE	15,391.00	8,231.80					
150106	1,463.00	877.80		Yes			Yes
160214	485.00	388.00		Yes			Yes
160304	1,435.00	-					
180107	218.00	-					
190905	180.00	-					
200307	11,610.00	6,966.00		Yes			Yes
TOTAL WASTE GENERATED	31,768.00						

* hazardous substances.

2023

TOTAL WASTE GENERATED		OF WHICH SENT TO LANDFILL		DISPOSAL OPERATIONS		WHERE DISPOSAL TAKES PLACE	
WASTE GENERATED	QUANTITY (KG)	QUANTITY (KG)	INCINERATED WASTE (WITH ENERGY RECOVERY)	INCINERATED WASTE (WITHOUT ENERGY RECOVERY)	WASTE SENT TO LANDFILL	ONSITE	OFFSITE
HAZARDOUS WASTE	16,377.00	13,977.00					
150110*	195.00	195.00	Yes				Yes
160601*	2,400.00	-					
170603*	70.00	70.00	Yes				Yes
180103*	8,147.00	8,147.00	Yes				Yes
180106*	5,565.00	5,565.00		Yes			Yes
NON- HAZARDOUS WASTE	15,391.00	7,159.20					
150106	1,463.00	585.20	Yes				Yes
160214	485.00	97.00	Yes				Yes
160304	1,435.00	1,435.00		Yes			Yes
180107	218.00	218.00		Yes			Yes
190905	180.00	180.00	Yes				Yes
200307	11,610.00	4,644.00	Yes				Yes
TOTAL WASTE GENERATED	31,768.00						

* hazardous substances.

As for waste transport management, following an assessment of the carriage of dangerous goods by road and the type of waste produced, the Human Technopole Foundation appointed a qualified professional as transport safety consultant. The aim is to help ensure safety during carriage in compliance with the requirements of the ADR, i.e. the European Agreement concerning the International Carriage of Dangerous Goods by Road.

The following information is provided with regard to the impacts of waste transport on atmospheric emissions:

- ▶ KPI = tons CO₂ / tons transported waste;
 - ▶ CO₂ consumed = litres consumed * emission coefficient;
 - ▶ Emission coefficients kg CO₂ / litres Diesel.
- In 2023, the KPI of tons CO₂ / tons transported waste was 0.05, while the total tons of CO₂ emitted for waste transport was 1.453.

Details of emissions calculated in accordance with GRI 305 are given below.

EMISSIONS				
	UNIT OF MEASUREMENT	2021	2022	2023
SCOPE 1	tons CO ₂ eq	7.418	6.650	385.664
SCOPE 2 (location-based)	tons CO ₂ eq	1,551.84	2,623.43	2,681.45
SCOPE 2 (market-based)	tons CO ₂ eq	0.00	280.04	755.32
SCOPE 3	tons CO ₂ eq	0.062	1.174	1.453

RADIOACTIVE WASTE MANAGEMENT

IN 2023, HT produced **radioactive waste from research activities**, albeit in insignificant quantities. This is due to the use of radioactive matter within the Cryo-Electron Microscopy Facility, where uranyl acetate is used as a medium to create fluorescence in samples analysed by electron microscopes. The waste generated by these activities consists of physical media and absorbent material contaminated by uranyl solutions, prepared at 2% concentrations in a few ml of distilled water.

Radioactive waste is characterised by radiological content, which is classified into categories according to the concentration of radionuclides and the time required for radioactivity to decay. In Italy, such waste is classified, according to the *Decree of 7 August 2015*, into **five categories** based on radioactivity content:

- ▶ very short-lived waste,
 - ▶ very low-level waste,
 - ▶ low-level waste,
 - ▶ intermediate-level waste,
 - ▶ high-level waste
- and specific disposal solutions are identified for each category⁵.

The resulting radioactive waste and equipment contaminated by material (slides, gauze, tissue paper and other disposable material) are collected in airtight polyethylene cans which are then placed inside steel bins provided by Campoverde, an authorised collection company. A label or accompanying sheet is placed on each bin, indicating the type of radionuclide and the overall activity. When the containers are full, pick-up is arranged through the STRIMS communication portal, i.e. the Waste, Materials and Sources Traceability System set up by the National

Inspectorate for Nuclear Safety and Radiation Protection. On the day of collection, the containers are placed in a steel bin reporting all the information on the product contained (radionuclide, activity, physical state, closure date) and delivered to Campoverde.

The integrated management of radioactive waste

from research activities, within which HT falls, is regulated by Article 74 of Legislative Decree No. 101 of 31 July 2020. The Integrated Service, managed by ENEA, guarantees all phases of the management cycle of radioactive waste and sources no longer used in the medical, industrial and scientific research sectors.

The figure below shows the integrated management flow of radioactive medical waste.

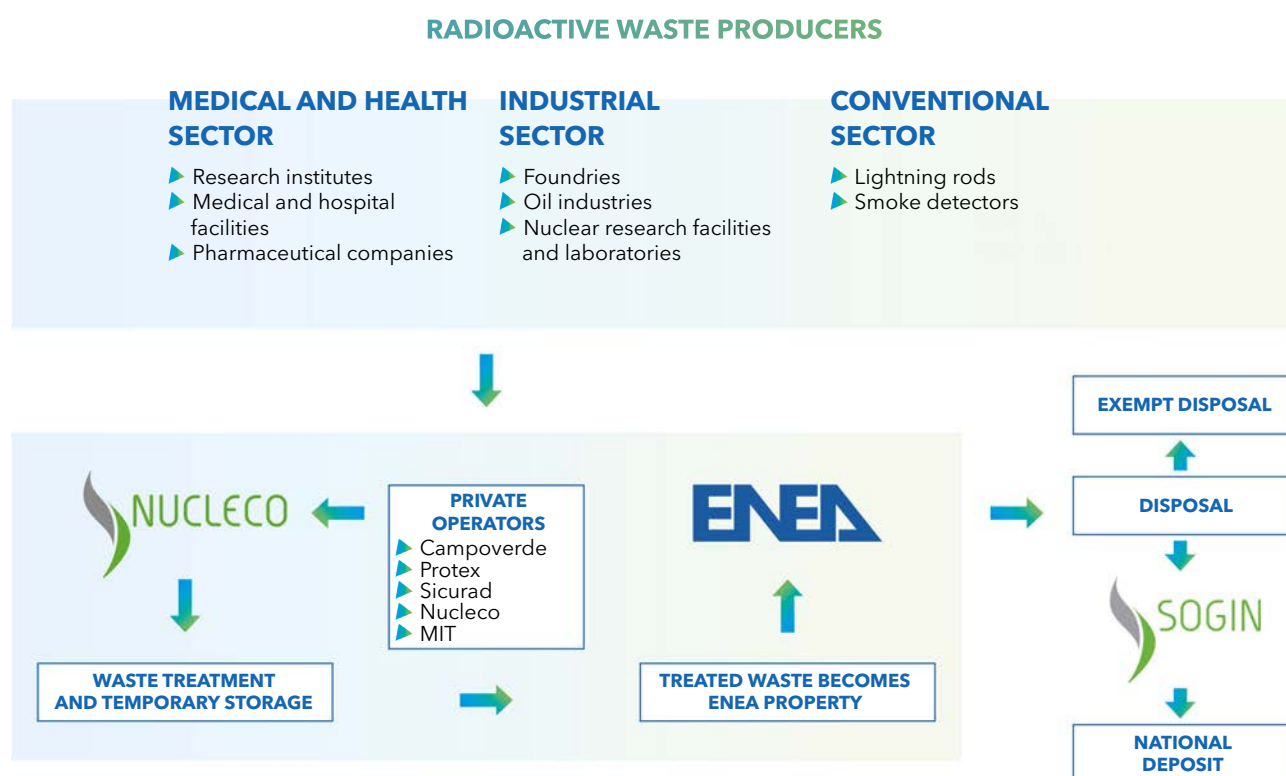


Figure 1. Integrated management of radioactive waste of medical-health origin.⁷

⁴ DECREE 7 August 2015. Classification of radioactive waste under Article 5 of Legislative Decree No. 45 of 4 March 2014.

⁵ <https://www.depositonazionale.it/>; https://www.depositonazionale.it/raccoltadocumenti/linee-guida/guida_tecnica_n26_gestione_rifiuti_radioattivi.pdf

⁶ LEGISLATIVE DECREE 31 July 2020, no. 101 Implementation of Directive 2013/59/Euratom, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom and reordering of sector legislation to implement Article 20, paragraph 1 a) of Law No 117 of 4 October 2019. (20G00121) (OJ General Series No. 201 of 12-08-2020 - Ordinary Suppl. No. 29)

⁷ <https://www.eai.enea.it/component/jdownloads/?task=download.send&id=280&catid=10&Itemid=101>



Figure 2. Uranyl Acetate radioactive waste management at the Human Technopole Foundation

Lastly, the HSE area reports that no damage was caused to the environment during 2023 and, therefore, no definitive sanctions or penalties were imposed for environmental offences or damage; two Environmental Non-Compliances (NC) were recorded due to the emission of HFC gas from equipment used to provide air-conditioning to buildings and whose details are reported below.

DETAILS OF ENVIRONMENTAL NON-COMPLIANCE MANAGEMENT

The use of heat pumps for both summer and winter air-conditioning is a more sustainable solution than other types of thermal systems as it involves the use of electricity mainly from renewable sources and avoids fossil fuel combustion. However, these systems are exposed to the risk of emitting refrigeration cycle gases, usually fluorinated gases (HFCs), which fall within the category of GHGs, i.e. greenhouse gases. In 2023, two greenhouse gas emissions were recorded in relation to two air-conditioning systems. This was caused by the breakage of parts of the system in which the gas circulates, which was then repaired and followed by virgin gas feeding. The gas released during these two events was R410A (gwp 2088) with a total of 381.06 Tons of CO₂ equivalent. The causes identified were neither due to any neglect of maintenance activities, which were carried out regularly, nor to construction defects. The corrective action that was implemented on these

systems was limited to repairing the leak. It was also decided to perform a leakage check on these machines twice as often as required by the relevant law. This means checking this specific equipment every three months rather than every six months.

ZERO IMPACK

HT has joined the 'Circular Food Delivery' service provided by an innovative food-tech start-up whose mission is to change the packaging paradigm from product to service so as to make 'reuse' the new standard. The service offered to HT means that employees can order their meal from the Zero Impack App and receive their lunch directly at work in reusable containers that are later retrieved, sanitised and put back into circulation. This process eliminates packaging waste and drastically reduces the environmental impact. The project also contributes to raising awareness of sustainability and reuse issues, which are extremely topical and high on the European political agenda. In 2023 (starting from April), 25,272 meals were delivered to HT in 35,177 containers via the food delivery service. Assuming an average weight of 100 g of such disposable containers, waste was reduced by approximately 3.5 tonnes.

2.4.6 ACTIVITIES AND PROGRAMMES FOR THE DEVELOPMENT OF THE 'CENTRE FOR INNOVATION AND TECHNOLOGY TRANSFER'



This activity is linked to the 'Innovation through research' strategic objective and falls within the 'Research and innovation' macro-category.

By developing programmes that are designed to promote the commercialisation of intellectual property and technology transfer of research findings to the market, the Human Technopole Foundation can generate positive effects on economic resources, contributing to the progress of Sustainable Development Goal 9 'Industry, innovation and infrastructure'. In fact, with this activity, HT supports the UN's aim of encouraging innovation, technological development and research, with ensuing implications, including financial ones. The activity also has potential positive effects on people, contributing to the progress of Objective 8 'Decent work and economic growth', which also aims to promote decent job creation and entrepreneurship.

With reference to this activity, it should be recalled that pursuant to Article 49-bis of Decree-Law No. 34 of 19 May 2020 (converted into Law No. 77 of 17 July 2020), the Human Technopole Foundation has been assigned the task of establishing a 'Centre for Innovation and Technology Transfer in the life science field' and has been endowed with adequate financial resources to foster innovative processes proposed by public and private entities from the research and innovation system.

Following a complex consultation with sector stakeholders, aimed at identifying the needs of the various parties involved in the technology transfer process, in July 2021 HT set up an in-house department dedicated to supporting the growth of the Tech Transfer (TT) culture in the Italian life science ecosystem.

For details of the activities carried out by CITT, please refer to sub-chapter 2.3.5 'Innovation through research (*Technology Transfer*)'.

2.4.7 DEVELOPMENT AND SHARING OF SUSTAINABLE AND INNOVATIVE BUILDINGS AND INFRASTRUCTURES (NATIONAL FACILITIES)



This activity is linked to the 'Development and provision of infrastructure and innovative research tools' strategic objective and falls within the 'Research and innovation' macro-category.

HT can generate positive impacts on the environment, economic resources and personal wellbeing by developing an 'open innovation' strategy that can ensure the transparent and effective use of HT's infrastructures (National Facilities), making them available to the national scientific community. HT can thus contribute to the progress of Sustainable Development Goals 9 'Industry, innovation and infrastructure' (focused on creating quality, sustainable and inclusive infrastructures to support economic development and the wellbeing of individuals, whilst considering environmental protection) and 11 'Sustainable cities and communities' (focused also on the idea of shared spaces, participation and integration within the community).

As regards this material topic, it should be recalled that the Agreement signed on 30 December 2020 between the Ministry of Economy and Finance, the Health Ministry, the University and Research Ministry and the Human Technopole Foundation regulates the identification of National Facilities (NFs) with a high technological impact, to be built on the HT Campus. These facilities will be accessible to the national and international scientific community to conduct high quality research in their respective fields, regardless of the institution they belong to.

For the purposes of defining National Facilities under the Agreement, it was decided to apply the definition of 'research infrastructure' introduced by the European Strategy Forum for Research Infrastructures (ESFRI), i.e. facilities, expertise, resources and related services used by the scientific community to conduct high quality research in their respective fields, regardless of the institution or country they come from.

It is recalled that a two-level public consultation open to the national scientific community was conducted in previous years to identify the National Facilities to be implemented on the HT Campus; based on the findings of such consultation, in 2023 the Supervisory Board decided to implement the first five National Facilities with high technological impact, available to the national research community.

The National Facilities identified are:

- ▶ National Facility for **Genomics**
- ▶ National Facility for **Genome Engineering and Disease Modelling**
- ▶ National Facility for **Structural Biology**
- ▶ National Facility for **Light Imaging**
- ▶ National Facility for **Data Handling and Analysis**

Each National Facility, which is scheduled to be implemented as from 2024, will include specific operating units called Infrastructure Units (IUs), defined as the set of people, tools, resources, technological procedures and state-of-the-art experimental protocols required for a specific thematic line of research.

Access to the National Facilities by external users affiliated with Universities, Research and Healthcare Scientific Institutes (IRCCS), and Public Research Institutions will be supported by open access calls as provided for by Law 160/2019, Art. 1, para. 276, letter b. Access will be granted on the basis of the principles of scientific excellence, with the aim of supporting quality research. The quality of applications will be assessed and approved by an independent panel of experts, the Independent Permanent Evaluation Commission (CIVP), which will also define the selection procedures to access the National Facilities as laid down in Article 6 of the Agreement.

The CIVP members selected and appointed by the Supervisory Board of the Human Technopole Foundation on 15 November 2023, of which Prof. Walter Ricciardi, Chairman of the HT Scientific Committee, is also an ex officio member, are (in alphabetical order):

- ▶ **Prof. Juha Kere**, Professor of Molecular Genetics, Department of Biosciences and Nutrition, Karolinska Institute, Stockholm, Sweden;
- ▶ **Prof. Filippo Mancia**, Professor of Physiology and Cellular Biophysics, Department of Physiology and Cellular Biophysics, Columbia University, New York, United States;

- ▶ **Prof. Samuele Marro**, Associate Professor of Neuroscience and co-director of the Stem Cell Engineering Core, Black Family Stem Cell Institute, Icahn School of Medicine at Mount Sinai, New York, USA;
- ▶ **Dr. Jan Peychl**, Senior Service Leader, Light Microscopy Facility, Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany.
- ▶ **Prof. Giampietro Schiavo**, Professor of Cellular Neuroscience, Department of Neuromuscular Diseases, Queen Square Institute of Neurology, University College London, UK;
- ▶ **Prof. Maria Secrier**, Associate Professor in Computational Cancer Biology, Institute of Genetics, Department of Genetics, Evolution and Environment, University College London, UK;
- ▶ **Prof. Arianna Tucci**, Associate Professor in Genomic Medicine at Queen Mary University of London, UK;
- ▶ **Dr Virginie Uhlmann**, Group Leader, European Bioinformatics Institute (EMBL-EBI), Cambridge, UK and Director of the BioVisionCenter, University of Zurich, Switzerland;

For further information on National Facilities, HT has published the necessary information and documentation on its website at: [National Facilities - Human Technopole](#).

2.4.8 DEVELOPMENT OF JOB OPPORTUNITIES FOR RESEARCHERS AND ADMINISTRATIVE STAFF



This activity is linked to the 'Talent attraction and training, and research output sharing' strategic objective and falls within the 'Social issues and people' macro-category.

HT generates positive impacts on people and the economy by developing job opportunities for researchers and administrative staff, contributing to the progress of Sustainable Development Goals 9 'Industry, innovation and infrastructure' and 8 'Decent work and economic growth'.

One of HT's primary goals is to attract talent by offering an international and highly cooperative work environment for high-quality interdisciplinary research in a dynamic setting, with independent research teams capable of attracting graduates and post-doctoral fellows and offering access to state-of-the-art facilities.

HT aims to attract the most talented scientists and administrative staff, focusing on their expertise and professionalism through selection processes that comply with international standards and are managed through open and transparent calls.

To develop and expand job opportunities, HT offers working conditions that are in line with leading international research centres and are enriched by a series of high-level financial, welfare and insurance benefits.

The Human Technopole Foundation is also committed to providing its employees with a flexible work environment in order to promote a good work-life balance.

The current and expected increase in HT's staff entails possible negative environmental consequences of rises in CO₂ emissions due to increased staff mobility and traffic.

Therefore, as early as 2022, HT appointed a Mobility Manager and tasked the latter with drawing up and approving HT's first Commuting Plan. After an initial section describing the internal and external context of HT, the Plan defines the areas requiring action and the corresponding roadmap, based on severity and urgency, also considering HT's relationship with other entities/companies in the area. In particular, the Plan includes proposed measures for each area, accompanied by technical specifications, objectives to be pursued, implementation methods and monitoring activities. In 2023, some activities proposed in the Plan were actually implemented, including the following:

- ▶ carpooling was encouraged and promoted by conducting awareness-raising campaigns and creating duly marked parking spaces reserved for carpooling employees. In addition, an important contribution to the achievement of this goal was the launch of the **HTCarpooling App**, i.e. an App (available on the web or downloadable on smartphones) where drivers can enter their commuting itinerary and be contacted by other commuters to arrange carpooling.

- ▶ an awareness-raising campaign on the use of public transport was carried out by publishing, on HT's intranet, a few virtuous case histories of colleagues using alternative means of transport to a private car (e.g. metro, train, bicycle, skateboard). Internal communication activities were also carried out to update employees on public transport bonuses granted by the Italian Government and tell them about the benefits of sustainable mobility;
- ▶ employees using public transport were constantly updated, in a specific section of HT's intranet, about strikes or critical issues. In addition, maps of the cycle-pedestrian routes that can be used to reach the Campus were made available;
- ▶ HT's fleet of bicycles available to employees was improved;

With regard to the MIND area and electric mobility, HT employees can also use electric vehicle charging stations.

In the last months of 2023, employees were asked to fill out the 'Commuting questionnaire of the Human Technopole Foundation (2023)' in order to obtain an up-to-date picture of their mobility-related habits and take the next steps to improve HT's sustainability as early as 2024.

The priorities identified by employees included: (i) the launch of a more structured communication plan aimed at raising awareness of sustainable mobility issues, also by organising corporate events and activities, (ii) the promotion of bicycle and/or scooter mobility by exploring the possibility of signing special agreements for the purchase of bicycles, e-bikes, scooters, etc., so as to improve micro-mobility in the MIND Area, (iii) the further promotion of carpooling, also by offering bonuses (to be defined) to regular carpooling employees so as to improve micro-mobility in the MIND Area.

2.4.9 ACHIEVEMENT OF GENDER BALANCE IN SENIOR, LEADERSHIP AND DECISION-MAKING POSITIONS



This activity is linked to the 'Sustainability (environmental, social and economic)' strategic objective and falls within the 'Gender equality' macro-category.

HT can generate positive impacts on people through activities aimed at achieving gender equality in senior job positions, thus contributing to the progress of Sustainable Development Goal 5 'Gender equality'.

Equal opportunities, gender equality and diversity maximisation have always been a cornerstone of HT's values. In accordance with the *Regulation for Equality, Diversity and Inclusion at Work*, HT is committed to valuing, protecting and providing support to all staff members so as to build an inclusive culture among colleagues and potential new hires, regardless of their nationality, religion, ability, age, cultural background, gender identity and sexual orientation.

HT has formalised this ongoing commitment to gender equality by defining an action plan for the implementation of its gender equality policy, namely the Gender Equality Plan (GEP), also known as the Gender Equality Strategic Plan (reference standard: UNI/ PdR 125:2022). The GEP meets the need to ensure a fair working environment where diversity is seen as a value, and describes the set of actions and measures that HT has adopted and intends to adopt to promote and guarantee equal opportunities in the workplace, measuring the progress of results through specific key

performance indicators. The Plan, valid for the 2022-2024 period, sets out the framework and measures that the Human Technopole Foundation will pursue to promote and improve gender equality within the organisation. GEP's update is submitted to the Management Committee and the Sustainability Committee for approval, then to the Supervisory Board and the President. In accordance with the eligibility criteria of Horizon Europe's Gender Equality Plan. HT's GEP:

- ▶ is a public document, available on HT's web page ([Gender-Equality-PlanITA-2.pdf\(humantechnopole.it\)](#)), and is periodically updated, reviewed and distributed within the organisation;
- ▶ provides for data collection and monitoring and for an annual report covering the relevant objectives, indicators and progress assessments;
- ▶ establishes specific training dedicated to gender equality issues and intended for the Human Technopole Foundation as a whole, including activities for specific topics or groups of people;
- ▶ has dedicated resources: in order to monitor GEP implementation and progress, its updating and the management of the allocated budget, the Human Technopole Foundation has established the Gender Equality Team (GET), coordinated by HT's Director of Administration and consisting of members and collaborators.

HT's GEP is in accordance with a national and international framework that includes: (i) the Guidelines of the European Institute for Gender Equality (EIGE, <http://eige.europa.eu>) that are aimed at "identifying and implementing innovative strategies to foster cultural change and promote equal opportunities" in universities and research centres; (ii) the European Union's Horizon Europe Research and Innovation Programme, the EU's largest research and innovation funding programme; (iii) the UNI/PdR 125:2022 Guidelines on the gender equality management system, concerning national gender equality policies within organisations.

In line with this framework, the Plan was drafted by analysing HT's context and needs, also thanks to a participatory process involving staff, after performing an in-depth quantitative analysis and a thorough internal consultation process involving the Sustainability Committee (Environment, Social, Governance) and the Gender Equality Team.

Consistent with the UNI/ PdR 125:2022 Guidelines on the gender equality management system, the Human Technopole Foundation has put in place several tools, namely:

1. a workplace equality, diversity and inclusion regulation, representing HT's global gender equality policy;
2. a gender equality management system that implements the relevant processes (planning and leadership, training, document management, indicator monitoring, internal and external communications, internal audits, management of non-compliant situations, periodic review, improvement);
3. processes governed by internal procedures and regulations related to the topics covered by the guidelines (recruitment, career, equal pay for equal work, parenthood and family care, work-life balance, prevention of abuse and harassment);
4. KPIs measuring the progress of the level of inclusiveness and respect for gender equality in different areas, by attributing to each of them a percentage with which to set the starting level and monitor progress.

The areas indicated by the guidelines are: KPI 1. Culture and Strategy, KPI 2. Governance, KPI 3. Human Resources management processes, KPI 4. Growth, career opportunities and inclusion, KPI 5. Equal pay for equal work, KPI 6. Parenthood, family care and work-life balance.

Based on the national reference framework, GEP's objectives are aligned with the areas suggested by the European Union's Horizon Europe Research and Innovation Programme and are structured into five topics:

- ▶ Gender balance in leadership and decision-making. Improving decision-making processes by addressing gender and other prejudices in order to meet new opportunities for excellence;
 - ▶ Gender equality in recruitment and career progression. Human resources management and development processes must ensure inclusion, gender equality and integration throughout the employee's life cycle: selection, general terms and conditions of contract, neutral onboarding, performance appraisals, equal pay for equal work. Promoting the career development of both female and male employees and, in particular, encouraging women to pursue scientific careers;
 - ▶ Work-life balance and organisational culture. Supporting parenthood and family care and promoting a healthy work-life balance;
 - ▶ Integration of the gender dimension into research and teaching content. Integrating the gender variable into scientific research as part of a broader commitment to diversity;
 - ▶ Measures against gender-based violence, including sexual harassment. Activities preventing all forms of physical, verbal, digital abuse (harassment) at work.
-

With respect to gender equality issues, in 2023 a campaign was conducted to assess HT staff's satisfaction.

A total of 68 people, i.e. 23% of HT's staff at the date of the survey, filled in the anonymous questionnaire, which was submitted to the entire staff. The questionnaire asked employees to assess their satisfaction, measured with a score of 1 to 5, with a number of topics related to gender equality: recruiting, career management, equal pay for equal work, parenthood, work-life balance, prevention of abuse and harassment.

Overall, the staff's satisfaction with these topics amounted to 70% (average score of 3.5), with the lowest satisfaction levels (62%) being recorded with respect to parenthood and the highest (80%) with respect to work-life balance. The issues for which satisfaction was lowest (less than 60%), and on which the GEP will have to take more decisive action, include:

- ▶ transparency in career communication (56%);
- ▶ pay transparency (58%);
- ▶ transparency in bonus and benefit criteria (54%);
- ▶ the effectiveness with which parental leave is promoted (58%).

Conversely, the issues for which satisfaction was highest (more than 80%) are:

- ▶ gender neutrality in selection (86%);
- ▶ discretion in matters of marriage and pregnancy and family responsibilities (82%);
- ▶ gender neutrality in job descriptions (88%);
- ▶ technological media enabling smart working and meetings (86%).

The open-ended responses also highlighted the following issues: (i) the promotion of training for managers on gender equality and wellbeing in the workplace, (ii) the strengthening of support for parenthood, both from an organisational and economic point of view, (iii) the importance of gender-inclusive policies, starting with the idea that gender equality at work is linked to the possibility for women to balance paid work with family care.

Therefore, the findings suggest possible areas for improvement, such as an increase in transparency and the promotion of parenthood policies for both men and women.

2.4.10 RESPONSIBLE SUPPLY CHAIN MANAGEMENT



This activity is linked to the 'Sustainability (environmental, social and economic)' strategic objective and falls within the 'Social issues and people' macro-category.

HT can generate positive effects on the environment, economic resources and people's wellbeing from responsible supply chain management, with a focus on environmental and social sustainability requirements. This activity can contribute to the progress of Sustainable Development Goals 8 'Decent work and economic growth' (which focuses on promoting decent jobs for all) and 12 'Responsible consumption and production' (which also refers to the promotion of sustainable procurement practices in accordance with national policies and priorities).

To operate and perform its institutional duties, HT procures works, services and supplies in compliance with Legislative Decree No. 50 of 18 April 2016, as amended, and the current law on public tenders and contracts, namely Legislative Decree 36/2023.

When awarding public contracts, HT acts in compliance with the principles of cost-effectiveness, efficiency, timeliness and fairness, also respecting the principles of free competition, non-discrimination, transparency, proportionality and disclosure, as well as the principle of rotating invitations and awards in those procedures that require it.

HT also pays particular attention to energy and environmental sustainability criteria, as well as situations that may lead to conflicts of interest.

Economic operators wishing to bid for Human Technopole Foundation tenders are required to accept compliance with the Code of Ethics laying down the systems of values and rules of conduct that must be constantly referred to in the pursuit of business and that must inspire the conduct of anyone working in the interest of HT, regardless of their, even temporary, relationship with it.

As early as 2021, the Human Technopole Foundation issued a specific 'Purchasing Regulation', revised in September 2022, which governs the procurement, award, conclusion and performance of HT public procurement contracts.

For every tender, HT guarantees:

A	optimal use of resources needed for the selection process or contract performance, in application of the principles of efficiency and cost-effectiveness;
B	appropriateness of its actions with respect to the achievement of the intended purpose and public interest, in application of the principle of effectiveness;
C	no groundless protraction of the contractor selection process, in application of the principle of timeliness;
D	fair conduct and good faith both in the award stage and in the performance stage, in application of the principle of fairness;
E	access to the tendering process of all potentially interested stakeholders, in application of the principle of free competition; fair and impartial evaluation of bidders and removal of obstacles or restrictions
F	in preparing and assessing bids, in application of the principle of non-discrimination and equal treatment; accessibility of tender procedures and use of tools that ensure
G	quick and easy access to information about the tender, in application of the principles of transparency and disclosure;
H	appropriateness and suitability of the action to the purpose and amount of the contract, in application of the principle of proportionality;
I	relationships with an open number of economic operators, ensuring an equal opportunity for all economic operators of being awarded a public tender, in application of the principle of rotating invitations and awards; specification in tender documents of the minimum environmental criteria required by the
J	law in force, in application of energy and environmental sustainability criteria; adoption of appropriate measures to prevent and resolve conflicts of interest both during
K	tendering and contract performance, in application of the principle of preventing and resolving conflicts of interest.

Also through the development of digitisation projects and the effective organisation of procurement activities, HT seeks to match the timelines established by internal requirements, in terms of the purchase of goods and services

needed to carry out institutional activities, to those necessary to comply with the obligations laid down by current procurement and public contract regulations.

2.4.11 SUSTAINABLE CONSUMPTION MANAGEMENT AND DEVELOPMENT OF ENERGY EFFICIENCY PROGRAMMES



These activities are linked to the 'Sustainability (environmental, social and economic)' strategic objective and fall within the 'Environmental protection' macro-category.

The activities undertaken by the Human Technopole Foundation generate positive effects on the environment as a result of sustainable consumption management and the development of energy efficiency programmes, thus contributing to the progress of Sustainable Development Goal 7 'Affordable and clean energy'.

Of great significance for HT's contribution to the progress of this SDG is its appointment of an Energy Manager.

The Energy Manager, a position formally introduced in Italy by Article 19 of Law no. 10 of 9 January 1991, is responsible for energy conservation and rational use by energy-intensive consumers, which are required to appoint such figure every year. The Energy Manager's duties include:

- ▶ energy consumption data collection;
- ▶ energy consumption data analysis;
- ▶ energy budget preparation;
- ▶ promotion of efficient energy use within his organisation.

The Energy Manager supports management bodies with regard to the best use of energy within the organisation, performing facility management, end-user awareness raising and energy efficiency improvements.

The required nature of the Energy Manager's appointment depends on the volume of TOE (Tonnes

of Oil Equivalent), i.e. the unit of measurement for energy budgets (local or corporate), expressing primary or end-use energy consumption, with a single unit for each energy carrier (electricity, gas, oil, etc.). In the industrial sector, the appointment is required if consumption exceeds 10,000 TOE/year, while in other sectors this figure is 1,000 TOE/year. In general, when assessing whether the obligation thresholds have been reached, all energy handled by a company/entity is to be taken into account, regardless of whether it is paid for or free (e.g. renewables used for electricity generation), refers to owned or leased property, is purchased directly or under energy service contracts. If the threshold is not reached, an Energy Manager may still be appointed, especially to demonstrate sensitivity to the issues of rational energy use and sustainability.

As far as HT is concerned, an internal Energy Manager was appointed in 2022 for the year 2023, who started to arrange for several energy efficiency activities to be implemented in the near future. As of 2024, the Energy Manager position will be outsourced; in particular, HT has planned a number of activities and areas of intervention, which include the implementation of a new energy monitoring system, the preparation of an energy diagnosis under Legislative Decree 141/2016, consumption containment management activities to be agreed with plant operators, the administrative management of photovoltaic plants, generator sets and other electricity production points, efficiency and decarbonisation solutions, and periodic consumption management audits.

With regard to energy consumption data collection, at the operating level, the electrical energy analysers on Campus allow viewing directly from the interface of the switchboard device.

The analysers can record both instantaneous consumption and total energy consumption for each HT building. The existing installations are without remote connection, with the exception of the North Pavilion building where it is already configured on the Building Management System (BMS). Current monitoring involves the daily collection of displayed data and their storage by the Campus Development & Facility Management area on HT's SharePoint for subsequent analysis and modelling. Although this activity temporarily makes up for an effective energy monitoring system, it is essential to collect a significant amount of energy data, which must necessarily include seasonal changes, the completion of scientific installations and the actual use of all utilities.

In 2023, consumption data were also collected by the maintainer directly from the available reading equipment; yet, consumption certification, i.e. the possibility of verifying how much a building or, in more detail, a facility or even an individual research laboratory consumes, can only take place upon installation of a power-metering system.

An external maintainer will be appointed for such energy monitoring service, supported by MID technology applied to metric instruments for legal measurements, on the basis of a Campus customised offer.

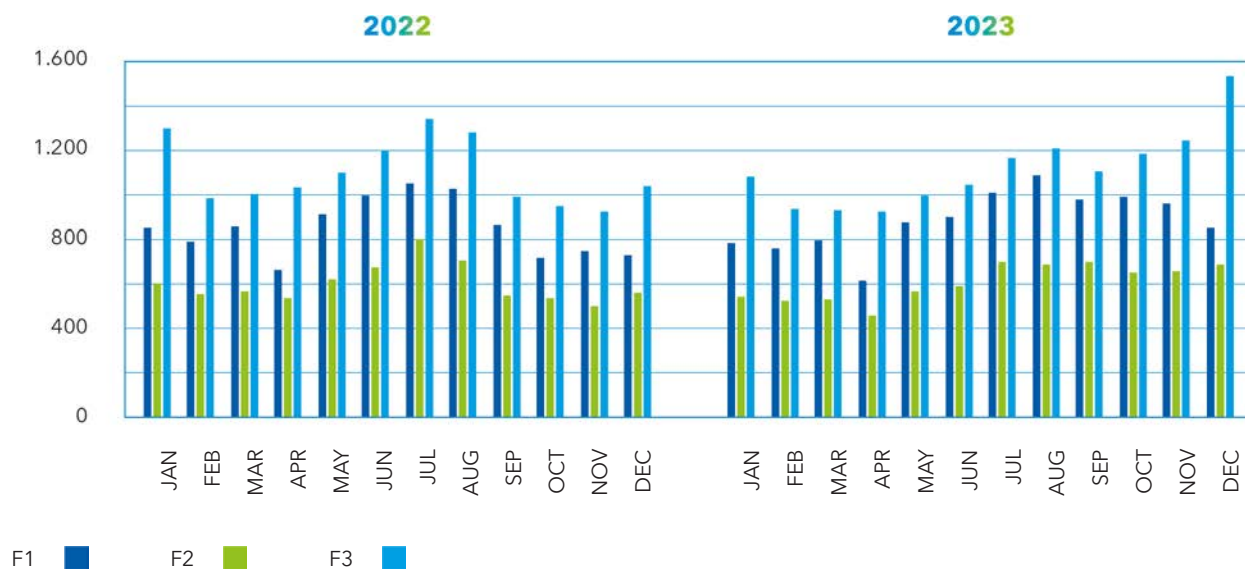
In any case, it should be borne in mind that 2023 was a construction and reactivation year for the Palazzo Italia offices, but also for the South Pavilion itself, which is also still being fitted out internally, even though its service facilities can now be considered as fully operational.

INFORMATION ON ELECTRICITY CONSUMPTION IN 2023

The following tables show electricity consumption in 2022 and 2023, as well as the estimated energy potentially produced by the photovoltaic systems installed on the HT Campus buildings that will come into service shortly. Approximately 81% of electricity consumed in 2023 was produced by renewable sources following implementation of the **green option** under a Consip agreement signed in 2021. It should be noted that this agreement guarantees 100% renewable energy; yet, the relevant contract expired in October 2023 and did not allow for the option to be used in full.



Electricity consumption in 2022 and 2023:

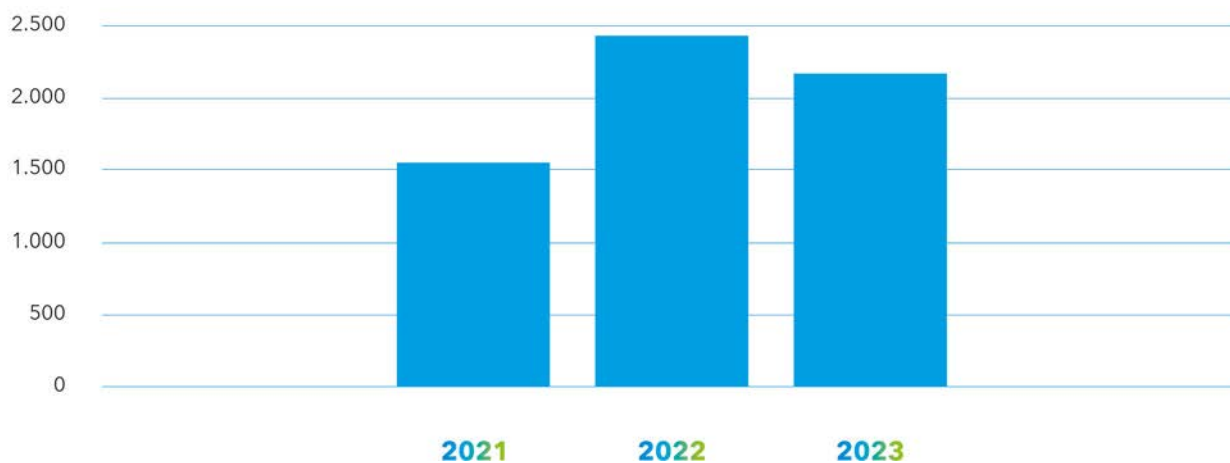


* The table uses the following conversion factor: kWh to GJ.

Energy intensity calculated for 2023 as the ratio of energy consumed by HT to the net area in m² amounts to: 0.42965 (MWh/m² ratio), i.e. 1.55 GJ/m².

The diagram below shows **emission savings arising from the use of renewable electricity**.

Tonnes of CO₂eq saved by renewable electricity consumption:



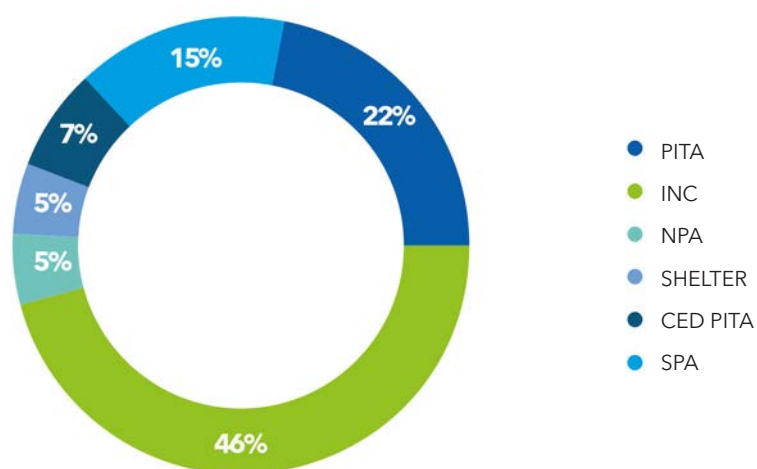
Estimated energy to be produced by the photovoltaic plants due to come into service shortly:

ENERGY FROM PHOTOVOLTAIC PLANTS

BUILDING	GJ PER YEAR ESTIMATED FOR 2024
Palazzo Italia	268
North Pavilion	47
South Pavilion	123
Incubator Labs	144
TOTAL	582

The image below shows the estimated energy consumption distribution on the HT Campus after re-activating the South Pavilion:

CONSUMPTION DISTRIBUTION: HT CAMPUS (%)



It also shows the Giga Joule equivalent of the energy produced by gas oil consumption to ensure the ongoing operation of facilities in the event of a breakdown. Consumption is mainly due to routine checks (twice weekly) and checks every two months whilst loaded:

In 2023, direct GhG emissions from gas oil consumption amounted to 4.604 Tons CO₂eq.

ENERGY GENERATED BY E.G. IN 2023

GJ*	9.35
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* Conversion factor: litres to GJ (3.6*10⁻³).

INFORMATION ON WATER CONSUMPTION IN 2023

With regard to water consumption, please find below the results of the calculations based on HT Campus staff's pro-capita consumption. Please note that water withdrawal/consumption data entered in the following table

(GRI 303-4) for 2023 are estimated on the basis of the data measured by the meters in the period since their installation, from which average consumption was then drawn to estimate annual consumption. Water discharge data entered in table GRI 303-3 are taken as being total estimated consumption (8.44 MI) less the amount sent for disposal as waste.

The tables under GRI 303-3 / 303-4 with comparisons to previous years are shown below

GRI 303-3

WATER WITHDRAWAL FROM THIRD PARTIES (WATER SUPPLIERS) BY SOURCE (in megalitres)	2021	2022	2023
	TOTAL	TOTAL	TOTAL
Groundwater	1.32	3.01	8.44
TOTAL	1.32	3.01	8.44

GRI 303-4

WATER DISCHARGE BY SOURCE AND BY TYPE (in megalitres)	2021		2022		2023	
	TOTAL	OF WHICH: FROM WATER-STRESSED AREAS	TOTAL	OF WHICH: FROM WATER-STRESSED AREAS	TOTAL	OF WHICH: FROM WATER-STRESSED AREAS
Third-party water suppliers	1.32	1.32	3.001	3.001	8.43	8.43
Of which: Fresh water (≤1,000 mg/l total dissolved solids)	1.315	1.315	3.001	3.001	8.433	8.433
TOTAL WATER DISCHARGE (in megalitres)	1.32	1.32	3.00	3.00	8.43	8.43

03

OUR EXPECTATIONS FOR THE FUTURE

The HT project represents an important opportunity to strengthen the life science community in Italy. In order for the institution to be successful, it is essential to manage possible risks that may undermine its proper development and make the most of opportunities in the short and medium term



Dario Ricca

Senior Technician
National Facility for Light Imaging

3.1 Risks and opportunities

A number of **risks** deriving from both the external and internal context, which might have negative effects on HT's short- and medium-term development, can be identified.

The main risks from the **external context** are as follows:

-
- | | |
|---|---|
| a) The impact of HT's status as a para-public organisation on the implementation of its determined strategies. | The complexity and timeframes that characterise public organisations, enabling them to duly take into account the guidelines of public-spending watchdogs, may affect HT's ability to allocate available resources and implement its strategy at any given time, in the form and manner decided by its internal bodies. |
|---|---|
-
- | | |
|---------------------------|---|
| b) Political risk. | Changes in the Italian and international political scenario might affect HT's medium-term mission and strategic objectives, causing potential uncertainty along the pathway to the achievement of its original project. |
|---------------------------|---|
-
- | | |
|--|--|
| c) The risk of insufficient interaction and collaboration with research institutes operating in Italy in the same scientific sectors as HT. | This source of risk is connected with the type of relationship that HT is able to establish with other Italian research institutes. In fact, the establishment of competitive rather than collaborative relationships would affect HT's available resources and its national and international attractiveness. |
|--|--|
-
- | | |
|--|--|
| d) The risk arising from the delay in the development of the MIND area. | As an urban district devoted to innovation, MIND was created to generate progress through a collective dimension. A delay in the development of site infrastructure and/or development plans for one of the public or private core areas might also have negative effects on HT. First of all, slowdowns or variants to the area's development plans might give rise to extra costs or fewer services for the Campus, and, furthermore, if some actors, primarily academic ones, procrastinate their settlement plans, this would slow down the establishment of scientific collaborations in the district, aimed at fostering the ecosystem that is also, by definition, a space for exchange between disciplines and a space for technology and scientific transfer. |
|--|--|
-

EXTERNAL RISKS

The table below shows the relationships between external risks, key strategic objectives and main capital impacts:

RISK	RISK DESCRIPTION	STRATEGIC OBJECTIVE	CAPITAL
The impact of HT's status as a para-public organisation on the implementation of its determined strategies	The complexity and timeframes that characterise public organisations, enabling them to duly take into accounts the guidelines of public-spending watchdogs, may affect at any time HT's ability to allocate available resources and implement its strategy, in the form and manner decided by its internal bodies.	- Development and provision of infrastructure and innovative research tools - Effectiveness and efficiency of operational processes - Innovation and quality of research	 Infrastructural capital
			 Human capital
			 Intellectual capital
The political risk	Changes in the Italian and international political scenario might affect HT's medium-term mission and strategic objectives, causing potential uncertainty along the pathway to the achievement of its original project.	- Innovation and quality of research - Scientific reputation and dissemination - Innovation through research - Development and provision of infrastructure and innovative research tools	 Human capital
			 Intellectual capital
			 Financial capital
The risk of insufficient interaction and collaboration with research institutes operating in Italy in the same scientific sectors as HT.	This source of risk is connected with the type of relationship that HT will be able to establish with other Italian research institutes once the project is fully operational. In fact, the establishment of competitive rather than collaborative relationships would affect HT's available resources and its national and international attractiveness.	- Partnerships, networking and stakeholder engagement - Innovation and quality of research	 Relational capital
			 Human capital
			 Intellectual capital
The risk arising from the delay in the development of the MIND area.	As an urban district devoted to innovation, MIND was created to generate progress through a collective dimension. A delay in the development of site infrastructure and/or development plans for one of the public or private core areas might also have negative effects on HT. First of all, slowdowns or variants to the area's development plans might give rise to extra costs or fewer services for the Campus, and, furthermore, if some actors, primarily academic ones, procrastinate their settlement plans, this would slow down the establishment of scientific collaborations in the district, aimed at fostering the ecosystem that is also, by definition, a space for exchange between disciplines and a space for technology and scientific transfer.	- Partnerships, networking and stakeholder engagement - Innovation and quality of research - Scientific reputation and dissemination - Development and provision of infrastructure and innovative research tools	 Relational capital
			 Human capital
			 Intellectual capital
			 Infrastructural capital
			 Financial capital

With reference to the **internal context**, the main risks are as follows:

a) Potential lower attractiveness of HT to outstanding national and international researchers after shifting its strategic focal point.	Partially shifting the focal point of HT's activities to the development of National Facilities might be seen by potential talented researchers as possibly producing cuts in resources allocated to basic research and thus in the ensuing opportunities, and thus make HT less attractive as a place for work and research.
--	---

RISK	RISK MANAGEMENT
Potential lower attractiveness to outstanding national and international researchers after shifting HT's strategic focal point	HT has developed human resources management practices and employment programmes comparable to those offered by international institutions. In addition, HT will continue to develop excellent scientific research and increase its scientific reputation. As long as the Foundation continues to receive stable support from its stakeholders, this risk can be considered low

b) Potential lower attractiveness of HT to industrial partners after shifting its strategic focal point.	Partially shifting the focal point of HT's activities to the development of National Facilities might be seen by private institutes, potential technology transfer partners, as a drop in HT's interest in this area of activity, thus weakening its relations with industrial partners.
---	--

RISK	RISK MANAGEMENT
Potential lower attractiveness to industrial partners after shifting HT's strategic focal point	HT has launched activities for the implementation of a 'Centre for Innovation and Technology Transfer'. This risk can remain low thanks to CITT's efficient activity in attracting stakeholders and industrial partners to share projects and collaborations

c) Potentially reduced standing of the HT project and loss of reputation with stakeholders.	A slowdown in infrastructural investments, also due to external causes, might lower the standing of the entire project, harming HT's reputation as an outstanding national project.
--	---

RISK	RISK MANAGEMENT
Potentially reduced standing of the HT project and loss of reputation with stakeholders due to delays in infrastructural investments	Such events, which have already delayed the development of HT in the past, may recur in the future. The Foundation will work with its partners and stakeholders to try to ensure that the length of any delays is not such as to have a significant effect on project implementation. Therefore, this risk is deemed manageable

INTERNAL RISKS

The table below shows the relationships between internal risks, key strategic objectives and main capital impacts:

RISK	RISK DESCRIPTION	STRATEGIC OBJECTIVE	CAPITAL
Potential lower attractiveness of HT to outstanding national and international researchers after shifting its strategic focal point.	Partially shifting the focal point of HT's activities to the development of National Facilities might be seen by potential talented researchers as possibly producing cuts in resources allocated to basic research and thus in the ensuing opportunities, and thus make HT less attractive as a place for work and research.	- Scientific reputation and dissemination - Partnerships, networking and stakeholder engagement - Talent attraction and training, and research output sharing	 Relational capital  Human capital  Intellectual capital
Potential lower attractiveness of HT to industrial partners after shifting its strategic focal point.	Partially shifting the focal point of HT's activities to the development of National Facilities might be seen by private institutes, potential technology transfer partners, as a drop in HT's interest in this area of activity, thus weakening its relations with industrial partners.	- Partnerships, networking and stakeholder engagement - Innovation through research	 Relational capital  Intellectual capital  Financial capital
Potentially reduced standing of the HT project and loss of reputation with stakeholders.	A slowdown in infrastructural investments, also due to external causes, might lower the standing of the entire project, harming HT's reputation as an outstanding national project.	- Partnerships, networking and stakeholder engagement - Innovation and quality of research - Scientific reputation and dissemination - Development and provision of infrastructure and innovative research tools - Talent attraction and training, and research output sharing	 Relational capital  Human capital  Intellectual capital  Financial capital  Infrastructural capital

The **opportunities** that could foster HT's short- and medium-term development and success are as follows:

-
- a) Availability of cutting-edge research infrastructure with an ensuing positive impact on HT's image and its attractiveness to the world of science and industry.** State-of-the-art research laboratories and equipment make HT attractive to numerous stakeholders: high-profile researchers, research bodies and universities, and industrial partners.
-
- b) Availability of substantial financial, technological and human resources to be allocated to scientific research.** The provision of substantial and high-quality resources allows for the development of important projects and is also an important driver for the acquisition of further, especially financial resources, made available by national and international bodies (e.g. participation in calls for tenders, grants).
-
- c) HT's location in the MIND area.** MIND is currently one of the most important national urban regeneration projects and is increasingly attractive also to international investors. HT's location in the MIND district is an opportunity to develop relationships, collaborations and partnerships with outstanding organisations and institutes in the field of scientific research and technology transfer, as well as an important public presence for the enhancement of the new Milan area.



CUTTING-EDGE RESEARCH INFRASTRUCTURE

OPPORTUNITIES

The availability of cutting-edge research infrastructure has a positive impact on HT's image and makes it attractive to the world of science and industry

POSITIVE EFFECT MAXIMISATION

HT can maximise the positive effect of this opportunity by developing a 'user access' strategy, ensuring transparent and effective use of its infrastructure and making it available to the scientific community

SIGNIFICANT FINANCIAL, TECHNOLOGICAL AND HUMAN RESOURCES

OPPORTUNITIES

The provision of substantial and high-quality resources allows for the development of important projects and is also an important driver for the acquisition of further, especially financial resources, made available by national and international bodies

POSITIVE EFFECT MAXIMISATION

HT can maximise the effect of this opportunity by developing outstanding projects and high-quality collaborations that can attract additional resources from national and international bodies (e.g. participation in calls for tenders, grants)

HT'S LOCATION IN THE MIND AREA

OPPORTUNITIES

HT's location in the MIND area - a flagship national project that is increasingly attractive also to international investors - is an opportunity to develop relationships, collaborations and partnerships with outstanding organisations and institutes in the field of scientific research and technology transfer

POSITIVE EFFECT MAXIMISATION

HT can maximise the positive effect of this opportunity by developing and maintaining relationships with MIND area partners, scientific stakeholders and technology transfer partners. Further opportunities will arise from the development of relationships to achieve sustainable development goals (ESG)

OPPORTUNITIES

The table below shows the relationships between opportunities, key strategic objectives and main capital impacts:

OPPORTUNITIES	RISK DESCRIPTION	STRATEGIC OBJECTIVE	CAPITAL
Availability of cutting-edge research infrastructure with an ensuing positive impact on HT's image and its attractiveness to the world of science and industry.	State-of-the-art research laboratories and equipment make HT attractive to numerous stakeholders: high-profile researchers, research bodies and universities, and industrial partners.	- Development and provision of infrastructure and innovative research tools - Scientific reputation and dissemination - Innovation and quality of research - Partnerships, networking and stakeholder engagement	 Relational capital
			 Human capital
			 Intellectual capital
			 Infrastructural capital
Availability of substantial financial, technological and human resources to be allocated to scientific research.	The provision of substantial and high-quality resources allows for the development of important projects and is also an important driver for the acquisition of further, especially financial resources, made available by national and international bodies (e.g. participation in calls for tenders, grants).	- Development and provision of infrastructure and innovative research tools - Innovation and quality of research - Partnerships, networking and stakeholder engagement - Talent attraction and training, and research output sharing	 Relational capital
			 Human capital
			 Intellectual capital
			 Financial capital
HT's location in the MIND area.	MIND is currently one of the most important national urban regeneration projects and is increasingly attractive also to international investors. HT's location in the MIND district is an opportunity to develop relationships, collaborations and partnerships with outstanding organisations and institutes in the field of scientific research and technology transfer, as well as an important public presence for the enhancement of the new Milan area.	- Partnerships, networking and stakeholder engagement - Innovation and quality of research - Scientific reputation and dissemination - Development and provision of infrastructure and innovative research tools - Innovation through research	 Relational capital
			 Human capital
			 Intellectual capital

ESG RISKS

ENVIRONMENTAL - SOCIAL - GOVERNANCE

Risk management has become a particularly important issue in the current macroeconomic scenario, with increasing attention being paid not only to typical governance risks but also to environmental and social risks. Looking briefly at the details of these latter types of risks, the former (environmental risks) can be broken down into two categories: 'physical risk' and 'transition risk'. Physical risk refers to the financial impact of climate change on business, is classified as 'acute' or 'chronic' and can cause material damage or reduce productivity. Transition risk refers to the financial loss that may be incurred by an entity while shifting towards a more sustainable economy. Lastly, social risks may be defined as risks related to human rights issues, social responsibility, internal and external stakeholder relationships, gender equality, diversity and inclusion.

Against this backdrop, the Human Technopole Foundation intends to renew its commitment to comprehensive ESG risk mapping, consistent with its 'Sustainability (environmental, social and economic)' strategic objective. HT has currently launched a process to identify ESG risks related to its activities, with the aim of mapping and developing a series of mitigation activities that will soon be formalised in a policy to be submitted to its governance bodies. The risk assessment process starts with an examination of the main types of risk indicated in the table below.

ENVIRONMENTAL RISKS	SOCIAL RISKS	GOVERNANCE RISKS
▶ Climate change ▶ Pollution ▶ Loss in value of HT's assets as a result of extreme natural events	▶ Human rights risks including those related to the value chain ▶ Occupational safety risks ▶ Gender, equality and inclusion-related risks	▶ Fraud and corruption ▶ Inadequate intellectual property protection ▶ Research and development operating risks ▶ Data Protection and Cybersecurity risks

04

PERFORMANCE REVIEW

**Transparency, completeness, relevance and
comprehensibility guide the review
of our performance**

4.1 Key performance indicators	230
4.2 GRI Tables	238
GRI Content Index	257



Ilaria Mulas

*Senior Technician
Computational Biology Research Centre*

4.1 Key performance indicators

The table below shows the performance indicators related to the 8 strategic objectives of the Human Technopole Foundation.

PERFORMANCE INDICATORS/STRATEGIC OBJECTIVES



INNOVATION AND QUALITY OF RESEARCH

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Number of research groups	25	24	
Number of cohort studies involved	53	36	
Amount of external funding (individual fellowships/grants and other research funding) formalised in 2023	€5,386,450, of which €2,459,390 claimed as at 31.12.2023	€7,467,196, of which €3,239k claimed as at 31.12.2022	Change in 2022 figure of €7,332,796. A grant indicated as formalised in 2022 is, instead, to be attributed to 2023
Amount of external funding (individual fellowships/grants and other research funding) formalised in 2024	€4,986,334	€134,400	
Number of joint publications with external institutions	118	90	
Number of publications in international peer-reviewed journals	122	95	
Number of new experimental methods/ tools/protocols	37	26	



DEVELOPMENT AND PROVISION OF INFRASTRUCTURE AND INNOVATIVE RESEARCH TOOLS

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Investments (amount) in buildings/laboratories/technologies	€5,535,807	€10,066,838	
Investments (amount) in intangible assets	€14,521	€120,172	
% progress of infrastructure development projects (scheduled projects)	% progress of existing buildings: 100% % progress of buildings under design: 2% The last phase of the project, the final acceptance, is scheduled for August 2028, postponed from the previous deadline of April 2027	% progress of existing buildings: 100% % progress of buildings under design: 2% The last phase of the project, the final acceptance, is scheduled for August 2028, postponed from the previous deadline of April 2027	
% of square metres dedicated to research laboratories	41%	41%	
National Facilities	See subchapter 2.3.2 'Development and provision of infrastructure and innovative research tools' and subchapter 2.4.7 'Development and sharing of sustainable and innovative buildings and infrastructures (National Facilities)'	See subchapter 2.3. 'Development and provision of infrastructure and innovative research tools' and subchapter 2.4. 'Development and sharing of sustainable and innovative buildings and infrastructures (National Facilities)'	



TALENT ATTRACTION AND TRAINING, AND RESEARCH OUTPUT SHARING

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Number of PhD students	59	42	
Number of postdocs	35	25	
Number of researchers from foreign institutions	103	90	
% Italians returning from abroad	36%	29%	Italian employees and PhDs hired during the year from foreign institutions/total Italian employees and PhDs hired during the same period
Scientific visitors hosted	45	21	
Early career fellows funded	0	2	Allocations in the year
Number of scientific seminars held at HT	98	44	



SCIENTIFIC REPUTATION AND DISSEMINATION

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Number of participations in conferences with presentation of validated talks/posters	204	162	In 2023, 189 conferences were held during which validated talks/posters were presented. The difference is due to the participation of more researchers in the same conference
Number of researchers present in governance roles/bodies/ review boards of outstanding international institutions/research organisations	15	14	
Scientific conferences/courses/ training events organised (internal)	23	12	
Scientific conferences/courses/ training events organised (external)	5	4	

Number of participants in scientific events/conferences/training courses organised (internal)	1) Total participants HT = 376 2) Individual participants HT = 187	124
Number of participants in scientific events/conferences/training courses organised (external)	390	304
Number of dissemination/educational initiatives organised for non-specialist stakeholders	1	7
Number of research awards/honours/prizes (per institution/field)	6	7



INNOVATION (TECHNOLOGY TRANSFER)

THROUGH

RESEARCH

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Number of Technology Transfer training events	8	5	
No. of participants in Technology Transfer training events	500	420	
No. of HT scientists/professionals trained on Technology Transfer	5	52	HT scientists trained on TT are among the participants in TT training events (mentioned in the previous KPI)
No. of stakeholders involved in Technology Transfer activities	60	65	
No. of international events that HT participated in or organised	4	3	3 missions abroad and 1 international conference held in the MIND area
No. of countries with which Technology Transfer relationships have been established	2	5	
No. of agreements/collaborations with companies/hospitals/research institutes for Technology Transfer	4	3	These include the FITT and Rete perfeTTO associations
CITT (Centre for Innovation and Technology Transfer)	See subchapter 2.2.1 'Financial capital', subchapter 2.3.5 'Innovation through research (Technology Transfer)' and subchapter 2.4.6 'Activities and programmes for the development of the 'Centre for Innovation and Technology Transfer'	See subchapter 2.2 'Financial capital', subchapter 2.3 'Innovation through research (Technology Transfer)' and subchapter 2.4 'Activities and programmes for the development of the 'Centre for Innovation and Technology Transfer'	



SUSTAINABILITY (ENVIRONMENTAL, SOCIAL AND ECONOMIC)

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
ENVIRONMENTAL			
Energy from renewable sources (MWh)	7,028.42	Available 2023 estimate. See subchapter 2.4 'Sustainable consumption management and development of energy efficiency programmes'	
Indirect (Scope 2) GHG emissions from energy consumption	See para. 4.2 'GRI Tables', GRI 305-2		
CO ₂ emissions avoided by using electricity from renewable sources (tons)	2,171.08	Location-based = 2,093.41 tons CO ₂ eq (+36% compared to 2021)	
Direct (Scope 1) GHG emissions - Diesel fuel	See para. 4.2 'GRI Tables', GRI 305-1		
Other indirect (Scope 3) GHG emissions - Waste transport	See para. 4.2 'GRI Tables', GRI 305-3		
No. of environmental NCs / no. of audits	Total environmental audits: 0 Total environmental Non-Compliances found: 2	Total environmental audits: 2 Total environmental Non-Compliances found: 0	See para. 2.4.5. 'Effective waste management'
SOCIAL			
Diversity and equal opportunity (employees' gender)	See para. 4.2 'GRI Tables', GRI 405-1		
Diversity and equal opportunity (employees' age)	See para. 4.2 'GRI Tables', GRI 405-1		
% of researchers out of total employees	60%	54%	
% of female staff representing HT in events	Women 39% Men 61%	Women: 45% Men: 55%	Percentage change of female participation between 2023 and 2022: -6%
Annual % increase of female staff in higher grades (0-1-2-3 senior managers)	Women: 43% Men: 57%	Women: 45% Men: 55%	Percentage change of female staff in higher grades between 2023 and 2022: -2%

% improvement in gender balance in recruitment for 0-5 grade positions	2%	47%	
Number of anonymous sexual harassment or gender offence complaints handled per year	0	0	
Number of training courses on unconscious prejudice and bias per year	1	1	Training 'Double standard: gender inequalities in research and science'; for more information see subchapter 2.2.2 'Human Capital'
No. of new services for child and/or family care provided to staff	1	1	This is an agreement between HT and a kindergarten located in the neighbouring Municipality of Arese
Parental leave - total number of eligible employees	129 men 151 women	113 men 137 women	In 2023, 16 women and 2 men took parental leave
Number of children for whom childcare is supported per year	3	5	
Transparency in supplier selection	See subchapter 2.2.1 'Financial Capital - Procurement and purchases 2023' and subchapter 2.4.10 'Responsible supply chain management'	See subchapter 2.2. 'Financial Capital - Procurement and purchases 2022' and subchapter 2.4. 'Responsible supply chain management'	

ECONOMIC

Funding received from parties other than MEF as a percentage of total funding	0.74%	2.85%	
Formalised commitments not shown in the Balance Sheet	As at 31.12.2023, commitments related to open orders amounted to €47,538,194 and commitments related to pending purchase procedures amounted to €20,179,653, for an overall total of €67,717,847	See subchapter 2.2 section 'Financial Capital'	
Other economic and financial data	See subsection 2.2.1 'Financial Capital'		
Revenues from commercial events	€35,339	€38,032	



PARTNERSHIPS, NETWORKING AND STAKEHOLDER ENGAGEMENT

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
Number of partnerships and collaborations with universities/IRCCS/research centres/industry	18	13 partnerships and collaborations 3 Consortium Agreements. For more information, please refer to subchapter 2.2 section 'Relational Capital' and subchapter 2.4 section 'Development of partnerships and collaborations with universities and research institutes on scientific research projects'	
Number of research infrastructure development projects co-managed with suppliers	1	1	
Number of institutional initiatives	17	7	
Number of initiatives developed in partnership with other organisations in the MIND area	12	25	
Number of partnerships with other relevant stakeholders	1	3	
Press office activity indicators	Press mentions: 1,348	Press mentions: 1,695	
Social media indicators	Followers on social media: 43,750	Followers on social media: 35,102	
Number of newsletter subscribers	1,246	1,077	
Number of website single users	-	69,825	Due to technical issues with the data collection software, the number of website single users and website visits is not available for the whole of 2023. The problem has been resolved and the two KPIs will be shown in the 2024 report
Number of website visits	-	268,913	
News on website	30	52	
Internal communication campaigns	46	57	
No. of external commercial events	13	10	



EFFECTIVENESS AND EFFICIENCY OF PROCESSES

KPIs	2023 DATA/ REFERENCES	2022 DATA/ REFERENCES	NOTES
% of development of Digital Transformation and PMO projects	Data Governance: 75% Cyber Security: 81% IT Governance: 98% PMO: 100% IT Protocol Management System: 100% HR Travel: 95% Warehouse: 100%	Data Governance: 75% Cyber Security: 81% IT Governance: 98% PMO: 100% IT Protocol Management System: 100% HR Travel: 95% Warehouse: 100%	
Number of HT projects monitored with the Status Reporting system	15	24	
% of incident resolution in the Campus area (Buildings, Furniture, Laboratory Equipment)	Incidents opened during the year: 457 Resolved 100% as at 31.12.23	Incidents opened during the year: 430 Successfully resolved: 93.02%	



4.2 GRI Tables

GRI 2-7 - EMPLOYEES

	2021	2022	2023	CHANGE % (22-23)
TOTAL NUMBER OF EMPLOYEES	159	250	280	12.00%
PERMANENT CONTRACT	117	173	170	-1.73%
OF WHICH MEN	53	74	74	0.00%
OF WHICH WOMEN	64	99	96	-3.03%
PERMANENT CONTRACT	42	77	110	42.86%
OF WHICH MEN	22	38	55	44.74%
OF WHICH WOMEN	20	39	55	41.03%
FULL-TIME CONTRACT	154	243	271	11.52%
OF WHICH MEN	73	109	127	16.51%
OF WHICH WOMEN	81	134	144	7.46%
PART-TIME CONTRACT	5	7	9	28.57%
OF WHICH MEN	2	3	3	0.00%
OF WHICH WOMEN	3	4	6	50.00%

GRI 2-8 - NON-EMPLOYEES

	2021	2022	2023
TOTAL NUMBER OF WORKERS WHO ARE NOT EMPLOYEES	30	80	115

GRI 2-21 - ANNUAL TOTAL COMPENSATION RATIO

ANNUAL TOTAL COMPENSATION RATIO	2021	2022	2023
ANNUAL TOTAL COMPENSATION	5	5	4

GRI 2-30 - COLLECTIVE BARGAINING AGREEMENTS

	2021	2022	2023
TOTAL EMPLOYEES COVERED BY COLLECTIVE BARGAINING AGREEMENTS	159	250	280
TOTAL NUMBER OF EMPLOYEES	159	250	280
PERCENTAGE OF EMPLOYEES COVERED BY COLLECTIVE BARGAINING AGREEMENTS	100.00%	100.00%	100.00%

GRI 201-1 - DIRECT ECONOMIC VALUE GENERATED AND DISTRIBUTED

DETERMINATION OF ECONOMIC VALUE DIRECTLY GENERATED AND DISTRIBUTED [€]	ECONOMIC PERFORMANCE		
	2021	2022	2023
OTHER REVENUE	66,609,077	65,779,053	36,220,072
FINANCIAL INCOME AND INTEREST	-	-	1,968
ECONOMIC VALUE GENERATED	66,609,077	65,779,053	36,222,040
OPERATING COSTS	28,357,687	34,628,869	19,010,773
EMPLOYEE REMUNERATION	21,353,337	17,652,328	10,580,270
REMUNERATION OF PUBLIC ADMINISTRATION	694,085	617,441	542,538
REMUNERATION OF LENDERS	-	3,313	112
ECONOMIC VALUE DISTRIBUTED	50,405,109	52,901,951	30,133,693
AMORTISATION/DEPRECIATION, WRITE-DOWNS AND ADJUSTMENTS	15,853,076	12,837,770	6,070,601
PROVISIONS FOR RISKS AND OTHER PROVISIONS	315,553	1,301	-
PROFIT ALLOCATED TO RESERVES	35,339	38,031	17,746
ECONOMIC VALUE RETAINED	16,203,968	12,877,102	6,088,347

GRI 204-1 - PROPORTION OF SPENDING ON LOCAL SUPPLIERS [€]

	PROCUREMENT PRACTICES		
	2021	2022	2023
TOTAL TRADE PAYABLES	18,807,062	20,482,890	16,227,267
LOCAL TRADE SUPPLIERS (ITALY)	18,196,371	20,126,349	14,623,896
EU TRADE PAYABLES	509,551	36,788	673,945
NON-EU TRADE PAYABLES	101,140	319,752	929,426
PERCENTAGE OF LOCAL SUPPLIERS (ITALY)	96.75%	98.26%	90.12%
PERCENTAGE OF EU SUPPLIERS	2.71%	0.18%	4.15%
PERCENTAGE OF NON-EU SUPPLIERS	0.54%	1.56%	5.73%



GRI 302-1 - ENERGY CONSUMPTION WITHIN THE ORGANISATION

ENERGY CONSUMPTION AND COMPANY CAR FLEET						
Required details (R = renewable source, NR = non-renewable source)						
	R/NR	QL/QT	UoM	2021	2022	2023
HEATING OIL CONSUMPTION	NR	QT	l	2,900	2,600	1,800
CONSUMPTION OF ELECTRICITY PURCHASED FROM THE GRID, FROM NON-RENEWABLE SOURCES	NR	QT	MWh	-	613.36	1,652.23
CONSUMPTION OF ELECTRICITY PURCHASED FROM THE GRID, FROM RENEWABLE SOURCES	R	QT	MWh	5,792.60	7,879.45	7,028.42

GRI 302-3 - ENERGY INTENSITY

ENERGY INTENSITY (DENOMINATORS)	Unit of measurement	2022	2023
TOTAL SQUARE METRES	m ²	20,204	20,204
TOTAL NUMBER OF EMPLOYEES	people	250	280
ENERGY INTENSITY	Unit of Measurement	2022	2023
TOTAL ELECTRICITY CONSUMPTION	GJ	30,574.11	31,250.35
INTENSITY PER EMPLOYEE	GJ/people	122.3	111.6
ENERGY INTENSITY PER M2	GJ/m2	1.51	1.55

GRI 303-3 - TOTAL WATER WITHDRAWAL

THIRD-PARTY WATER WITHDRAWALS (WATER SUPPLIERS) BY WITHDRAWAL SOURCE (in megalitres)	2021	2022	2023
GROUNDWATER	1.32	3.01	8.44
TOTAL	1.32	3.01	8.44

GRI 303-4 - WATER DISCHARGE

WATER DISCHARGE BY SOURCE AND BY TYPE (in megalitres)	2021		2022		2023	
	Total	of which: from water- stressed areas	Total	of which: from water- stressed areas	Total	of which: from water- stressed areas
THIRD-PARTY WATER SUPPLIERS	1.32	1.32	3.001	3.001	8.43	8.43
OF WHICH: FRESH WATER (≤1,000 mg/l total dissolved solids)	1.315	1.315	3.001	3.001	8.433	8.433

GRI 303-5 - WATER CONSUMPTION

TOTAL WATER CONSUMPTION (in megalitres)	2021		2022		2023	
	Total	of which: from water- stressed areas	Total	of which: from water- stressed areas	Total	of which: from water- stressed areas
TOTAL WATER CONSUMPTION	1.32	1.32	3.01	3.01	8.44	8.44

GRI 305 - EMISSIONS

EMISSIONS	Unit of measurement	2021	2022	2023
SCOPE 1	tons CO ₂ eq	7.418	6.650	385.664
SCOPE 2 (location-based)	tons CO ₂ eq	1,551.84	2,623.43	2,681.45
SCOPE 2 (market-based)	tons CO ₂ eq	0.00	280.04	755.32
SCOPE 3*	tons CO ₂ eq	0.062	1.174	1.453

* CO₂ consumed = litres consumed * emission coefficient
Emission coefficient KgCO₂ / l (Diesel = 2.471)



GRI 306 - WASTE

				2021		
WASTE COMPOSITION		UoM		WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE D TO D
WASTE PACKAGING, ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED	150106	Mixed material packaging	Kg	-	-	
	150110*	Packaging containing residues of or contaminated by hazardous substances	Kg	-	-	
WASTES NOT OTHERWISE SPECIFIED IN THE LIST	160214	Discarded equipment, other than those mentioned in 16 02 09 to 16 02 13	Kg	-	-	
	160304	Inorganic wastes other than those mentioned in 16 03 03	Kg	-	-	
	160601*	Lead-acid batteries	Kg	-	-	
	160306	Organic wastes other than those mentioned in 16 03 05	Kg	-	-	
WASTE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES (INCLUDING SOIL FROM CONTAMINATED SITES)	170603*	Other insulation materials containing or consisting of hazardous substances	Kg	-	-	

* hazardous substances.

2022				2023		
DIRECTED DISPOSAL (306-5A)	WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE DIRECTED TO DISPOSAL (306-5A)	WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE DIRECTED TO DISPOSAL (306-5A)
-	2.132	1.2792	0.8528	1,463.00	877.80	585.20
-	0.113	-	0.113	195.00	-	195.00
-	0.274	0.2192	0.0548	485.00	388.00	97.00
-	0.739	-	0.739	1,435.00	-	1,435.00
-	-	-	-	2,400.00	2,400.00	-
-	0.089	-	0.089	-	-	-
-	-	-	-	70.00	-	70.00



GRI 306 - WASTE

				2021		
WASTE COMPOSITION		UoM		WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE D TO D
WASTES FROM HUMAN AND ANIMAL HEALTH CARE OR RELATED RESEARCH (except kitchen and restaurant wastes not arising from immediate health care)	180103*	Waste that must be collected and disposed of using special precautions to prevent the spread of infection	Kg	0.144	-	
	180106*	Hazardous chemicals or chemicals containing hazardous substances	Kg	-	-	
	180107	Chemicals other than those mentioned in 18 01 06	Kg	-	-	
WASTES FROM WASTEWATER TREATMENT PLANTS, OFF-GRID WASTEWATER TREATMENT PLANTS, AS WELL AS FROM WATER PURIFICATION AND ITS PREPARATION FOR INDUSTRIAL USE	190905	Saturated or exhausted ion exchange resins	Kg	-	-	
MUNICIPAL WASTE (HOUSEHOLD WASTE AND SIMILAR WASTE FROM COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL ACTIVITIES) INCLUDING SEPARATELY COLLECTED WASTE	200307	Bulky waste	Kg	3.27	1.962	
Total waste - ITALY		Kg		3.414	1.962	

* hazardous substances.

2022				2023		
DIRECTED DISPOSAL (306-5A)	WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE DIRECTED TO DISPOSAL (306-5A)	WASTE GENERATED	WASTE DIVERTED FROM DISPOSAL (306-4A)	WASTE DIRECTED TO DISPOSAL (306-5A)
0.144	5.062	-	5.062	8,147.00	-	8,147.00
-	3.664	-	3.664	5,565.00	-	5,565.00
-	-	-	-	218.00	-	218.00
-	-	-	-	180.00	-	180.00
1.308	21.475	12.885	8.59	11,610.00	6,966.00	4,644.00
1.452	33.5480	14.3834	19.1646	31,768.00	10,631.80	21,136.20



GRI 306 - WASTE

2021							
WASTE GENERATED (IN TONS)	TOTAL WASTE GENERATED	OF WHICH NOT SENT TO LANDFILL					
	QUANTITY (TON)	TOTAL QUANTITY (TON)	RECOVERY OPERATIONS			WHERE RECOVERY TAKES PLACE	
			WASTE PREPARED FOR REUSE	WASTE FOR RECYCLING	WASTE FOR OTHER RECOVERY OPERATIONS	ONSITE	OFFSITE
HAZARDOUS WASTE	0.144	-	-	-	-	-	-
180103*	0.144	-	-	-	-	-	-
NON-HAZARDOUS WASTE	3.27	1.962	-	-	-	-	-
200307	3.27	1.962	-	Yes	-	-	Yes
TOTAL WASTE GENERATED	3.414	-	-	-	-	-	-
2022							
HAZARDOUS WASTE	8.839	-	-	-	-	-	-
150110*	0.113	-	-	-	-	-	-
180103*	5.062	-	-	-	-	-	-
180106*	3.664	-	-	-	-	-	-
NON-HAZARDOUS WASTE	24.709	14.383	-	-	-	-	-
150106	2.132	1.279	-	Yes	-	-	Yes
160214	0.274	0.219	-	Yes	-	-	Yes
160304	0.739	-	-	-	-	-	-
160306	0.089	-	-	-	-	-	-
200307	21.475	12.885	-	Yes	-	-	Yes
TOTAL WASTE GENERATED	33.548	-	-	-	-	-	-

* hazardous substances.

OF WHICH NOT SENT TO LANDFILL

TOTAL QUANTITY (TON)	DISPOSAL OPERATIONS				WHERE DISPOSAL TAKES PLACE	
	INCINERATED WASTE (WITH ENERGY RECOVERY)	INCINERATED WASTE (WITHOUT ENERGY RECOVERY)	WASTE SENT TO LANDFILL	WASTE FOR OTHER DISPOSAL OPERATIONS	ONSITE	OFFSITE
0.144	-	-	-	-	-	-
0.144	Yes	Yes	-	Yes	-	Yes
1.308	-	-	-	-	-	-
1.308	Yes	-	Yes	-	-	Yes
-	-	-	-	-	-	-
8.839	-	-	-	-	-	-
0.113	Yes	-	-	-	-	Yes
5.062	Yes	-	-	-	-	Yes
3.664	-	Yes	-	-	-	Yes
10.326	-	-	-	-	-	-
0.853	Yes	-	-	-	-	Yes
0.055	Yes	-	-	-	-	Yes
0.739	-	Yes	-	-	-	Yes
0.089	-	Yes	-	-	-	Yes
8.590	Yes	-	-	-	-	Yes
-	-	-	-	-	-	-



GRI 306 - WASTE

2023							
WASTE GENERATED (IN TONS)	TOTAL WASTE GENERATED	OF WHICH NOT SENT TO LANDFILL					
	QUANTITY (TON)	TOTAL QUANTITY (TON)	RECOVERY OPERATIONS			WHERE RECOVERY TAKES PLACE	
			WASTE PREPARED FOR REUSE	WASTE FOR RECYCLING	WASTE FOR OTHER RECOVERY OPERATIONS	ONSITE	OFFSITE
HAZARDOUS WASTE	16,377.00	2,400.00	-	-	-	-	-
150110*	195.00	-	-	-	-	-	-
160601*	2,400.00	2,400.00	-	Yes	-	-	Yes
170603*	70.00	-	-	-	-	-	-
180103*	8,147.00	-	-	-	-	-	-
180106*	5,565.00	-	-	-	-	-	-
NON-HAZARDOUS WASTE	15,391.00	8,231.80	-	-	-	-	-
150106	1,463.00	877.80	-	Yes	-	-	Yes
160214	485.00	388.00	-	Yes	-	-	Yes
160304	1,435.00	-	-	-	-	-	-
180107	218.00	-	-	-	-	-	-
190905	180.00	-	-	-	-	-	-
200307	11,610.00	6,966.00	-	Yes	-	-	Yes
TOTAL WASTE GENERATED	31,768.00	-	-	-	-	-	-

* hazardous substances.

OF WHICH NOT SENT TO LANDFILL						
TOTAL QUANTITY (TON)	DISPOSAL OPERATIONS				WHERE DISPOSAL TAKES PLACE	
	INCINERATED WASTE (WITH ENERGY RECOVERY)	INCINERATED WASTE (WITHOUT ENERGY RECOVERY)	WASTE SENT TO LANDFILL	WASTE FOR OTHER DISPOSAL OPERATIONS	ONSITE	OFFSITE
13,977.00	-	-	-	-	-	-
195.00	Yes	-	-	-	-	Yes
-	-	-	-	-	-	-
70.00	Yes	-	-	-	-	Yes
8,147.00	Yes	-	-	-	-	Yes
5,565.00	-	Yes	-	-	-	Yes
7,159.20	-	-	-	-	-	-
585.20	Yes	-	-	-	-	Yes
97.00	Yes	-	-	-	-	Yes
1,435.00	-	Yes	-	-	-	Yes
218.00	-	Yes	-	-	-	Yes
180.00	Yes	-	-	-	-	Yes
4,644.00	Yes	-	-	-	-	Yes
-	-	-	-	-	-	-



GRI 401-1 - NEW EMPLOYEE HIRES AND EMPLOYEE TURNOVER

2021

	NO. OF EMPLOYEES	NO. OF NEW HIRES	NO. OF TERMINATIONS
WOMEN	84	51	5
< 30 years	NA	NA	NA
30-49 years	NA	NA	NA
> 49 years	NA	NA	NA
MEN	75	46	3
< 30 years	NA	NA	NA
30-49 years	NA	NA	NA
> 49 years	NA	NA	NA
TOTAL	159	97	8

2022

	NO. OF EMPLOYEES	NO. OF NEW HIRES	NO. OF TERMINATIONS
WOMEN	137	64	11
< 30 years	NA	NA	NA
30-49 years	NA	NA	NA
> 49 years	NA	NA	NA
MEN	113	46	8
< 30 years	NA	NA	NA
30-49 years	NA	NA	NA
> 49 years	NA	NA	NA
TOTAL	250	110	19

2023

	NO. OF EMPLOYEES	NO. OF NEW HIRES	NO. OF TERMINATIONS	% NEW HIRES	% TURNOVER
WOMEN	151	31	18	21%	12%
< 30 years	13	10	5	77%	38%
30-49 years	125	21	10	17%	8%
> 49 years	13	-	3	0%	23%
MEN	129	27	10	21%	8%
< 30 years	15	11	1	73%	7%
30-49 years	99	15	7	15%	7%
> 49 years	15	1	2	7%	13%
TOTAL	280	58	28	21%	10%
< 30 years	28	21	6	75%	21%
30-49 years	224	36	17	16%	8%
> 49 years	28	1	5	4%	18%

GRI 401-2 - BENEFITS PROVIDED TO FULL-TIME EMPLOYEES THAT ARE NOT PROVIDED TO TEMPORARY OR PART-TIME EMPLOYEES

	2023
Parental leave	18
Retirement provision	112
TOTAL	130

GRI 401-3 A, B - PARENTAL LEAVE

	2021			2022			2023		
	MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL	MEN	WOMEN	TOTAL
Employees that were entitled to parental leave	NA	NA	0	113	137	250	129	151	280
Employees that took parental leave	NA	NA	0	1	5	6	2	16	18

GRI 403-5 - WORKER TRAINING ON OCCUPATIONAL HEALTH AND SAFETY

2021			2022			2023		
TRAINING DELIVERED	NO. OF HOURS DE- LIVERED	NO. OF PARTICI- PANTS	TRAINING DELIVERED	NO. OF HOURS DE- LIVERED	NO. OF PARTICI- PANTS	TRAINING DELIVERED	NO. OF HOURS DE- LIVERED	NO. OF PARTICI- PANTS
General training	1417	159	General training	683	250	General training	808	275

* the average number of employees in 2023 was used to calculate average training hours.



GRI 403-9 A - WORK-RELATED INJURIES

	2021	2022	2023
Number of recordable work-related injuries	-	4	3
Rate of recordable work-related injuries	NA	NA	0.47*
Number of hours worked	NA	NA	430,061.50

* to calculate the injury rate, only 1 injury (the only one that occurred in the workplace) and the factor of 200,000 hours worked were taken into account.

GRI 404-1 - AVERAGE HOURS OF TRAINING PER YEAR PER EMPLOYEE⁸

EMPLOYEES BY GENDER AND CATEGORY

2023

	MEN	WOMEN	TOTAL
Senior managers	21	16	37
Middle managers	30	31	61
Office workers	78	104	182
Total	129	151	280

TRAINING HOURS BY GENDER AND PROFESSIONAL CATEGORY

2023

	MEN	WOMEN	TOTAL
Senior managers	302	243	545
Middle managers	421.5	255	676.5
Office workers	1,918.5	2,398	4,316.5
Total	2,642	2,896	5,538

AVERAGE TRAINING HOURS

2023

Per employee	19.78
of which Men	20.48
of which Women	19.18

TRAINING HOURS BY GENDER AND PROFESSIONAL CATEGORY

2023

	MEN	WOMEN
Senior managers	14.38	15.19
Middle managers	14.05	8.23
Office workers	24.60	23.06

⁸ the training hours refer only to scientific/administrative and non-mandatory training hours.

GRI 405-1 A - DIVERSITY OF GOVERNANCE BODIES AND EMPLOYEES

GOVERNANCE BODIES BY GENDER

2023

	MEN	WOMEN
Supervisory Board	6	6
Management Committee	4	1
Board of Auditors	1	2
Scientific Committee	11	4
Supervisory Body	3	-

GOVERNANCE BODIES BY GENDER (%)

2023

	MEN	WOMEN
Supervisory Board	50%	50%
Management Committee	80%	20%
Board of Auditors	33%	67%
Scientific Committee	73%	27%
Supervisory Body	100%	-

GOVERNANCE BODIES BY AGE

2023

	< 30 YEARS	30-50 YEARS	> 50 YEARS
Supervisory Board	-	1	11
Management Committee	-	-	5
Board of Auditors	-	1	2
Scientific Committee	-	-	15
Supervisory Body	-	-	3

GOVERNANCE BODIES BY AGE (%)

2023

	< 30 YEARS	30-50 YEARS	> 50 YEARS
Supervisory Board	-	8%	92%
Management Committee	-	-	100%
Board of Auditors	-	33%	67%
Scientific Committee	-	-	100%
Supervisory Body	-	-	100%



GRI 405-1 B

EMPLOYEES BY PROFESSIONAL CATEGORY AND GENDER			2023
	MEN	WOMEN	
Senior managers	21	16	
Middle managers	30	31	
Office workers	78	104	
Total per professional category	129	151	
Total			280

EMPLOYEES BY PROFESSIONAL CATEGORY AND GENDER (%)			2023
	MEN	WOMEN	
Senior managers	8%	6%	
Middle managers	11%	11%	
Office workers	28%	37%	

EMPLOYEES BY PROFESSIONAL CATEGORY AND AGE				2023
	< 30 YEARS	30-50 YEARS	> 50 YEARS	
Senior managers	0	28	9	
Middle managers	0	50	11	
Office workers	28	146	8	
Total per professional category	28	224	28	
Total				280

EMPLOYEES BY PROFESSIONAL CATEGORY AND AGE (%)				2023
	< 30 YEARS	30-50 YEARS	> 50 YEARS	
Senior managers	0%	10%	3%	
Middle managers	0%	18%	4%	
Office workers	10%	52%	3%	

GRI 405-2 - RATIO OF BASIC SALARY AND REMUNERATION OF WOMEN TO MEN

CATEGORY	2021			2022			2023		
	WOMEN	MEN	RATIO	WOMEN	MEN	RATIO	WOMEN	MEN	RATIO
Office workers	16.39	15.74	104%	16.30	16.29	100%	16.43	16.88	97%
Middle managers	26.62	26.59	100%	27.55	27.33	101%	27.27	27.55	99%
Senior managers	47.83	57.30	83%	47.50	57.65	82%	41.23	49.41	83%



GRI Content Index

The following table shows the performance indicators contained in the GRI.

Declaration of use	HT submitted its report in accordance with GRI Standards for the period going from 01.01.23 to 31.12.23
GRI 1 used	GRI 1 - Foundation 2021
Relevant GRI sector standards	To date, there are no GRI Sector Standards relevant to Human Technopole's activity

GRI STANDARD/ OTHER SOURCE	DISCLOSURE	LOCATION
General disclosures		
GRI 2 - General disclosures 2021 version		- Cover - Subchapter 1.1 'Mission, vision and values'
	2-1 Organizational details	- Subchapter 1.2 'Research Centres and Scientific Facilities' - Subchapter 2.2.3 'Infrastructural Capital'
	2-2 Entities included in the organization's sustainability reporting	- Subchapter 1.1 'Mission, vision and values'
	2-3 Reporting period, frequency and contact point	Methodological note
	2-4 Restatements of Information	- Subchapter 4.2 'GRI Tables', GRI 305 Emissions or GRI 305 Emissions (Scope 1, 2, 3)
	2-5 External assurance	- Methodological note - Sub-chapter 'Independent auditor's report on the Integrated Report'
	2-6 Activities, value chain and other business relationships	- Subchapter 1.2 'Research Centres and Scientific Facilities' - Subchapter 2.2.1, section 'Financial Capital' - Subchapter 2.2.4, section 'Relational Capital' - Sub-chapter 2.4.2, 'Development of partnerships and collaborations with universities and research institutes on scientific research projects' and 2.4.11 'Sustainable consumption management and development of energy efficiency programmes'

	OMISSION	GRI SECTOR STANDARD REF. NO.	NOTES
	OMITTED REQUIREMENTS	REASON	EXPLANATION
Emissions			As a result of emission factor updating, direct (Scope 1), indirect from energy consumption (Scope 2) and indirect (Scope 3) GHG emissions of 2022 were corrected and those for 2021 were calculated. For Scope 2, both location-based and market-based emissions were corrected.
Report'			
tions projects' pment of			



**GRI STANDARD/
OTHER SOURCE**

DISCLOSURE

LOCATION

**GRI 2 -
General disclosures
2021 version**

2-7 Employees

- Subchapter 2.2.2 '*Human Capital*'
- Subchapter 4.2 '*GRI tables*', GRI 2-7 Employees

2-8 Workers who are not employees

- Subchapter 2.2.2 '*Human Capital*'
- Subchapter 4.2 '*GRI Tables*', GRI 2-8 Workers who are not employees

2-9 Governance structure and composition

Sub-chapter 1.4 'Governance and organisation'

2-10 Nomination and selection of the highest governance body

Sub-chapter 1.4 'Governance and organisation'

2-11 Chair of the highest governance body

Sub-chapter 1.4 'Governance and organisation'

2-12 Role of the highest governance body in overseeing the management of impacts

Sub-chapter 1.4 'Governance and organisation'

2-13 Delegation of responsibility for managing impacts

Sub-chapter 1.4 'Governance and organisation'

2-14 Role of the highest governance body in sustainability reporting

Sub-chapter 1.4 'Governance and organisation'

2-15 Conflicts of interest

Sub-chapter 1.4 'Governance and organisation'

2-16 Communication of critical concerns

Sub-chapter 1.4 'Governance and organisation'

2-17 Collective knowledge of the highest governance body

- Sub-chapter 1.4 'Governance and organisation'
- Sub-chapter 2.2.2 '*Human Capital*' and 2.2.4 '*Relational Capital*'

[illegible]



**GRI STANDARD/
OTHER SOURCE**

DISCLOSURE

LOCATION

2-18 Evaluation of the performance of the highest governance body

Subchapter 1.4 '*Governance and organisation*'

2-19 Remuneration policies

Remunerations are determined in accordance with Article 6 of Prime Ministerial Decree No. 28 of 27 February 2018, implementing Article 1 of Law No. 232 of 2016

2-20 Process to determine remuneration

Remunerations are determined in accordance with Article 6 of Prime Ministerial Decree No. 28 of 27 February 2018, implementing Article 1 of Law No. 232 of 2016

2-21 Annual total compensation ratio

Subchapter 4.2 '*GRI Tables*', GRI 2-21 Annual total compensation ratio

2-22 Statement on sustainable development strategy

Letter to stakeholders

GRI 2 -

**General disclosures
2021 version**

2-23 Policy commitments

- Subchapter 1.1 '*Mission, vision and values*'
- Subchapter 1.4 '*Governance and organisation*'
- Subchapter 2.4 '*Responsible and sustainable approach*'

2-24 Embedding policy commitments

Subchapter 2.4 '*Responsible and sustainable approach*'

2-25 Processes to remediate negative impacts

Subchapter 2.4 '*Responsible and sustainable approach*'

2-26 Mechanisms for seeking advice and raising concerns

Methodological note

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GRI STANDARD/ OTHER SOURCE	DISCLOSURE	LOCATION
	2-27 Compliance with laws and regulations	See the Notes column
GRI 2 - General disclosures 2021	2-28 Membership associations	Subchapter 2.2.4 , section ' <i>Relational Capital</i> '
	2-29 Approach to stakeholder engagement	- Methodological note - Subchapter 2.1 ' <i>Stakeholder engagement and the materiality matrix</i> '
	2-30 Collective bargaining agreements	Subchapter 4.2 ' <i>GRI Tables</i> ', GRI 2-30 Collective bargaining agreements
GRI 3 - Material topics 2021	3-1 Process to determine material topics	Subchapter 2.1, ' <i>Stakeholder engagement and the materiality matrix</i> '
	3-2 List of material topics	Subchapter 2.1 ' <i>Stakeholder engagement and the materiality matrix</i> '
GRI 201 - Economic performance 2016	201-1 Economic value generated and distributed	- Subchapter 2.2.1 ' <i>Financial Capital</i> ' - Subchapter 4.2 ' <i>GRI Tables</i> ', GRI 201-1 Economic value generated and distributed
	201-4 Financial assistance received from government	- Subchapter 2.2.1 ' <i>Financial Capital</i> '
GRI 204 - Procurement practices 2016	204-1 Proportion of spending on local suppliers	- Subchapter 2.2.1 ' <i>Financial Capital</i> ' - Subchapter 4.2 ' <i>GRI Tables</i> ', GRI 204-1 Proportion of spending on suppliers
GRI 205 - Anti-corruption 2016	205-1 Operations assessed for risks related to corruption	- Subchapter 1.4 ' <i>Governance and organisation</i> ' - Subchapter 2.4.10 ' <i>Responsible supply chain management</i> '
	205-2 - Communication and training about anti-corruption policies and procedures	See the Notes column
	205-3 Confirmed incidents of corruption and actions taken	See the Notes column
GRI 302 - Energy 2016	302-1 Energy consumption within the organization	- Subchapter 2.4.11 ' <i>Sustainable consumption management and development of energy efficiency programmes</i> ' - Subchapter 4.2 ' <i>GRI Tables</i> ', GRI 302-1 Energy consumption within organization

[illegible]



GRI STANDARD/ OTHER SOURCE	DISCLOSURE	LOCATION
GRI 302 - Energy 2016	302-3 Energy intensity	- Subchapter 2.4.10 'Sustainable consumption management and development of energy efficiency programmes' - Subchapter 4.2 'GRI Tables', GRI 302-3 Energy intensity
	303-3 Total water withdrawal	- Subchapter 2.4.11 'Sustainable consumption management and development of energy efficiency programmes' - Subchapter 4.2 'GRI Tables', GRI 303-3 Total water withdrawal
GRI 303 - Water and Effluents 2018	303-4 Water discharge	- Subchapter 2.4.11 'Sustainable consumption management and development of energy efficiency programmes' - Subchapter 4.2 'GRI Tables', GRI 303-4 Water discharge
	303-5 Water consumption	- Subchapter 4.2 'GRI Tables', GRI 303-5 Water consumption
	305-1 Direct (Scope 1) GHG emissions	- Subchapter 2.4.11 'Sustainable consumption management and development of energy efficiency programmes' - Subchapter 4.2 'GRI Tables', GRI 305 Emissions
GRI 305 - Emissions 2016	305-2 Energy indirect (Scope 2) GHG emissions	- Subchapter 2.4.11 'Sustainable consumption management and development of energy efficiency programmes' - Subchapter 4.2 'GRI Tables', GRI 305 Emissions
	305-3 Other indirect (Scope 3) GHG emissions	- Subchapter 2.4.5 'Effective waste management' - Subchapter 4.2 'GRI Tables', GRI 305 Emissions
	306-3 Waste generated	- Subchapter 2.4.5 'Effective waste management' - Subchapter 4.2 'GRI Tables', GRI 306 Waste
GRI 306 - Waste 2020	306-4 Waste diverted from disposal	- Subchapter 2.4.5 'Effective waste management' - Subchapter 4.2 'GRI Tables', GRI 306 Waste
	306-5 Waste directed to disposal	- Subchapter 2.4.5 'Effective waste management' - Subchapter 4.2 'GRI Tables', GRI 306 Waste
	401-1 New employee hires and employee turnover	- Subchapter 2.2.2 'Human Capital' - Subchapter 4.2 'GRI Tables', GRI 401-1 New employee hires and employee turnover
GRI 401 - Employment 2016	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	- Subchapter 2.2.2 'Human Capital' - Subchapter 2.4.9 'Achievement of gender balance in senior, leadership and decision-making positions' - Subchapter 4.2 'GRI Tables', GRI 401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees



GRI STANDARD/ OTHER SOURCE	DISCLOSURE	LOCATION
GRI 401 - Employment 2016	401-3 Parental leave	- Subchapter 2.4.3 'Support for work-life balance and parenthood' and 2.4.9 'Achievement of gender balance in senior, leadership decision-making positions' - Subchapter 4.2 'GRI Tables', GRI 401-3 Parental leave
	403-5 Worker training on occupational health and safety	- Subchapter 2.2.2 'Human Capital' - Subchapter 4.2 'GRI Tables', GRI 403-5 Worker training on occupational health and safety
GRI 403 - Occupational health and safety 2018	403-8 Workers covered by an occupational health and safety management system	Subchapter 2.2.2 'Human Capital'
		Subchapter 2.2.2 'Human Capital'
	403-9 Work-related injuries	Subchapter 4.2 'GRI Tables', GRI 403-9 Work-related injuries
	403-10 Work-related ill-health	Subchapter 2.2.2 'Human Capital'
GRI 404 -Training and education 2016	404-1 Average hours of training per year per employee	- Subchapter 2.2.2 'Human Capital' - Subchapter 4.2 'GRI Tables', GRI 404-1 Average hours of training per year per employee
	404-2 Programs for upgrading employee skills and transition assistance programs	- Subchapter 2.2.2 'Human Capital' - Subchapter 2.3.3 'Talent attraction and training, and research on sharing' - Subchapter 2.3.8 'Effectiveness and efficiency of operational processes'
	404-3 Percentage of employees receiving regular performance and career development reviews	Subchapter 2.2.2 'Human Capital'
GRI 405 - Diversity and equal opportunity 2016	405-1 Diversity and equal opportunity	- Subchapter 2.2.2 'Human Capital' - Subchapter 4.2 'GRI Tables', GRI 405-1 Diversity and equal opportunity
	405-2 Ratio of basic salary and remuneration of women to men	Subchapter 4.2 'GRI Tables', GRI 405-2 Ratio of basic salary and remuneration of women to men

INTEGRATED REPORT 2023

OMISSION			GRI SECTOR STANDARD REF. NO.	NOTES
OMITTED REQUIREMENTS	REASON	EXPLANATION		
d' o and				
Occupational				
				In 2023 no accidents involving non-employee workers occurred
g per				This includes data on the calculation of average hours of scientific and administrative training (non-mandatory) and, separately, the calculation of average HSE training hours calculated on the average number of employees for the year 2023.
output				
processes'				
portunity				
uneration				

267

05

FINANCIAL STATEMENTS

MANAGEMENT REPORT	271
BALANCE SHEET AND INCOME STATEMENT	286
CASH FLOW STATEMENT	292
Explanatory Notes	300
PART A - INTRODUCTION	300
PART B - INFORMATION ON BALANCE SHEET ASSETS	308
PART B - INFORMATION ON BALANCE SHEET LIABILITIES AND EQUITY	321
PART C - INFORMATION ON THE INCOME STATEMENT	329
PART D - OTHER INFORMATION	336



REPORT AND FINANCIAL STATEMENTS AS AT 31 DECEMBER 2023

The year 2023 was a year of further development and significant new achievements for the Human Technopole Foundation, characterised by a significant increase in internal research, a significant growth in staff and other personnel, including PhD students and trainees, and the repurposing of the Campus infrastructure (Palazzo Italia, laboratories, scientific facilities, data centre and networking spaces).

It was also a year marked by the dissemination of specialist skills and the development of young talent through various training programmes.

With the conclusion in 2022 of the preliminary work for the start-up of the new facilities, in 2023 the operational phase for the construction and enhancement of infrastructural facilities with a high technological impact for the national scientific community was launched, and the notice for the selection of the CIPV (Commissione Indipendente di Valutazione Permanente [Independent Permanent Evaluation Commission]) was published by the Surveillance Authorities, ending with the appointment of the 8 members at the Supervisory Board meeting of 15 November.

Achievements in 2023 include scientific awards, associated with the acquisition of several external grants from national and international institutions (ERC, EC/Horizon, EMBO, AIRC, Telethon), thus supplementing the annual public grant to the Human Technopole Foundation.

The structuring of the Centre for Innovation and Technology Transfer (CITT) in the Life Science sector, as an internal department of the Human Technopole Foundation, continued.

Lastly, 2023 was also the year of the 'passing of the baton' at the helm of the Human Technopole Foundation, which saw the end of Prof. Iain Mattaj's mandate and the taking office of the new Director, Prof. Marino Zerial, who thus takes up the challenge for new important goals, which will turn the Human Technopole Foundation into one of the leading research institutes on the Italian and international science scene.

MANAGEMENT REPORT

The 2023 financial year of the Human Technopole Foundation (hereinafter also referred to as 'HT') closed with a positive result after tax of €35,339, after provisions for IRES (corporate income tax) and IRAP (regional production tax) taxes of €694,085. Depreciation, amortisation and write-downs of tangible and intangible assets in the amount of €15,853,076 were made.

In addition, the activities carried out in 2023 resulted in total economic commitments of €134,326,924. These commitments resulted in the recognition in the financial statements of operating grants and capital grants in the amount of over €66,609,077, relating to the portion pertaining to the year, and approximately €139,007,012 in deferred income, for the portion of commitments pertaining to future years.

In financial terms, in 2023, grants received of about €380,038,065 were recorded against monetary outlays of about €74,401,471.

The Financial Statements for the year ended 31 December 2023 were prepared in accordance with Articles 2423 et seq. of the Italian Civil Code, adopting the extended form, even though the prerequisites set forth in Article 2435-bis for preparing them in an abridged form are met.

The criteria used in drafting and evaluation take into account the standards in the national legal system pursuant to Leg. 139/2015, through which Directive 2013/34/EU was implemented.

The annual financial statements are subject to certification by the Board of Auditors as statutory auditors.

ACTIVITIES IN 2023

The year 2023 was one of growth and consolidation for the Human Technopole Foundation.

Within the scope of its specific mission, in particular, all research centres became fully operational, reaching a total of 25 research groups at the end of 2023, in addition to several Scientific Service Units supporting both the centres and existing scientific facilities.

Also following the inclusion in the list of institutional units that are part of the Public Administration sector

(Sector S.13) prepared by ISTAT (National Institute of Statistics) in application of the European System of Accounts (EU Regulation No. 549/2013 of the European Parliament and of the Council, SEC 2010) and the related fulfilments, the process of setting up the administrative machine was consolidated through a further definition of compliance and the operations of the Human Technopole Foundation.

A. RESEARCH ACTIVITIES AND FACILITIES DEVELOPMENT

During 2023, the Institute continued to build critical mass, with a population of 300 scientific staff in HT's research centres, facilities and services at the end of the year. During the year, HT scientists achieved many significant scientific results in their respective fields, resulting in 122 peer-reviewed publications in prestigious international journals. In 2023, HT scientists were awarded numerous prestigious grants and scholarships (e.g. from ERC, EC/Horizon, EMBO, AIRC, Telethon, Cariplo, etc.), bringing the total amount of external competitive research grants raised by HT to €17 million.

In line with HT's objective to establish and develop collaborations with the Italian and international biomedical research community, discussions were held throughout the year on potential areas of collaboration with numerous universities, research centres, clinical research institutes, research networks, associations and companies engaged in life sciences research both in Italy and abroad. These interactions led to the signing of 18 agreements (MoUs, Framework Agreements, Research Collaboration Agreements) for new joint projects with scientists from numerous universities, research hospitals, research institutes and

industries worldwide. The universities, research institutes and national research hospitals involved in the above-mentioned collaborations include the University of Bari, the University of Turin, the CNR, IFOM, Humanitas, SR-TIGET, HiT, Besta IRCCS and Ca' Granda Ospedale Maggiore Policlinico IRCCS, among others.

Many activities were carried out in the area of advanced scientific training, targeting both internal scientists and the external life science research community. The number of HT doctoral and post-doctoral students continued to increase in 2023, reaching 59 and 35 respectively. HT's PhD and postdoctoral communities were an important target for the numerous internal training and career development events organised for HT scientists during the year. 23 internal training courses and workshops were also offered, covering topics ranging from technical skills (flow cytometry, high-performance computing, statistics, optical microscopy, etc.) to soft skills (e.g. leadership, research writing, etc.) These training opportunities were complemented by the organisation at HT of almost 100 seminars, held by HT scientists and high-profile external scientists.

Five important training events for the external life science research community took place at HT. These included week-long courses and workshops in the areas of sequencing technologies, omics and image data analysis, as well as the inaugural scientific symposium of the European Cancer Dependency Map initiative. In total, almost 400 external scientists from national and international institutions participated in these events.

In order to encourage mobility and the sharing of expertise, infrastructure and methods with the external research community, in 2023 HT hosted 45 scientific visitors - from 30 different research institutes in Italy and abroad - who spent time at HT to collaborate with HT scientists on specific projects in different research areas, or to apply specific technologies available at the Human Technopole Foundation to their own projects and/or acquire expertise in related methods.

B. BUILDING, PLANT AND TECHNOLOGY DEVELOPMENT OF THE HUMAN TECHNOPOLE FOUNDATION CAMPUS

In accordance with the Human Technopole Foundation's strategic planning, in 2023, work continued on the development and improvement of the infrastructure and space for scientific research, among which it is worth mentioning the main construction sites:

1. The completion of the building site for the repurposing of Palazzo Italia, which revised the internal distribution of administrative offices and areas for computational research, and created the space for the general warehouse and cryobank in the basement;
2. The completion of the refurbishment and fitting out of the South Pavilion building for an additional 2,500 square metres of wet and dry research space. The building was activated at the end of July 2023, completing all of the first buildings planned for the HT Campus.

Furthermore, from the point of view of the ongoing improvement of the infrastructure available to HT and future National Facilities, these are the other most significant activities carried out in 2023:

- ▶ revision of the design of the liquid nitrogen supply line serving Cryo-em laboratories and the future storage area for biological samples (biobank). The subsequent tender procedure
- ▶ was awarded in October 2023 and the service for the supply of technical gases and liquid nitrogen

was started pending work completion. On-site production of the piping for liquid nitrogen distribution was prepared in December 2023, with on-site construction commencing at the end of January 2024. Start-up is scheduled in June 2024.

- ▶ revision of the project for the construction of the new Biosafety Level 3 (BSL3) laboratory to be located in the South Pavilion. The subsequent tender is being awarded and the construction site will finish in July 2024, followed by the authorisation to operate the research lines.
- ▶ awarding of the development of a technical-economic feasibility project (TEFP) to develop an integrated contract for the implementation of a major expansion of light imaging microscopy in the North Pavilion. A phased implementation is envisaged.
- ▶ awarding of the development of a technical-economic feasibility project (TEFP) to develop an integrated contract for the implementation of a major expansion of Cryo-em microscopy in the South Pavilion. The construction will require major structural and plant engineering work due to the requirements of the microscopes (similar to the instrument fleet already operating in the North Pavilion) and will be completed in 2025.
- ▶ awarding of the development of a technical-economic feasibility project (TEFP) to develop an integrated tender for the construction of an additional Tape Library in the basement of Palazzo Italia for the long-term storage of scientific data in support of ICT. This will be completed in Q1 2025.

► preparation of tender documentation for the award of the supply and installation of 2 prefabricated shelter modules for a new CED HPC cluster to be temporarily positioned in the technical area of Palazzo Italia for an additional power of 320 kW in total. It is scheduled for delivery by Q1 2025. The option of doubling this infrastructure if the needs of the National Facilities so require is included in the tender. The infrastructure is needed in order to allow the Human Technopole Foundation to complete the fully operational Technological Hub and Data Centre.

On the other hand, with regard to the works for the completion of the Campus in the medium term, the final design for the new building complex consisting of 2 buildings, the South Building and the Technological Hub, as well as complementary works for an expected total works of approximately €249,821,554 were completed.

Following the Management Committee's approval

on 7 September 2022, the project was finally approved by the Supervisory Board on 2 February 2023 and the preparatory activities for the Services Conference to obtain the building permit are under way. Executive design should be completed by 2024, to be followed by the tendering of the works within the year with the support of an auxiliary contracting authority that is currently being defined.

Related to this, HT finalised in February 2023 the purchase by Arexpo of the land necessary to complete HT's perimeter, as envisaged in the MIND Area Integrated Intervention Plan (IIP).

In terms of Facility Management services, in 2023 HT gradually internalised cleaning, concierge and maintenance services (hitherto provided by Arexpo S.p.A) and started to directly manage the same following their acquisition by joining the Consip FM4 Convention, with expected cost savings. This activity will continue on 2024, incorporating also the management of the armed security service at the Campus.

C. PROCUREMENT, TENDERING AND PURCHASING PROCESSES

At the same time as the significant increase in production value, procurement activities were also important in 2023, as briefly described here:

TYPE OF PURCHASE	AMOUNT (EURO)	%
PURCHASES OUTSIDE THE PROCEDURE LAID DOWN BY LEGISLATIVE DECREE 50/2016	1,708,246	6.27%
SIGNING FRAMEWORK AGREEMENTS/CENTRAL PURCHASING AGREEMENTS	8,117,507	29.85%
PURCHASES UNDER LEGISLATIVE DECREE 50/2016 - ABOVE-THRESHOLD PROCUREMENTS	7,249,928	26.66%
PURCHASES UNDER LEGISLATIVE DECREE 50/2016 - BELOW-THRESHOLD PROCUREMENTS	10,122,101	37.22%
TOTAL	27,197,782	100.00%

Also in terms of quantity, around 500 purchase orders were executed in 2023, with a significant share relating to below-threshold purchases, leading to a reduction in their average amount.

It should be noted that the Human Technopole Foundation had three disputes with suppliers in 2023, for which, at the outcome of the technical assessment and trial results, provisions for risks totalling €315,553 were set aside.

Finally, in the course of 2023, the needs and process requirements assessment for the evaluation of

the new integrated management system began. This activity constitutes the first step in the project to replace the current internal management information system 'SAP Business ByDesign', which will continue at least for the whole of 2024. This project is part of the institute's broader objective of overall administrative digitisation, aimed at ensuring the efficiency and effectiveness of operational processes, as well as greater transparency and integrity of the Human Technopole Foundation's management and financial data.

SUMMARY OF RESULTS 2023

Paragraph 3(b) of Article 2428 of the Italian Civil Code, as amended by Legislative Decree No. 32 of 2 February 2007, states that the management report shall include, "financial and, where appropriate, non-financial performance indicators relevant to the specific activities to the extent necessary for an understanding of the company's position and performance". Given the non-profit nature of the Human Technopole Foundation, it was decided, without prejudice to what is set out in the financial

statements and the notes to the financial statements, to illustrate the key data of the balance sheet, the income statement and the operating ratios that highlight the results achieved.

The financial statements for the financial year 2023, accompanied by this report and the notes to the financial statements, have been subjected to a mandatory audit by the Board of Auditors.

EURO	31/12/2023	31/12/2022
VALUE OF PRODUCTION	66,609,077	65,779,053
EBITDA	16,923,524	13,521,012
OPERATING RESULT	730,815	666,249
PROFIT FOR THE YEAR	35,339	38,032
FIXED ASSETS	131,361,161	125,810,834
TOTAL EQUITY	541,562,132	470,516,175
NET FINANCIAL POSITION	419,566,523	113,929,831

Value of production amounted to €66,609,077, which includes:

- ▶ MEF (Italian Ministry of Economy and Finance) grants totalling €65,145,771, of which:
 - for HT a total of €63,950,038;
 - for the Centre for Innovation and Technology Transfer (CITT) a total of €460,711;
 - for the National Facilities a total of €735,022;
- ▶ grants from other entities (non-MEF funds) of €1,318,138;
- ▶ 'other revenues' amounting to €145,166;

With regard to the balance sheet items, the value of equity as at 31 December 2023 was €541,562,132. In particular, it includes the Endowment Fund of the Human Technopole Foundation of €77,261,869

and the HT Management Fund, which amounts to €231,802,262 and includes the annual grants, not yet used, that Article 1 paragraph 121 of Law 232/2016 allocated to the Human Technopole Foundation in the period 2017-2023. In addition, equity also includes the residual balance of the CITT Management Fund in the amount of €12,770,719 and that attributable to the new National Facilities in the amount of €219,593,481. A total of about €69,289,382 was utilised from the Management Fund, following the economic commitments made by the Human Technopole Foundation.

Finally, the value of equity also includes the surplus for the year 2022 in the amount of €38,032 and the surplus for the current year in the amount of €35,339.

The net financial position amounted to €419,566,523, representing the sum of the value of cash and cash equivalents, amounting to €41,780,186, and the value of current financial

assets, amounting to €377,786,337, relating to the balance of the centralised treasury account opened with the Bank of Italy.

INCOME STATEMENT

The following table shows the results achieved during the year (€), in terms of revenue, EBITDA and pre-tax profit.

EURO	31/12/2023	31/12/2022
VALUE OF PRODUCTION	66,609,077	65,779,053
EBITDA	16,923,524	13,521,012
PRE-TAX PROFIT	729,424	655,472

KEY OPERATING FIGURES

The reclassified income statement, compared with that of the previous year, is as follows.

EURO	31/12/2023	31/12/2022	CHANGE
VALUE OF PRODUCTION	66,609,077	65,779,053	830,024
EXTERNAL COSTS	28,332,216	34,605,713	(6,273,498)
VALUE ADDED	38,276,861	31,173,340	7,103,521
PERSONNEL EXPENSE	21,353,337	17,652,328	3,701,009
EBITDA	16,923,524	13,521,012	3,402,513
AMORTISATION, DEPRECIATION AND WRITE-DOWNS AND OTHER PROVISIONS	16,192,709	12,854,763	3,337,947
OPERATING RESULT	730,815	666,249	64,566
NON-RECURRING INCOME	-	-	-
FINANCIAL INCOME AND CHARGES	1,391	10,777	(9,386)
ORDINARY RESULT	729,424	655,472	73,952
REVALUATIONS AND WRITE-DOWNS	-	-	-
PRE-TAX PROFIT	729,424	655,472	73,952
INCOME TAXES	694,085	617,441	76,645
PROFIT FOR THE YEAR	35,339	38,032	(2,693)



THE BALANCE SHEET

The main changes in the balance sheet during the 2023 financial year have been summarised in the following table, in which the asset and liability items have been appropriately reclassified so as to provide evidence of invested capital, financing sources and their key factors.

RECLASSIFIED BALANCE SHEET 2023

EURO	31/12/2023	31/12/2022	CHANGE
NET INTANGIBLE ASSETS	173,257	158,736	14,521
NET TANGIBLE ASSETS	131,187,904	125,652,098	5,535,806
EQUITY INVESTMENTS AND OTHER FINANCIAL ASSETS	-	-	-
FIXED CAPITAL	131,361,161	125,810,834	5,550,327
INVENTORIES	82,084	58,004	24,080
TRADE RECEIVABLES	116,526	87,702	28,824
OTHER RECEIVABLES	151,204,102	390,172,018	(238,967,916)
ACCRUED INCOME AND PREPAYMENTS	1,593,069	1,452,443	140,626
SHORT-TERM OPERATING ASSETS	152,995,781	391,770,166	(238,774,385)
TRADE PAYABLES	16,227,267	20,482,890	(4,255,623)
DOWN PAYMENTS	-	-	-
TAX AND SOCIAL SECURITY PAYABLES	3,382,932	4,045,710	(662,778)
OTHER PAYABLES	1,931,870	1,188,949	742,921
ACCRUED EXPENSES AND DEFERRED INCOME	139,007,012	134,252,672	4,754,341
SHORT-TERM OPERATING LIABILITIES	160,549,081	159,970,220	578,861
NET WORKING CAPITAL	123,807,861	357,610,780	(233,802,919)
SEVERANCE PAY	1,495,397	1,023,134	472,263
TAX AND SOCIAL SECURITY PAYABLES (BEYOND THE NEXT FINANCIAL YEAR)	-	-	-
OTHER MEDIUM AND LONG-TERM LIABILITIES	316,854	1,301	315,553
MEDIUM AND LONG-TERM LIABILITIES	1,812,251	1,024,436	787,816
INVESTED CAPITAL	121,995,609	356,586,344	(234,590,735)
EQUITY	(541,562,132)	(470,516,175)	(71,045,957)
MEDIUM AND LONG-TERM NET FINANCIAL POSITION	-	-	-
SHORT-TERM NET FINANCIAL POSITION	419,566,523	113,929,831	305,636,692
EQUITY AND NET FINANCIAL DEBT	(121,995,609)	(356,586,344)	234,590,735

Specifically, Equity reflects, after deducting the annual utilisation of the Total Management Fund, the increases recorded during the year. The latter relate to the 2023 Management Fund, amounting to €2,000,000, allocated to the CITT (Centre for

Innovation and Technology Transfer) by Law 77 of 17 July 2020, which converted Decree-Law 34 of 19 May 2020, and to the HT Management Fund, which was set at €140,300,000 for the year 2023.

KEY FINANCIAL FIGURES

The net financial position as at 31/12/2023 is as follows:

EURO	31/12/2023	31/12/2022	CHANGE
BANK DEPOSITS	419,565,637	113,928,791	305,636,846
CASH AND CASH EQUIVALENTS	886	1,137	(252)
CASH AND CASH EQUIVALENTS	419,566,523	113,929,929	305,636,594
CURRENT FINANCIAL ASSETS	-	-	-
LOANS FROM BANKS (WITHIN THE FINANCIAL YEAR)	-	98	(98)
SHORT-TERM FINANCIAL PAYABLES	-	98	(98)
NET FINANCIAL POSITION	419,566,523	113,929,831	305,636,692
SHORT-TERM MEDIUM AND LONG-TERM NET FINANCIAL POSITION	-	-	-
NET FINANCIAL POSITION	419,566,523	113,929,831	305,636,692

It should be noted that the value of the net financial position also includes the balance of the centralised treasury account with the Bank of Italy, amounting to €377,786,337, which, in the statutory balance sheet, is classified under 'Current financial assets'. More specifically, this account was opened in October 2020 by implementing the provisions of Article 49-bis, para 4, of Decree-Law No. 34/2020 (known as 'Relaunch Decree'), converted with amendments into Law No. 77/2020, which provided for the opening of a non-interest-bearing account in the name of the Human Technopole Foundation at the State Treasury. This account includes, inter alia, the financial advance received from the Human Technopole Foundation, amounting

to €249,821,554.63, to cover the estimated construction costs of the new South Building.

Moreover, within the framework of ordinary bank relationships, in addition to the current account with Banca Intesa in the name of HT, which has a balance of €26,674,431, there is also a current account with Banca Intesa in the name of CITT, which has a balance of €9,582,229 as of 31 December 2023 and the current account with Banca Intesa relating to Non-MEF Funds, which has a balance of €5,518,696 as of 31 December 2023. Finally, an amount of €3,945 is reported as credit card balance and an amount of €886 as cash balance.

In order to provide a clearer picture of the financial position, the table below shows certain financial statement indicators.

EURO	31/12/2023	31/12/2022
FIXED ASSETS (FA) / INVESTED CAPITAL (IC)	107.7%	35.3%
READY LIQUIDITY (RL) / INVESTED CAPITAL (IC)	343.9%	32.0%
EQUITY LESS FIXED ASSETS	410,200,972	344,705,341

INVESTMENTS

During the year, investments were made in the following areas:

EURO - FIXED ASSETS	31/12/2023	31/12/2022	NET INVESTMENTS
TANGIBLE ASSETS			
LAND AND BUILDINGS	69,189,610	61,396,105	7,793,505
PLANT AND MACHINERY	2,403,592	2,713,821	(310,229)
INDUSTRIAL AND COMMERCIAL EQUIPMENT	29,867,201	31,975,887	(2,108,685)
OTHER ASSETS	24,886,228	23,694,308	1,191,920
ASSETS UNDER CONSTRUCTION	4,782,363	5,871,977	(1,089,614)
OTHERS	58,910	-	58,910
INTANGIBLE ASSETS			
CONCESSIONES, LICENCES, TRADEMARKS			
AND SIMILAR RIGHTS	70,996	38,134	32,862
OTHERS	102,261	120,602	(18,341)

The change in the item 'Land and Buildings' is largely attributable to the purchase of the land for the South Building and technology hub for €2,613,553, the refurbishment of Palazzo Italia for

approximately €4,127,311 and the refurbishment of the South Pavilion building for €1,314,180.

OTHER INFORMATION

SUPERVISORY BOARD

The Supervisory Board monitors the use of resources and carries out general guidance and audits over the Human Technopole Foundation. The composition of this body provides for thirteen members, appointed by the Prime Minister's Office, including the Chairman (Art. 12 of the Articles of Association). As at 31 December 2023, the Supervisory Board of the Human Technopole Foundation consisted of twelve members, including the Chairman.

It is pointed out that a thirteenth member of the Supervisory Board may be appointed by the Participating Members, in agreement with each other, provided that they pay at least three per cent of the annual grant State grant, also in association with each other. To date, there are no Participating Members in the Human Technopole Foundation.

MANAGEMENT COMMITTEE

The Management Committee is vested with the powers necessary to ensure the orderly running and achievement of the Human Technopole Foundation's purpose.

As at 31 December 2023, the Management Committee of the Human Technopole Foundation consisted of five members, including the Chairman.

SCIENTIFIC COMMITTEE

The Human Technopole Foundation's Scientific Committee is an advisory body, to which the Articles of Association assign a wide range of functions, including assessing the correlation between scientific activities and the Human Technopole Foundation's multi-year plans, its organisation in the medium term and the correct allocation of resources (both economic and human) to the various projects. The composition of this body comprises fifteen members, appointed by the Supervisory Board. Fourteen members were appointed to serve four-year terms in 2022, including the Chairman, Prof. Walter Ricciardi. On 1 June 2023, the Supervisory Board appointed the fifteenth member and the Scientific Committee is now in its full composition.

In the impossibility of appointing the Strategic Evaluation Committee on behalf of the European Research Council (ERC) as required by the Articles of Association, for the first three-year evaluation of the Human Technopole Foundation's activity in June 2023, the Supervisory Board asked the Scientific Committee for its willingness to proceed with the evaluation of the scientific activity for the four-year period 2019-2022, which was concluded at the end of 2023.

SUPERVISORY BODY

The Supervisory Body referred to in Article 6, paragraph 1, letter b) of Legislative Decree no. 231 of 8 June 2001, endowed with autonomous powers of initiative and control pursuant to Article 2 of the Human Technopole Foundation's Articles of Association, consists of three members, two of whom are external and one internal. It continued its supervisory activity on the functioning and observance of the 231 Model, bringing it into line with the recent new legislation on whistleblowing (Legislative Decree no. 24/2023).

In the latter part of the financial year 2023, the Supervisory Body also began updating the 231 Model in relation to the recent expansion of the catalogue of predicate offences.

The Human Technopole Foundation constantly monitors its internal operational processes, which are still in the growth and stabilisation phase, in order to promote the gradual definition of the way in which operational activities are governed and operated (regulations and procedures).

THE CENTRE FOR INNOVATION AND TECHNOLOGY TRANSFER

In 2023, the activities of the Centre for Innovation and Technology Transfer (CITT) focused on three directions:

1. Training young Italian life science researchers through courses aimed at providing them with the basic tools for understanding the technology transfer process, attended by a total of around 80 researchers and young professionals selected from all over Italy and abroad. The courses were organised in cooperation with Netval (National Association of Technology Transfer Operators) and the University Institute of Advanced Studies (IUSS) in Pavia. CITT also organised the conference 'Future Trends in Translational Medicine', in collaboration with Nature Italy, with the aim of encouraging researchers to embark on pathways to enhance their research for the benefit of society and of fostering debate on innovation in Italy.
2. Supporting the establishment and implementation of a network of technology transfer players. To this end, in 2023 CITT started a dialogue with FITT, the Human Technopole Foundation for Innovation and Technology Transfer mandated by the Lombardy Regional Authority, and the PerferTTO network, the Italian NRRP-funded network of IRCCS technology transfer offices. In addition CITT

also organised 4 meetings with technology transfer officers, both from the Milan area and outside, to discuss topics such as the reform of the Industrial Property Code (discussing in particular the overcoming of what is known as the Professor Privilege), the dynamics of venture capital funds in the life science sector and the Golden Power regulations.

3. International promotion, fostering interaction between the Italian technology transfer system and that of other countries, in order to compare models that can potentially be applied to the Italian system, encourage exchanges between researchers and attract talent and funding towards innovation produced in our country. In June 2023, CITT took part in the Swiss Tech Tour organised by the Embassy of Switzerland in Italy and Swiss Business Hub Milan, in collaboration with Presence Switzerland, bringing along some Italian TTOs with the aim of strengthening relations with the Swiss innovation ecosystem. In November 2023, CITT organised a Study Tour, also open to some 20 technology transfer officers working at Italian institutes (universities, IRCCS, research centres...), to discover the Austrian innovation ecosystem.

Entry in the ISTAT (National Institute of Statistics) List of Public Administrations

By measure adopted pursuant to Art. 1 para. 2 of Legislative Decree No. 196/2009, the National Institute of Statistics registered the Human Technopole Foundation in the ISTAT List of Public Administrations.

Following registration, the Human Technopole Foundation is subject to the provisions in force on public finance, including the rules on public expenditure containment.

In this regard, the Human Technopole Foundation has launched an audit to check all applicable regulations, including any provisions relating to expenditure containment measures, known as 'spending review'.

In particular, the Human Technopole Foundation has verified, also through the opinion of the competent offices of the Ministry of Economy and Finance and of the supervising administrations, the applicability of these provisions to its own case, i.e. that of a newly-established body, which can be considered 'fully operational' only once the investments for the construction of the headquarters and infrastructure have been completed.

It is worth noting, however, that as early as 2021 the Human Technopole Foundation adopted for its general current expenses a policy of maximum compliance with the Consip agreements and other aggregating entities provided for by the legislator, which, as is well known, remain outside the scope of spending review rules.

ORGANISATIONAL, MANAGEMENT AND CONTROL MODEL

The Human Technopole Foundation has continued to implement the "Organisational, Management and Control Model" pursuant to Legislative Decree no. 231/2001 (Model 231), regulating the administrative liability of entities in the field of offences caused by crime, last updated on 29 June 2022. In relation to Model 231, training activities were carried out for managerial and non-managerial personnel.

2024- 2028 Strategic Plan and 2024 - 2026 Planning Document

On 21 December 2023, the Supervisory Board approved the update of the Human Technopole Foundation's Multi-Year Planning Document (DPP) for the period 2024 - 2026 and the 2024- 2028 Strategic Plan, pursuant to Article 13 of the Articles of Association.

Internal Audit & Compliance

During the year, the annual Internal Audit Plan was developed based on risk analysis. In detail, audits were carried out on the following Departments: Finance, Scientific Affairs Strategies, Official Relations and Public Affairs, Supply Chain, ICT, as well as carrying out checks on the incompatibility, conflict of interest of the members of the Human Technopole Foundation Bodies, and finally on the Negotiated Procedures without prior publication of a notice pursuant to Art. 63 of Legislative Decree No. 50/2016.

With regard to compliance activities, the department codified new Regulations, Procedures or Guidelines by assisting the internal departments concerned.

The department continues to manage the Register of Conflicts of Interest.

Manager in charge

In 2023, Financial Risk Management was performed in order to identify and map the main operational risks and controls impacting the Human Technopole Foundation's financial statements.

More specifically, the analysis and mapping of the 'as is' situation vs. the 'to be' situation with regard to the SoD (Segregation of Duties) and the main controls aimed at monitoring and mitigating risks were further pursued, focusing on the following operational processes: Warehouse cycle, Expenditure reporting cycle and Grant cycle.

The resulting evidence led to specific risk and control matrices for the aforementioned operational processes, as well as to the identification of additional control points and policies/procedures to be implemented or updated, in order to mitigate balance sheet risk.

Stakeholder Relations

During 2023, official meetings and visits were promoted with international, national and local interlocutors of the Human Technopole Foundation

contributed to the activities and projects of the MIND district, including hosting visits organised by partners in the area. The Human Technopole Foundation also took part in official and industry initiatives by research, innovation and health ecosystems players.

In 2023, the third edition of the Integrated Report was produced to provide the Human Technopole Foundation's stakeholders with a unified view of the many aspects of HT, as well as to strengthen the institute's transparency path.

HUMAN RESOURCES AND ORGANISATION

The number of Human Technopole Foundation employees at the end of 2023 was 280, up from 250 at the end of 2022. Employees are divided into 37 senior managers (Industry Managers National Collective Labour Agreement), 61 middle managers and 179 office workers (Chemistry National Collective Labour Agreement) and 3 apprentices. During 2023, 58 human resources were recruited, against 28 resignations.

The activation of PhDs and Post Docs also continued, reaching 59 and 35 respectively by the end of 2023.

During the period under review, the Human Technopole Foundation continued its activities to define its organisational set-up in order to ensure better rationalisation and efficiency in process management. The Human Technopole Foundation intervened, both in Administration and Research, by preparing and updating a number of regulations, internal procedures and guidelines, including the drafting of the "Human Resources Management Process Manual", which brought together the existing internal Human Resources procedures, and the approval of the internal procedure on the prevention of harassment. In addition, the "Human Resources Area Regulation" was also approved, which defines the principles to which the Human Technopole Foundation adheres in the area of

human resources management, as well as the processes and activities of the HR department.

With regard to recruitment, the selection of Technicians Staff Scientists and Postdocs positions within the research groups in the areas of Neurogenomics, Genomics, Computational Biology, Structural Biology and Health Data Science continued. In the areas of Genomics and Health Data Science, selections were made for a number of Group Leader positions. In the fourth quarter of 2023, selections began for both Heads and technical figures of the National Facilities.

In June 2023, the Human Technopole Foundation's Gender Equality Plan (GEP) was revised and approved, following the guidelines of the European Institute for Gender Equality (EIGE), which aims to "identify and implement innovative strategies to foster cultural change and promote equal opportunities" in universities and research centres.

With regard to staff training, various training activities were carried out for staff, both of a technical-specialist nature and relating to the development of soft skills.

Finally, initiatives were carried out within the framework of corporate Mobility policies.

EVENTS OCCURRING AFTER THE END OF THE FINANCIAL YEAR

No significant events occurred after the end of the financial year.

OUTLOOK

With respect to the development of internal research activities, a further expansion of the Research Group lines is planned.

With regard to Personnel, the recruitment and hiring of new resources will continue, especially in the Research Centres and scientific facilities, in line with the growth plan envisaged in the Planning Document for the year 2024, whereby by the end of the year the Human Technopole Foundation will reach a total of 450 units, including PhD staff.

On the infrastructure side, we will proceed with the process of obtaining the building permit for the new buildings to complete the Campus, with the aim of tendering the construction of the buildings by early 2025.

Significant investments are also expected in design and works for the construction of spaces for the management of the National Facilities.

With regard to the National Facilities Implementation Plan, the definition and opening of the first calls for tenders for access to the facilities of the first external research projects is envisaged, in accordance with the provisions of the Agreement signed with the Supervising Administrations pursuant to Law 160/2019.

PROPOSED ALLOCATION OF THE ECONOMIC RESULT

Ladies and Gentlemen,

We thank you for the trust you have placed in us and invite you to approve the Financial Statements, Notes to the Financial Statements and this Report as presented, proposing to allocate the economic surplus for the financial year 2023, amounting to €35,339 to the Management Fund.

Milan, 10 April 2024

THE MANAGEMENT COMMITTEE
Chairman
(Prof. Marino Zerial)



BALANCE SHEET AND INCOME STATEMENT

HT BALANCE SHEET - ASSETS

BALANCE SHEET ASSETS - (VALUES EXPRESSED IN EURO)	31/12/2023	31/12/2022
A) RECEIVABLES FROM MEMBERS FOR PAYMENTS STILL DUE	-	-
Receivables from members already called up	-	-
Receivables from members not yet called up	-	-
B) FIXED ASSETS, WITH SEPARATE INDICATION OF LEASED ASSETS	131,361,161	125,810,834
I. Intangible assets	173,257	158,736
4) Concessions, licences, trademarks and similar rights	70,996	38,134
7) Other	102,261	120,602
II. Tangible assets	131,187,904	125,652,098
1) Land and buildings	69,189,610	61,396,105
2) Plant and machinery	2,403,592	2,713,821
3) industrial and commercial equipment	29,867,201	31,975,887
4) Other assets	24,886,228	23,694,308
5) Assets under construction and down payments	4,782,363	5,871,977
7) Other	58,910	-
III. Financial assets	-	-
C) CURRENT ASSETS	570,969,235	504,247,652
I. Inventory	82,084	58,004
1) Raw materials, consumables and goods	82,084	58,004
II. Receivables	151,320,628	390,259,720
1) trade receivables	116,526	87,702
within 12 months	116,526	87,702
beyond 12 months	-	-
5-b) tax assets	179,855	80,632

BALANCE SHEET ASSETS - (VALUES EXPRESSED IN EURO)	31/12/2023	31/12/2022
within 12 months	179,855	80,632
beyond 12 months	-	-
5-quater) from others	150,582,368	389,775,433
within 12 months	4,855,141	389,775,433
beyond 12 months	145,727,226	-
6) OTHER RECEIVABLES FROM INTERNAL RECHARGES	441,879	315,953
within 12 months	441,879	315,953
beyond 12 months	-	-
III. Current financial assets	377,786,337	103,725,028
7) Non-interest-bearing accounts with the General State Treasury	377,786,337	103,725,028
IV. Cash and cash equivalents	41,780,186	10,204,900
1) Bank and postal deposits	41,779,300	10,203,763
3) Cash-in-hand and cash equivalents	886	1,137
D) ACCRUED INCOME AND PREPAYMENTS	1,593,069	1,452,443
Sundry	1,593,069	1,452,443
TOTAL ASSETS	703,923,465	631,510,929



HT FOUNDATION BALANCE SHEET - LIABILITIES

BALANCE SHEET LIABILITIES (VALUES EXPRESSED IN EURO)	31/12/2023	31/12/2022
A) EQUITY	541,562,132	470,516,175
I. Endowment Fund and Reserves	77,261,869	77,261,869
HT Endowment Fund	77,261,869	77,261,869
IV. Management Fund	464,166,462	393,155,844
HT Management Fund	231,802,262	236,760,236
NF Management Fund	219,593,481	143,164,179
CITT Management Fund	12,770,719	13,231,429
VIII. Economic surplus (deficit) from the previous year	98,463	60,431
IX. Economic surplus (deficit) for the year	35,339	38,032
B) PROVISIONS FOR RISKS AND CHARGES	316,854	1,301
3) Other provisions	316,854	1,301
C) SEVERANCE PAY	1,495,397	1,023,134
D) PAYABLES	21,542,069	25,717,646
4) Loans from banks	-	98
within 12 months	-	98
7) Trade payables	16,227,267	20,482,890
within 12 months	16,227,267	20,482,890
12) Tax payables	1,985,037	2,956,573
within 12 months	1,985,037	2,956,573
beyond 12 months	-	-

BALANCE SHEET LIABILITIES (VALUES EXPRESSED IN EURO)	31/12/2023	31/12/2022
13) Payables to social security institutions	1,397,895	1,089,137
within 12 months	1,397,895	1,089,137
beyond 12 months	-	-
14) Other payables	1,522,991	915,248
within 12 months	1,522,991	915,248
beyond 12 months	-	-
15) Other payables from internal recharges	408,879	273,701
within 12 months	408,879	273,701
beyond 12 months	-	-
E) ACCRUALS AND DEFERRALS	139,007,012	134,252,672
Sundry	139,007,012	134,252,672
TOTAL LIABILITIES	703,923,465	631,510,929



HT INCOME STATEMENT

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
A) VALUE OF PRODUCTION	66,609,077	65,779,053
1) Turnover from sales and services	-	-
2) Changes in inventories of work in progress, semi-finished and finished products	-	-
3) Changes in contract work in progress	-	-
4) Increases in fixed assets for internal work	-	-
5) Other revenue and income:	66,609,077	65,779,053
a) Various	145,166	191,691
b) HT grants:	63,950,038	64,737,640
of which HT Operating grants	48,148,019	51,925,398
of which HT Capital grants	15,802,019	12,812,242
c) CITT grants	460,711	254,939
of which CITT Capital grants	-	-
of which CITT Operating grants	460,711	254,939
d) National Facilities grants	735,022	46,625
e) other entities grants	1,318,139	548,158
of which other entities capital grants	-	-
of which other entities operating subsidies	1,318,139	548,158
B) COSTS OF PRODUCTION	65,878,262	65,112,804
6) Purchases of raw materials, consumables and goods	10,179,848	8,923,279
7) Expenses for services	16,003,219	23,453,360
8) Costs for use of third party assets	951,078	1,140,275
9) Personnel expenses	21,353,337	17,652,328
a) Wages, salaries	15,322,839	12,807,916
b) Social security contributions	4,401,184	3,563,014
c) Severance pay	1,028,831	862,395
d) Pensions and similar costs	172,691	107,485
e) Other costs	427,791	311,518
10) Amortisation, depreciation and write-downs	15,853,076	12,837,770
a) Amortisation of intangible assets	63,381	44,394

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
b) Depreciation of tangible assets	15,789,695	12,793,376
c) Other write-downs of fixed assets	-	-
d) Write downs of current receivables and cash and cash equivalents	-	-
11) Changes in inventories of raw, ancillary and consumable materials and goods	24,080	15,692
12) Provision for risks	315,553	-
13) Other provisions	-	1,301
14) Other operating costs	1,198,071	1,088,799
Difference between value and costs of production	730,815	666,249
C) FINANCIAL INCOME AND CHARGES	1,391	10,777
17) Interest and other financial charges:	-	3,313
from subsidiaries	-	-
from related companies	-	-
from parents	-	-
other	-	3,313
17 bis) foreign exchange gains and losses	1,391	7,464
D) VALUE ADJUSTMENTS TO FINANCIAL ASSETS	-	-
Pre-tax profit	729,424	655,472
20) Income taxes for the year	694,085	617,441
a) Current taxes	694,085	617,441
b) Deferred taxes	-	-
c) Deferred tax assets	-	-
d) Income (expenses) from joining the tax consolidation/tax transparency scheme	-	-
21) Profit/(Loss) for the year	35,339	38,032



CASH FLOW STATEMENT

HT CASH FLOW STATEMENT

INDIRECT METHOD - DESCRIPTION [€]	31/12/2023	31/12/2022
A. FINANCIAL FLOWS FROM OPERATIONS		
Economic surplus (deficit) for the year	35,339	38,032
Income taxes	694,085	617,441
Interest expense/(interest income)	-	3,313
(Dividends)	-	-
(Gains)	-	-
Total Capital gains/Losses deriving from disposal of assets	-	-
1. Economic surplus (deficit) for the year before income tax, interest, dividends and capital gains/losses from sale in the net working capital	729,424	658,785
Non-monetary adjustments with no balancing entry in		
net working capital		
Allocations to provisions	315,553	1,301
Amortisation/depreciation of fixed assets	15,853,076	12,837,770
Write-downs due to impairment losses	-	-
Total non-monetary adjustments with no balancing entry in net working capital	16,168,629	12,839,071
2. Cash flow before changes in the net working capital	16,898,053	13,497,856
Changes in net working capital		
Decrease/(increase) in inventories	(24,080)	15,692
Decrease/(increase) in trade receivables	(28,824)	5,892

INDIRECT METHOD - DESCRIPTION [€]	31/12/2023	31/12/2022
Increase/(decrease) in trade payables	(4,255,623)	1,675,828
Decrease/(increase) in accrued income and prepayments	(140,626)	(890,124)
Increase/(decrease) in accrued expenses and deferred income	4,754,341	7,667,068
Other decreases/(Other Increases) in working capital	239,030,167	(11,163,115)
Total changes in net working capital	239,335,354	(2,688,758)
3. Cash flow after changes in net working capital	256,233,408	10,809,098
Other adjustments		
Interest received/(paid)	-	(3,313)
(Income taxes paid)	(676,193)	(884,775)
Dividends collected	-	-
(Use of provisions)	472,263	458,212
Other collections/(payments)	-	-
Total other adjustments	(203,930)	(429,876)
CASH FLOW FROM OPERATING ACTIVITIES (A)	256,029,478	10,379,222
B. CASH FLOWS FROM INVESTING ACTIVITIES		
Tangible assets	(21,325,501)	(22,860,213)
(Investments)	(21,325,501)	(22,860,213)
Disinvestments	-	-



INDIRECT METHOD - DESCRIPTION [€]	31/12/2023	31/12/2022
Intangible assets	(77,902)	(164,566)
(Investments)	(77,902)	(164,566)
Disinvestments	-	-
Current financial assets	(274,061,308)	(63,711,029)
(Investments)	(274,061,308)	(63,711,029)
Disinvestments	-	-
(Acquisition of business units net of cash and cash equivalents)	-	-
Sale of business units net of cash and cash equivalents	-	-
CASH FLOWS FROM INVESTMENT ACTIVITIES (B)	(295,464,712)	(86,735,808)
C. CASH FLOWS FROM FINANCING ACTIVITIES		
Third-party funds		
Increase/(Decrease) in short term bank loans and borrowings	(98)	98
Opening of loans	-	-
(Loans repaid)	-	-
Own funds		
Increase in Endowment Fund	-	-
Increase in Management Fund	71,010,618	66,096,353
(Dividends and interim dividends)	-	-

INDIRECT METHOD - DESCRIPTION [€]	31/12/2023	31/12/2022
FINANCIAL FLOWS FROM FINANCING ACTIVITIES (C)	71,010,520	66,096,451
INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS (A+-B+-C)	31,575,286	(10,260,134)
Foreign exchange effect on cash and cash equivalents	-	-
Opening cash and cash equivalents		
Bank and postal deposits	10,203,763	20,464,315
Cheques	-	-
Cash-in-hand and cash equivalents	1,137	719
Total opening cash and cash equivalents	10,204,900	20,465,035
Of which not freely usable	-	-
Closing cash and cash equivalents		
Bank and postal deposits	41,779,300	10,203,763
Cheques	-	-
Cash-in-hand and cash equivalents	886	1,137
Total closing cash and cash equivalents	41,780,186	10,204,900
Of which not freely usable	-	-

INCOME STATEMENT - CITT DETAILS

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
A) VALUE OF PRODUCTION	460,721	254,939
1) Turnover from sales and services	-	-
2) Changes in inventories of work in progress, semi-finished and finished products	-	-
3) Changes in contract work in progress	-	-
4) Increases in fixed assets for internal work	-	-
5) Other revenue and income:	460,721	254,939
a) Various	10	-
b) HT grants:	-	-
of which HT Operating grants	-	-
of which HT Capital grants	-	-
c) CITT grants	460,711	254,939
of which CITT Capital grants	-	-
of which CITT Operating grants	460,711	254,939
d) National Facilities grants	-	-
e) other entities grants	-	-
of which other entities capital grants	-	-
of which other entities operating subsidies	-	-
B) COSTS OF PRODUCTION	460,721	254,939
6) Purchases of raw materials, consumables and goods	2,196	-
7) Expenses for services	226,893	130,867
8) Costs for use of third party assets	179	-
9) Personnel expenses	231,196	123,947
a) Wages, salaries	195,994	114,143
b) Social security contributions	25,298	6,774
c) Severance pay	6,258	1,568
d) Pensions and similar costs	957	534
e) Other costs	2,689	928

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
10) Amortisation, depreciation and write-downs	-	-
a) Amortisation of intangible assets	-	-
b) Depreciation of tangible assets	-	-
c) Other write-downs of fixed assets	-	-
d) Write downs of current receivables and cash and cash equivalents	-	-
11) Changes in inventories of raw, ancillary and consumable materials and goods	-	-
12) Provision for risks	-	-
13) Other provisions	-	-
14) Other operating costs	257	125
Difference between value and costs of production	-	-
C) FINANCIAL INCOME AND CHARGES	-	-
17) Interest and other financial charges	-	-
from subsidiaries	-	-
from related companies	-	-
from parents	-	-
other	-	-
17 bis) Foreign exchange gains and losses	-	-
D) VALUE ADJUSTMENTS TO FINANCIAL ASSETS	-	-
Pre-tax profit	-	-
20) Income taxes for the year	-	-
a) Current taxes	-	-
b) Deferred taxes	-	-
c) Deferred tax assets	-	-
d) Income (expenses) from joining the tax consolidation/tax transparency scheme	-	-
21) Profit/(Loss) for the year	-	-



INCOME STATEMENT - TRADE DETAIL

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
A) VALUE OF PRODUCTION	97,133	98,864
1) Turnover from sales and services	-	-
2) Changes in inventories of work in progress, semi-finished and finished products	-	-
3) Changes in contract work in progress	-	-
4) Increases in fixed assets for internal work	-	-
5) Other revenue and income:	97,133	98,864
a) Various	97,133	98,864
b) HT grants:	-	-
of which HT Operating grants	-	-
of which HT Capital grants	-	-
c) CITT grants	-	-
of which CITT Capital grants	-	-
of which CITT Operating grants	-	-
d) National Facilities grants	-	-
e) other entities grants	-	-
of which other entities capital grants	-	-
of which other entities operating subsidies	-	-
B) COSTS OF PRODUCTION	620,171	583,531
6) Purchases of raw materials, consumables and goods	(112)	(5,551)
7) Expenses for services	259,439	207,479
8) Costs for use of third party assets	-	-
9) Personnel expenses	73,197	68,808
a) Wages, salaries	55,613	51,744
b) Social security contributions	13,625	13,176
c) Severance pay	2,964	2,876
d) Pensions and similar costs	-	12
e) Other costs	995	1,000
10) Amortisation, depreciation and write-downs	276,219	256,480
a) Amortisation of intangible assets	-	-
b) Depreciation of tangible assets	276,219	256,480

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
c) Other write-downs of fixed assets	-	-
d) Write downs of current receivables and cash and cash equivalents	-	-
11) Changes in inventories of raw, ancillary and consumable materials and goods	-	-
12) Provision for risks	-	-
13) Other provisions	-	-
14) Other operating costs	11,427	56,314
Difference between value and costs of production	(523,037)	(484,667)
C) FINANCIAL INCOME AND CHARGES	-	953
17) Interest and other financial charges	-	-
from subsidiaries	-	-
from related companies	-	-
from parents	-	-
other	-	-
17 bis) Foreign exchange gains and losses	-	953
D) VALUE ADJUSTMENTS TO FINANCIAL ASSETS	-	-
Pre-tax profit	(523,037)	(485,620)
20) Income taxes for the year	195,131	186,270
a) Current taxes	195,131	186,270
b) Deferred taxes	-	-
c) Deferred tax assets	-	-
d) Income (expenses) from joining the tax consolidation/tax transparency scheme	-	-
21) Profit/(Loss) for the year	(718,169)	(671,890)

Explanatory Notes

PART A - INTRODUCTION

The Human Technopole Foundation was established by Article 1, paragraph 116, Law No. 232 of 11 December 2016.

The financial year ended 31 December 2023 was the Human Technopole Foundation's sixth year of operations and was characterised by the growth of scientific operations through the launch of research activities and the infrastructural development of the HT Campus, which led to the repurposing of the South Pavilion and Palazzo Italia, and the purchase of the land on which the South Building and Technological Pole will be built.

The values shown in these financial statements take into account the provisions contained in the Agreement provided for by the Budget Law of 27 December 2019 no. 160, Article 1 - paragraphs 275 to 277, which the Human Technopole Foundation signed on 30 December 2020 with the Founding Ministries - Ministry of University and Research, Ministry of Economy and Finance and Ministry of Health.

In fact, the Agreement assigns to the Human Technopole Foundation, as part of its mission as an infrastructural scientific hub supporting national scientific research, the task of supporting newly identified "infrastructural scientific facilities", defined as "facilities, resources and related services used by the scientific community to conduct high-quality research in their respective fields, without any official or national affiliation".

Within the scope of this mandate, the Human Technopole Foundation is, *inter alia*, requested to allocate a share of no less than 55% (fifty-five per cent) per year of the public funding granted to the Human Technopole Foundation pursuant to Article 1, paragraph 121, of Law no. 232 of 11 December 2016, excluding, however, from its 'scope' "the facilities under construction in accordance with the provisions of the Multi-Year Scientific Activity Programme Plan referred to in Articles 13.3(b) and 18.2(a) of the Articles of Association of the Human Technopole Foundation (Strategic Plan), and the resources required for their implementation, operation and maintenance".

These financial statements, submitted for your examination and approval, show a positive operating result for the year of €35,339.

Data on public/private grants received and the related use of financial resources are highlighted below. For 2018, 2019 and 2020, the residual liquidity at the end of each financial year is shown, while for the financial years 2021, 2022 and 2023, the incomes and their use are detailed. As at 31 December 2023, residual liquidity amounted to €419,566,523.

YEAR	GRANTS	ACTIVITY	AMOUNT (EURO)
2018-2019		Liquidity as at 31.12.2019	79,160,927
2020		Liquidity as at 31.12.2020	83,552,616
	MEF-HT	Amount of grant received on 09.10.2021 BDI	7,818,663
	MEF-HT	Amount of grant received on 21.09.2021 BDI	30,763,999
	MEF-HT	Amount of grant received on 16.12.2021 BDI	17,978,376
		Other money received from 01.01.2021 to 31.12.2021 (Banca Intesa) CITT	807
	NON-MEF	Amount of grant received on 27.09.2021 (EMBO)	16,250
2021	NON-MEF	Amount of grant received on 02.12.2021 (GOOGLE)	8,747
	NON-MEF	Amount of grant received on 13.12.2021 (EMBO)	176,062
	NON-MEF	Amount of grant received on 24.12.2021 (MAECI)	12,810
		Net disbursements from 01.01.2021 to 31.12.2021 (Banca Intesa) and cash	(79,849,295)
		Liquidity as at 31.12.2021	60,479,034
	MEF-HT	Amount of grant received on 15.11.2022	22,760,586
	MEF-HT	Amount of grant received on 03.10.2022 BDI	41,165,459
	MEF-HT	Amount of grant received on 22.12.2022 BDI	9,948,204
	MEF-HT	Amount of grant received on 04.07.2022 BDI	30,000,000
	MEF-HT	Amount of grant received on 27.12.2022 BDI	20,600,779
	NON-MEF	Amount of grant received on 24.02.2022 (WAF-Harschnitz)	143,090
	NON-MEF	Amount of grant received on 25.01.2022 (EI08A - SVCF-Desc)	17,643
	NON-MEF	Amount of grant received on 27.01.2022 (EI07A - SVCF-Jug)	17,792
	NON-MEF	Amount of grant received on 27.12.2022 (BBRF-Harschnitz-NARSAD)	16,166
	NON-MEF	Amount of grant received on 22.12.2022 (AIRC-Iorio-Fellow Savino)	8,750
	NON-MEF	Amount of grant received on 26.01.2022 (EI02A - EMBO-Pigino)	48,750
	NON-MEF	Amount of grant received on 06.05.2022 (EI09A ERC-Coscia)	524,563
	NON-MEF	Amount of grant received on 27.06.2022 (Grant Helen Foster)	33,000
2022	NON-MEF	Amount of grant received on 28.06.2022 (EI09A ERC-Coscia)	374,688
	NON-MEF	Amount of grant received on 22.11.2022 (EI12A NEUROCOV)	1,132,229
	NON-MEF	Amount of grant received on 17.11.2022 (EI16A EUREKA)	36,443
	NON-MEF	Amount of grant received on 11.11.2022 (BBRF HARSCHNITZ NARSAD)	16,778
	NON-MEF	Amount of grant received on 19.10.2022 (EI03A ERC PIGINO CILIATUBILIN)	325,056
	NON-MEF	Amount of grant received on 17.10.2022 (AI4LIFE)	575,250
	NON-MEF	Amount of grant received on 27.09.2022 (EI02A - EMBO-Pigino)	16,250
	NON-MEF	Amount of grant received on 09.09.2022 (R2D2)	175,000
	NON-MEF	Amount of grant received on 26.08.2022 (EI15A EMBO HARSCHNITZ COLOMBO)	22,000
	NON-MEF	Amount of grant received on 08.07.2022 (EI10A WAF HARSCHNITZ)	196,333
		Net disbursements from 01.01.2022 to 31.12.2022 (Banca Intesa) and cash	(74,703,914)
		0085cd	113,929,929



YEAR	GRANTS	ACTIVITY	AMOUNT (EURO)
	MEF-HT	Amount of grant received on 11/07/2023 BDI	35,075,000
	MEF-HT	Amount of grant received on 05/07/2023 BDI	136,500,000
	MEF-HT	Amount of grant received on 03/05/2023 BDI	35,075,000
	MEF-HT	Amount of grant received on 15/03/2023 BDI	35,075,000
	MEF-HT	Amount of grant received on 20/10/2023 BDI	35,075,000
	MEF-HT	Amount of grant received on 05/09/2023 BDI	30,000,000
	MEF-HT	Amount of grant received on 24/10/2023 BDI	40,986,337
	MEF-HT	Amount of grant received on 14.12.2023	30,000,000
	NON-MEF	Amount of grant received on 13/01/2023 (EI02A EMBO-Pigino-Fellow Klena)	48,750
	NON-MEF	Amount of grant received on 13/01/2023 (EI15A EMBO HARSCHNITZ Fellow Colombo)	44,000
	NON-MEF	Amount of grant received on 13/01/2023 (EI06A EMBO-Pigino-Fellow Foster)	33,000
	NON-MEF	Amount of grant received on 13/01/2023 (EI20A EMBO-Casanal-Fellow Leroy)	67,200
	NON-MEF	Amount of grant received on 30/01/2023 (8A AIRC-Kalebic-MFAG 2022)	71,610
	NON-MEF	Amount of grant received on 14/02/2023 (EI19A EMBO-Vannini-Fellow Borsellini)	67,200
	NON-MEF	Amount of grant received on 30/03/2023 (EH 7AAIRC-Iorio-Fellow Savino)	8,750
	NON-MEF	Amount of grant received on 20/04/2023 (EI03A ERC PIGINO)	266,776
2023		CILIATUBILINCODE MPI-CBG)	
	NON-MEF	Amount of grant received on 26/06/2023 (EI06A EMBO-Pigino-Fellow Foster)	33,000
	NON-MEF	Amount of grant received on 29/06/2023 (EI03A ERC PIGINO CILIATUBILINCODE MPI-CBG)	370,186
	NON-MEF	Amount of grant received on 30/06/2023 (7A AIRC-Iorio-Fellow Savino)	8,750
	NON-MEF	Amount of grant received on 07/08/2023 (SNSF-Coscia-Fellow Ramanadane)	52,583
	NON-MEF	Amount of grant received on 25/08/2023 (EMBO-Harschnitz-Fellow Colombo)	22,000
	NON-MEF	Amount of grant received on 22/09/2023 (EMBO-Pigino-Fellow Klena)	10,833
	NON-MEF	Amount of grant received on 28/09/2023 (AIRC-Iorio-Fellow Savino)	4,375
	NON-MEF	Amount of grant received on 27/10/2023 (Telethon-Harschnitz-Modelling ADA-SCID)	14,328
	NON-MEF	'Amount of grant repaid on 14/11/2023 (EIP4A - Longevity Impetus)'	(145,000)
	NON-MEF	Amount of grant received on 7/12/2023 (EUREKA-Bienko-Mohit Viridi)	36,443
	NON-MEF	Amount of grant received on 7/12/2023 (EUREKA-Pinheiro-Valsecchi)	37,150
	NON-MEF	Amount of grant received on 27/12/2023 (ERC-Bienko-Radialis)	1,199,793
	MEF-HT	Net disbursements from 01.01.2023 to 31.10.2023 (Banca Intesa) and cash	(74,401,471)
		Liquidity as at 31.12.2023	419,566,523

SIGNIFICANT EVENTS DURING THE YEAR

Reference is made in full to what has already been outlined in the Management Report.

PREPARATION CRITERIA

The Financial Statements for the year ended 31 December 2023 were prepared in accordance with Articles 2423 et seq. of the Italian Civil Code, adopting the extended form, even though the prerequisites set forth in Article 2435-bis for preparing them in an abridged form are met. The criteria used in drafting and evaluation take into account the standards in the national legal system pursuant to Leg. Decree No. 139/2015, through which Directive 2013/34/EU was implemented.

The book values are expressed in € by rounding off the relevant amounts. Any differences from rounding have been reported in the item "€ rounding Reserve" among Equity items. Pursuant to article 2423, para. six, of the Italian Civil Code, the Notes to the Financial Statements have been prepared in units of €. These Notes to the Financial Statements present information on the items of the Balance sheet and Income statement in the order these items are indicated in the financial statements.

BASIS OF PREPARATION

The valuation of financial statement items has been made on the basis of general policies of prudence and competence with a going concern perspective.

In accordance with the accrual principle, the effect of operations and other events is recorded in the year which such operations and events refer to, rather than in the year of the corresponding cash flows (receipts and payments).

In accordance with the principle of relevance, the recognition, measurement, presentation and disclosure requirements have not been complied with when their observance would have an immaterial effect on the truthful and accurate overview.

Continuity of application of the measurement policies over time is an essential element for the purposes of comparability of the company's financial statements during the various years.

Balance sheet items have been stated and presented by taking the substance of the transaction or contract into account.

The Financial Statements consist of the 'Balance Sheet', the 'Income Statement', the 'Cash Flow Statement', the 'Notes to the Financial Statements' and are accompanied by the 'Management Report'.

The 'Balance Sheet' is arranged by macro-classes, according to the criterion of increasing liquidity, while the groupings and items are subdivided by type.

The various balance sheet items are shown net of the relevant adjustment items.

The memorandum accounts are no longer shown in the balance sheet and are described in these Notes to the Financial Statements.

The 'Income Statement' has been prepared in accordance with the format set by Article 2425 of the Civil Code and represents economic transactions.

The scheme is characterised by the cost and revenue structure of the production carried out, with a development in scalar form and whose content reflects a sorting of costs by type.

The Income Statement is subdivided into areas showing:

- ▶ **Ordinary operations,** (items A and B), which consists of the typical and non-typical activities of the Human Technopole Foundation and whose economic result is indicated by the definition: 'Difference between value and production costs';
- ▶ **Financial transactions,** (items C and D), which refers to expenses and income arising from the provision of monetary funds and their temporary investment pending their use in ordinary operations;

► **Income taxes**, (item 20), consist of direct taxes (IRAP and IRES) on the taxable income for the year. They were accounted for by taking into account taxable income for the year and according to current tax regulations. At the balance sheet date, there were no deferred tax liabilities or deferred tax assets.

The comparison with the previous accounting period is implemented by indicating in two separate columns the balance for the current year and the balance for the previous year.

The Cash Flow Statement constitutes an element of the Financial Statements. It should be noted that the Human Technopole Foundation, in complying with the provisions of OIC (Italian Accounting Body) 10, has adopted the indirect method.

The Notes to the Financial Statements have been prepared with the aim of clarifying, completing and analysing the information contained in the Balance Sheet, Income Statement and Cash Flow Statement, as well as providing information on the valuation criteria applied, the transactions that occurred and the changes in the various asset and liability items.

They form an integral part of these Financial Statements and provide descriptive and tabular information, with particular reference to the asset, economic and financial aspects of operations.

EXCEPTIONAL EVENTS PURSUANT TO ART. 2423, FIFTH PARAGRAPH, OF THE CIVIL CODE

No exceptional events requiring recourse to derogations under Art. 2423, fifth paragraph, of the Civil Code occurred during the year.

ACCOUNTING POLICIES

FIXED ASSETS

Intangible assets

They are recorded at historical acquisition cost, including accessory charges and VAT (where this is considered non-deductible as a result of being allocated to official activities) and shown net of depreciation charged directly to the individual items over the years.

Licences, concessions and trademarks and the software used have a useful life of 3 years.

Regardless of any amortisation already recognised, if there is impairment the asset is written down accordingly. If the reasons for the write-down no longer apply in the subsequent years, the original value is posted, adjusted according to the sole amortisations.

Tangible assets

Tangible assets are recorded at purchase cost including accessory charges and non-deductible VAT and adjusted by the corresponding depreciation provisions.

Depreciation, charged to the Income Statement, was calculated based on use, destination and economic-technical life of the assets, based on the remaining useful life criterion, a criterion we believe is well represented by the following rates, reduced by half in the year in which the asset became operational:

ASSET TYPE	% DEPRECIATION
Industrial buildings	3%
Plant and machinery	15%
Furniture	12%
Laboratory furniture and furnishings	10%
Commercial furniture	15%
Laboratory equipment	20%
General plant and equipment	10%
Electronic office machines	20%
Light construction	10%

Regardless of any depreciation already recognised, if there is impairment the asset is written down accordingly. If the reasons for the write-down no longer apply in the subsequent years, the original value is posted, adjusted according to the sole amortisations.

INVENTORY

Inventories at 31 December 2023 are valued using the same valuation method as in 2022, which is weighted average cost.

RECEIVABLES

They are stated at their estimated realisable value and without using the amortised cost method, taking into account that all receivables have short-term collectability and therefore the application of the amortised cost method would have insignificant effects.

CURRENT FINANCIAL ASSETS

As of the 2016 financial year, accounting standard OIC 14 has changed the classification and valuation of cash and cash equivalents by restricting them to bank and post office current accounts that are collectible on a spot basis and usable for any business purpose. In light of these provisions, we highlight two important aspects concerning the assets held in the treasury accounts with the Bank of Italy in the name of the Human Technopole Foundation:

- ▶ they are devoid of the spot collectability requirement (given the procedure and withdrawal limits imposed by law and the guidelines agreed with the Ragioneria Generale dello Stato (RGS);
- ▶ they have strong similarities with the centralised treasury management methods, given the Human Technopole Foundation's impossibility to access these funds directly, but only after a request for authorisation and transfer forwarded to the RGS.

In accordance with the provisions of the new OIC 14, these assets of the Human Technopole Foundation, which are held in treasury accounts with the Bank of Italy, are therefore recorded under 'Current financial assets' at nominal value.

EQUITY

The equity of non-commercial entities is intended on a lasting basis to support the acquisition of the necessary production factors of both current and investment nature; its nature can therefore be defined as a purpose fund, to be allocated to the achievement of the statutory purposes.

PAYABLES

Payables are recorded at their nominal value, which is considered representative of their extinction value and substantially in line with the amortised cost criterion.

Payables in foreign currencies have been accounted for on the basis of the exchange rates on the date on which the relevant transactions were carried out; positive or negative differences arising from the valuation of foreign currency items at the year-end exchange rate are respectively credited and debited to the year.

In addition to the value of payables for invoices received, 'Trade payables' include the value of invoices to be received for services rendered and orders delivered, which had not been invoiced by the balance sheet date.

"Tax payables" include liabilities for withholding taxes as withholding agent, direct taxes for the year represented by IRAP and IRES, as well as indirect taxes. The latter are determined in accordance with a realistic forecast of the tax liability to be paid, taking into account current tax legislation, and are shown net of advance payments.

'Payables to social security institutions' include social security charges relating to employees and personnel, accrued and unpaid at the end of the year, including payables to supplementary pension funds for those who have availed themselves of the option provided for by Law No. 296 of 27.12.2006 concerning the allocation of severance indemnity as from 01.01.2007.

'Other payables' comprise residual payables, not included, by their nature, in the previous items, including payables to employees for all liabilities

accrued towards them, in accordance with current legislation, including the value of accrued and untaken holiday leave and other benefits at the balance sheet date.

The item 'Other payables from internal recharges' includes cost recharges between the various funds (projects).

ACCRUALS AND DEFERRALS

These were determined on an accrual basis. The item 'prepayments' includes costs incurred before the end of the financial year for the portion pertaining to the following year. Deferred income includes income realised before the end of the financial year, but accruing in the following year.

PROVISION FOR RISKS

Provisions for risks and charges represent liabilities of a definite nature, certain or probable, with an indefinite date of occurrence or amount. These are, therefore, contingent liabilities connected with situations already existing at the balance sheet date and related to obligations already undertaken at the balance sheet date, but characterised by a state of uncertainty whose outcome depends on the occurrence or non-occurrence of one or more events in the future and, therefore, will have a cash impact in subsequent years.

Potentiality is defined as a situation, condition or event existing at the balance sheet date, characterised by a state of uncertainty, which, on the occurrence or non-occurrence of one or more future events, may result in a loss (contingent liability) or a gain (contingent asset).

Depending on the degree of realisation and occurrence, future events can be classified as probable, possible or remote. An event is probable when its occurrence is considered more likely than not. An event is possible when it depends on a circumstance that may or may not occur. An event is remote when it has very little chance of occurring.

SEVERANCE PAY

This represents the actual debt accrued towards employees, in accordance with the law and current employment contracts, taking into account all forms of ongoing remuneration. The provision corresponds to the total of individual indemnities accrued in favour of employees at the balance sheet date and is equal to the amount that would have been payable to employees if they had terminated their employment at that date. It should be noted that the value included in this item relates to the severance pay accruals that most employees decided to keep within the company, not availing themselves of the option provided for by Law No. 296 of 27.12.2006 to pay the severance pay accrued from 1.1.2007 to Supplementary Pension Funds.

INCOME TAXES

Taxes are set aside on an accrual basis and according to current tax regulations. At the balance sheet date, there were no deferred tax liabilities or deferred tax assets.

INCOME AND EXPENSES

Income and expenses are recognised on an accrual basis, irrespective of the date of receipt and payment, and in accordance with the principle of prudence, also in view of the preservation of the value of the Human Technopole Foundation's assets and on a going concern basis.

GRANTS FOR OPERATING EXPENSES

Pursuant to Accounting Principle No. 1 for non-profit organisations, operating grants received, whether by law or under contractual provisions, related to specific activities of the Human Technopole Foundation, are recognised on an accrual basis, based on the costs incurred to which they relate, regardless of their receipt.

In this regard, in fact, the principle provides that "where a correlation can be discerned between income, even of a non-monetary nature, it may be correlated with the expenses of the financial year.

This correlation is a fundamental corollary of the principle of the accrual basis of operational events characterising official activities and expresses the need to set off the expenses of the financial year, whether certain or presumed, against the related income." Since these grants are specifically for the ordinary activities of the Human Technopole Foundation, they are recognised in the Income Statement under item A5) Other revenues and income, where they are shown separately under the sub-item 'Operating grants'. The costs pertaining to the year are partly covered through the use of the grant deferred in the previous year, through the entry of the portion pertaining to the future in the item of deferred income, and partly through the use of the 'Management fund'.

CAPITAL GRANTS

Grants that are fully collected are entered in the balance sheet under deferred income and are reduced at the end of each tax period by charging to the Income Statement an annual portion determined according to the useful life of the asset acquired.

In application of the principles set forth in OIC No. 16 (letter F.II.a) capital grants received from the State (included in the mixed grant granted annually in relation to investment plans destined both to expenses for the acquisition of depreciable instrumental goods and to expenses of a different nature with specific reference to orders formalised by the end of the financial year) are also recognised with this criterion for the portion destined to acquire tangible fixed assets, commensurate with the cost of the investments and with the allocation constraint connected to the mission of the Human Technopole Foundation under the law and the articles of association.

The accounting treatment of capital grants adopted is that of the 'income method', according to which the amount of the grant, charged to the Income Statement under 'other revenues and income', is deferred on an accrual basis to subsequent years through the recording of deferred income, with depreciation charged to the Income Statement calculated on the gross cost of the assets equal to the portion of the grant pertaining to the year.

OTHER ENTITIES GRANTS

Grants that relate to European research projects and other similar funding from other entities (from bank foundations or other public or private institutions) with the adoption of the accounting principle for non-profit entities No. 1 are charged, at the time of disbursement, to deferred income and, at the end of the financial year, charged to income on the basis of the costs incurred (if the grant was made during the year).

OTHER REVENUES AND INCOME

This item includes all positive non-financial income components relating to ancillary activities, which in the case of the Human Technopole Foundation mainly refer to the rental of certain spaces used for commercial activities. This item also includes fees received from other organisations in connection with scientific projects of a commercial nature.

ORDER ACCOUNTS

The commitments undertaken by the Human Technopole Foundation are set out in the appropriate section of the Notes to the financial statements. In particular, there is evidence of the value of contracts for which there is a revocable commitment to make future disbursements.



PART B - INFORMATION ON BALANCE SHEET ASSETS

FIXED ASSETS

INTANGIBLE ASSETS

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
173,257	158,736	14,521

CHANGES IN INTANGIBLE ASSETS

	START-UP AND EXPANSION COSTS	DEVELOPMENT COSTS	INDUSTRIAL PATENTS AND INTELLECTUAL PROPERTY RIGHTS	CONCESSIONS, LICENCES, TRADEMARKS AND SIMILAR RIGHTS
VALUE AT BEGINNING OF YEAR				
Cost	-	-	-	78,157
Write-ups	-	-	-	-
Amortisation (Accumulated amortisation)	-	-	-	(40,023)
Write-downs	-	-	-	-
Carrying amount	-	-	-	38,134
CHANGES DURING THE YEAR				
Increases for acquisitions	-	-	-	76,365
Reclassifications (of carrying amount)	-	-	-	1,537
Decreases due to sale and divestiture (of the carrying amount)	-	-	-	-
Revaluations performed dur- ing the year	-	-	-	-
Amortisation for the year	-	-	-	(45,040)
Write-downs performed dur- ing the year	-	-	-	-
Other changes	-	-	-	-
Total changes	-	-	-	32,862
VALUE AT END OF YEAR				
Cost	-	-	-	156,059
Write-ups	-	-	-	-
Amortisation (Accumulated amortisation)	-	-	-	(85,063)
Write-downs performed dur- ing the year	-	-	-	-
Carrying amount	-	-	-	70,996

The change from the previous year, net of amortisation, was €14,521.

Intangible assets increased in the year 2023 by €77,902 due to increases in software licences and upgrades relating to the tax class 'Concessions, Licences, Trademarks and Similar Rights' as shown in the following table.

GOODWILL	INTANGIBLE ASSETS UNDER CONSTRUCTION AND DOWN PAYMENTS	OTHER	TOTAL INTANGIBLE ASSETS
-	-	146,726	224,883
-	-	-	-
-	-	(26,124)	(66,147)
-	-	-	-
-	-	120,602	158,736
-	1,537	-	77,902
-	(1,537)	-	-
-	-	-	-
-	-	-	-
-	-	(18,341)	(63,381)
-	-	-	-
-	-	-	-
-	-	(18,341)	14,521
-	-	146,726	302,785
-	-	-	-
-	-	(44,465)	(129,528)
-	-	-	-
-	-	102,261	173,257



TANGIBLE ASSETS

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
131,187,904	125,652,098	5,535,806

CHANGES IN TANGIBLE ASSETS

	LAND AND BUILDINGS	PLANT AND MACHINERY	INDUSTRIAL AND COMMERCIAL EQUIPMENT
VALUE AT BEGINNING OF YEAR			
Cost	65,472,743	3,076,280	42,239,687
Write-ups	-	-	-
Depreciation (accumulated depreciation)	(4,076,638)	(362,459)	(10,263,800)
Write-downs	-	-	-
CARRYING AMOUNT	61,396,105	2,713,821	31,975,887
CHANGES DURING THE YEAR			
Increases for acquisitions	8,100,318	24,860	6,176,050
Reclassifications (of carrying amount)	1,766,106	-	1,056,425
Decreases due to sale and divestiture (of the carrying amount)	-	-	-
Revaluations performed during the year	-	-	-
Depreciation for the year	(2,072,919)	(335,089)	(9,341,160)
Write-downs performed during the year	-	-	-
Other changes	-	-	-
Total changes	7,793,505	(310,229)	(2,108,685)
VALUE AT END OF YEAR			
Cost	75,339,167	3,101,140	49,472,161
Write-ups	-	-	-
Depreciation (accumulated depreciation)	(6,149,557)	(697,548)	(19,604,960)
Write-downs performed during the year	-	-	-
CARRYING AMOUNT	69,189,610	2,403,592	29,867,201

OTHER ASSETS	TANGIBLE ASSETS UNDER CONSTRUCTION AND DOWN PAYMENTS	OTHERS	TOTAL TANGIBLE ASSETS
28,598,728	5,871,977	-	145,259,415
-	-	-	-
(4,892,334)	-	-	(19,595,231)
(12,086)	-	-	(12,086)
23,694,308	5,871,977	-	125,652,098
4,800,863	4,264,784	58,910	23,425,784
429,165	(5,354,398)	-	(2,102,702)
-	-	-	-
-	-	-	-
(4,038,108)	-	-	(15,787,276)
-	-	-	-
-	-	-	-
1,191,920	(1,089,614)	58,910	5,535,806
33,828,755	4,782,363	58,910	166,582,496
-	-	-	-
(8,930,441)	-	-	(35,382,506)
(12,086)	-	-	(12,086)
24,886,228	4,782,363	58,910	131,187,904

The change from the previous year, net of depreciation, was €5,535,806.

The value of tangible assets shows an increase in historical cost compared to the previous year of €21,323,082.

The change in the item 'Land and Buildings' is largely attributable to the purchase of the land for the creation of the South Building and technology hub for about €2.6 million, the refurbishment of the Palazzo Italia for about €4.1 million, and the refurbishment of the South Pavilion building for about €1.3 million.

The increase in the item 'industrial and commercial equipment' of about €7 million is mainly due to the purchase of the Cryo-Em Facility microscopy system for about €1.1 million, the Illumina System sequencing system for about €990 thousand, a multimodal imaging system for about €732 thousand, and for the purchase of ultra-freezers, laboratory robots, centrifuges, for about €1.6 million.

The increase in the item 'others' of €58,910 refers to the request for the production of a work of art for the enhancement of Palazzo Italia.

The change in the item 'Other Assets' is broken down as follows:

OTHER TANGIBLE ASSETS	FURNITURE AND FURNISHINGS	LIGHT CONSTRUCTION	LABORATORY FURNITURE AND FIXTURES	ELECTROMECHANICAL AND ELECTRONIC OFFICE MACHINES	MOBILE PHONES
Historical cost	677,781	16,939,633	5,403,367	5,577,947	-
Depreciation previous years	(102,828)	(2,506,982)	(639,579)	(1,655,031)	-
BALANCE AT 31/12/2022	574,953	14,432,651	4,763,788	3,922,916	-
Purchases during the year	756,683	30,665	1,745,435	2,697,245	-
Depreciation for the year	(149,282)	(1,697,030)	(713,767)	(1,478,029)	-
BALANCE AT 31/12/2023	1,182,354	12,766,286	5,795,456	5,142,132	-

- ▶ The increase in 'Light Construction' is attributable to the purchase of the 'Incubator Labs 1' structures;
- ▶ The increase in 'Furniture and fixtures' and 'Laboratory furniture and fixtures' is attributable to the purchase of new furniture for Palazzo Italia and new laboratory furniture;
- ▶ The increase in the item 'Electromechanical and Electronic Office Equipment' is mainly attributable to the supply and installation of VDI Virtual Desktop Infrastructure clusters.

The item 'Tangible assets under construction and down payments' increased by €4,266,321.03, mainly attributable to the supply and installation

of a high content screening system with annexed incubator and inclusive of design amounting to approximately €1.2 million, for a new-generation integrated liquid aspiration/dispensing system with a three-year warranty inclusive of training amounting to approximately €911 thousand, for the supply of five integrable automatic incubators of which three for cell cultures and two for cold storage of culture media amounting to approximately €791 thousand.

It should be noted that reclassifications were made in the year 2023 from the item 'Tangible assets under construction and down payments' amounting to approximately €3.2 million.

CURRENT ASSETS

INVENTORY

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	82,084	58,004	24,080

INVENTORY	VALUE AT BEGINNING OF YEAR	CHANGE DURING THE YEAR	VALUE AT END OF YEAR
Raw materials, consumables and goods	58,004	24,080	82,084
TOTAL INVENTORIES	58,004	24,080	82,084

Inventories are valued, as in the previous year, at weighted average cost. Compared to the year 2022, inventories increased by €24,080.

RECEIVABLES REPORTED IN CURRENT ASSETS

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	151,320,628	390,259,720	(238,939,092)

Changes and due date of receivables reported in current assets:

	VALUE AT BEGINNING OF YEAR	CHANGE DURING THE YEAR	VALUE AT END OF YEAR	PORTION DUE WITHIN ONE YEAR	PORTION DUE AFTER ONE YEAR	OF WHICH WITH A REMAINING DURATION BEYOND 5 YEARS
Trade receivables reported in current assets	87,702	28,824	116,526	116,526	-	-
Tax receivables	80,632	99,224	179,855	179,855	-	-
Receivables due from others reported in current assets	389,775,433	(239,193,065)	150,582,368	4,855,141	145,727,226	-
Other receivables from internal recharges	315,953	125,925	441,879	441,879	-	-
TOTAL RECEIVABLES REPORTED IN CURRENT ASSETS	390,259,720	(238,939,092)	151,320,628	5,593,402	145,727,226	-

The item 'Trade receivables' as at 31/12/2023 is broken down as follows:

DESCRIPTION	AMOUNT
Trade receivables - Italy	51,566
Trade receivables - Foreign	
Receivables for invoices to be issued to customers - Italy	
Receivables for invoices to be issued to foreign customers	64,960
TOTAL	116,526

We highlight the receivable of about €65 thousand representing the exposure under the Sanger research project.

The item 'Tax receivables' as at 31/12/2023 includes the receivable from the tax authorities for VAT amounting to €179,855.

The item 'Receivables from others' as of 31 December 2023, amounting to €150,582,368, is broken down as follows:

DESCRIPTION	AMOUNT
Receivables from the State for grants to be disbursed	147,727,226
Credit notes to be received	570,436
Others	2,284,705
TOTAL	150,582,368

The item 'Receivables from State for grants to be disbursed' amounts to €147,727,226 and consists of the grants indicated in Article 1, paragraph 121 of Law No. 232 of 11 December 2016, relating to the years 2018, 2020 and 2022 for HT amounting to €143,727,226 and the grants pursuant to Law Decree No. 34/2020 (CITT) relating to the year 2022 and 2023 amounting to €4,000,000, for the portion not collected at the closing date of the financial year, as summarised in the tables from page 316 onwards.

With regard to the CITT, it should be noted that in the year 2023, an appropriation was made for grants to be disbursed for the current financial year in the amount of €2,000,000 and a transfer was made of the appropriation of €2,000,000 for the year 2021 as the possibility of retaining resources from the financial year 2021 is limited only to the financial year 2022, these being resources referring to the authorisation of Law Decree no. 24/2020 art. 49 bis. This is done in compliance with the non-applicability of Decree-Law No. 32 of 2019, Article

4-quater, paragraph 1, letter b), which provides for the extension by a further financial year of the term for the retention of appropriation residues in the budget, based on the provisions of Article 34, Paragraph 12, second sentence, of Decree-Law No. 137 of 28 October 2020, converted, with amendments, into Law No. 176 of 18 December 2020, for the resources allocated to the capital account chapters referring to specific measures issued for the management of the Covid-19 emergency, in particular Law Decree 18/2020, Law Decree 23/2020 and Law Decree 34/2020.

With regard to 'Credit notes to be received', it should be noted that the balance is determined by invoices received with incorrect VAT application (split payment). The account was opened in order to ensure that erroneous documents awaiting Credit Notes were accounted for.

The item 'Other' is largely attributable to advance payments to suppliers in the amount of €2,301,614 as contractually agreed.



PERIOD	GRANTS PURSUANT TO LAW 232/2016	GRANTS DISBURSED AS AT 31.12.2019	REMAINING GRANTS AS AT 31.12.2019	GRANTS DISBURSED AS AT 31.12.2020	REMAINING GRANTS AS AT 31.12.2020
2017	€10,000,000	€6,531,520	€3,468,480	€3,468,480	-
2018	€114,300,000	-	€114,300,000	€56,350,370	€57,949,630
2019	€136,500,000	-	€136,500,000	-	€136,500,000
2020	€112,100,000	-	-	-	€112,100,000
2021	€122,100,000	-	-	-	-
2022	€133,600,000	-	-	-	-
2023	€140,300,000	-	-	-	-
TOTAL	€768,900,000	€6,531,520	€254,268,480	€59,818,850	€306,549,630

PERIOD	GRANTS PURSUANT TO DECREE LAW 34/2020 (CITT)	GRANTS DISBURSED AS AT 31.12.2019	REMAINING GRANTS AS AT 31.12.2019	GRANTS DISBURSED AS AT 31.12.2020	REMAINING GRANTS AS AT 31.12.2020
2020	€10,000,000	-	-	€10,000,000	-
2021	€2,000,000	-	-	-	-
2022	€2,000,000	-	-	-	-
2023	€2,000,000	-	-	-	-
TOTAL	€16,000,000	-	-	€10,000,000	-

GRANTS DISBURSED AS AT 31.12.2021	REMAINING GRANTS AS AT 31.12.2021	GRANTS DISBURSED AS AT 31.12.2022	REMAINING GRANTS AS AT 31.12.2022	GRANTS DISBURSED AS AT 31.12.2023	REMAINING GRANTS AS AT 31.12.2023
-	-	-	-	-	-
€56,561,038	€1,388,592	-	€1,388,592	-	€1,388,592
-	€136,500,000	-	€136,500,000	€136,500,000	-
-	€112,100,000	€22,760,586	€89,339,414	€30,000,000	€59,339,414
-	€122,100,000	€51,113,663	€70,986,337	€70,986,337	-
-	-	€50,600,779	€82,999,221	-	€82,999,220
-	-	-	-	€140,300,000	-
€56,561,038	€372,088,592	€124,475,028	€381,213,564	€377,786,337	€143,727,226

GRANTS DISBURSED AS AT 31.12.2021	REMAINING GRANTS AS AT 31.12.2021	GRANTS DISBURSED AS AT 31.12.2022	REMAINING GRANTS AS AT 31.12.2022	GRANTS DISBURSED AS AT 31.12.2023	REMAINING GRANTS AS AT 31.12.2023
-	-	-	-	-	-
-	€2,000,000	-	€2,000,000	€(2,000,000)	-
-	-	-	€2,000,000	-	€2,000,000
-	-	-	-	-	€2,000,000
-	€2,000,000	-	€4,000,000	€(2,000,000)	€4,000,000

BREAKDOWN OF CURRENT RECEIVABLES BY GEOGRAPHICAL AREA

The breakdown of receivables at 31 December 2023 by geographical area is not significant.

CURRENT FINANCIAL ASSETS

Changes in current financial assets:

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	377,786,337	103,725,028	274,061,308

DESCRIPTION	VALUE AT BEGINNING OF YEAR	CHANGES DURING THE YEAR	VALUE AT END OF YEAR
Non-interest-bearing accounts with the Central State Treasury	103,725,028	274,061,308	377,786,337
TOTAL CURRENT FINANCIAL ASSETS	103,725,028	274,061,308	377,786,337

Paragraph 4 Article 49-bis of Decree-Law No. 34 of 19 May 2020, converted with amendments by Law No. 77 of 17 July 2020, added the following sentence to the Law establishing the Human Technopole Foundation, in particular, to Article 1, paragraph 121 of Law No. 232/2016: "The grants to the Endowment Fund and to the Management Fund of the Human Technopole Foundation charged to the State budget shall be credited to a non-interest-bearing account opened with the State Treasury, in the name of the Human Technopole Foundation". Therefore, in compliance with the regulatory provisions, the non-interest-bearing current account No. 25084 at the Central State Treasury was opened. This account is credited with the

annual grant and the sum necessary for the Human Technopole Foundation's activities is transferred to the treasury account opened with Banca Intesa in the manner set forth in Ministerial Decree MEF 49506 of 16 June 2010 and subsequent guidelines. The balance as at 31/12/2023 is derived from the amount of the grant portion received during the fiscal years 2020 to 2023 and any transfers to the treasury account. It should be noted in particular that this balance includes, inter alia, the financial advance received from the Human Technopole Foundation, amounting to €250 million, to cover the estimated construction costs of the new South Building.

CASH AND CASH EQUIVALENTS

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	41,780,186	10,204,900	31,575,286

DESCRIPTION	VALUE AT BEGINNING OF YEAR	CHANGES DURING THE YEAR	VALUE AT END OF YEAR
Bank and postal deposits	10,203,763	31,575,538	41,779,300
Cheques	-	-	-
Cash-in-hand and cash equivalents	1,137	(252)	886
TOTAL CASH AND CASH EQUIVALENTS	10,204,900	31,575,286	41,780,186

The balance represents cash and cash equivalents and the existence of cash and valuables at the end of the financial year.

The item 'Bank and postal deposits' as of 31/12/2023, amounting to €41,779,300, is broken down as follows:

DESCRIPTION	AMOUNT
Banca Intesa c/c 162106	26,674,431
Banca Intesa c/c 176258	9,582,229
Banca Intesa account no. 17247 Non-MEF funds	5,518,696
Credit Card	3,945
TOTAL	41,779,300

The account Banca Intesa 162106 is the treasury account of the Human Technopole Foundation, the account Banca Intesa c/c 176258 is the account that receives the transactions related to CITT, account 17247 was opened to receive the receipts and disbursements of the non-MEF funds.

Credit cards are used to meet immediate expenses.

ACCRUED INCOME AND PREPAYMENTS

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
1,593,069	1,452,443	140,626

They measure income and expenses that are prepaid or deferred with respect to their cash and/or documented manifestation; they are independent of the date of payment or collection of the related income and expenses, which are common to two

or more financial years and are apportionable over time. At 31 December 2023, there were no accrued income and prepayments relating to more than five years.

	ACCRUED INCOME	PREPAYMENTS	TOTAL ACCRUED INCOME AND PREPAYMENTS
Value at beginning of year	-	1,452,443	1,452,443
Change during the year	-	140,626	140,626
VALUE AT END OF YEAR	-	1,593,069	1,593,069

The item is broken down as follows:

DESCRIPTION	AMOUNT
SOFTWARE LICENCES	286,168
IT SUPPORT AND MAINTENANCE SERVICES	735,988
MAINTENANCE AND REPAIR OF SCIENCE INSTRUMENTS	411,022
SUBSCRIPTIONS TO PUBLICATIONS, NEWSPAPERS AND MAGAZINES	689
OTHER RESEARCH SUPPORT SERVICES	8,290
ADMINISTRATIVE SUPPORT SERVICES	16,905
OTHER INSURANCES	600
PUBLICATION OF ADVERTISEMENTS AND STAFF RECRUITMENT	117,321
COMPUTER RENTAL	2,076
OTHER EXPENSES FOR SERVICES	6,603
OTHER TAXES AND FEES	710
RENT PAYABLE	6,697
TOTAL PREPAYMENTS	1,593,069

PART B - INFORMATION ON BALANCE SHEET LIABILITIES AND EQUITY

EQUITY

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
541,562,132	470,516,175	71,045,957

Changes in equity items:

	VALUE AT BEGINNING OF YEAR	ALLOCATION OF PROFIT FOR THE YEAR		OTHER CHANGES			PROFIT FOR THE YEAR	VALUE AT END OF YEAR
		ALLO- CATION OF DIVI- DENDS	OTHER AL- LOCATIONS	INCREASES	DECREASES	RECLAS- SIFICA- TION		
Endowment Funds and Reserves	77,261,869	-	-	-	-	-	-	77,261,869
HT Management Fund	236,760,236	-	-	63,135,000	(68,093,469)	675	-	231,802,262
NF Management Fund	143,164,179	-	-	77,165,000	(735,022)	(675)	-	219,593,481
CITT Management Fund	13,231,429	-	-	2,000,000	(2,460,711)	-	-	12,770,719
Economic surplus (deficit) from the previous year	60,431	-	38,032	-	-	-	-	98,463
Economic surplus (deficit) for the year	38,032	-	(38,032)	-	-	-	35,339	35,339
TOTAL EQUITY	470,516,175	-	-	142,300,000	(71,289,382)	-	35,339	541,562,132

The following table shows the changes in the Management Fund divided between the HT share and the National Facilities share for a total of €455,539,353:

PERIOD	GRANTS PURSUANT TO LAW 232/2016	GRANTS USED			
		2018	2019	2020	
2017	10,000,000	275,387	5,070,516	4,654,097	
2018	114,300,000			68,154,251	
2019	136,500,000				
2020	112,100,000				
2021	122,100,000				
2022	133,600,000				
2023	140,300,000				
TOTAL	768,900,000	275,387	5,070,516	72,808,348	

As established by Article 1, paragraph 119 of Law No. 232 of 11 December 2016, the Human Technopole Foundation's assets are made up of grants from the founding Ministries and increased by further grants from the State, as well as resources from public and private entities.

The Endowment Fund is constituted by the restricted fund for the start-up of the HT science project, provided for by art. 5 of Law Decree no. 185 of 25 November 2015, converted, with amendments, into Law no. 9 of 22 January 2016, and initially allocated to the Fondazione Istituto Italiano di Tecnologia (IIT) for an original amount of €79,900,000 and transferred net of the charges incurred for the project by IIT, in the form of both financial resources and assets in kind, to the Human Technopole Foundation, for an amount of €77,261,869.

As dictated by Article 6, paragraph four, of the Human Technopole Foundation's Articles of Association and Article 3 of the Regulation

governing the Human Technopole Foundation, contained in the Prime Ministerial Decree of 27 February 2018, the aforesaid endowment fund is not available and is restricted to the pursuit of the statutory purposes.

The Management Fund, as of the closing date of the 2023 financial year, was recorded among the Human Technopole Foundation's equity items for a total amount of €464,166,462 and includes the grants indicated in Article 1, paragraph 121 of Law no. 232 of 11 December 2016, relating to the years 2018, 2019, 2020, 2021, 2022 and 2023, for the portion not used at the closing date of the financial year.

This fund consists of three different items:

- ▶ HT Management Fund amounting to €231,802,262;
- ▶ NF Management Fund amounting to €219,593,481;
- ▶ CITT Management Fund amounting to 12,770,719.

				GRANTS TO BE USED	OF WHICH	
	2021	2022	2023		HT	National Facilities
	-	-	-	-	-	-
	46,145,749	-	-	-	-	-
	2,596,626	-	-	133,903,374	133,903,374	
	-	-	-	112,100,000	112,100,000	
	52,530,252	-	-	69,569,748		69,569,748
	-	69,248,708	-	64,351,292	(9,243,138)	73,594,431
	-	-	64,685,061	75,614,939	30,639,080	1,242,025*
	101,272,627	69,248,708	64,685,061	455,539,353	267,399,316	144,406,204

* The figure relating to the 2023 utilisation, in particular the amount of €30,639,080 referred to HT and €1,242,025 referred to the National Facilities, refers to the report submitted to the MEF and concerns the period 01.01.2023_30.06.2023.

The following table shows the changes in the CITT management fund:

PERIOD	CONTRIBUTIONS PURSUANT TO ART. 49-BIS DECREE LAW 34/2020 (CONV. INTO LAW NO. 77/2020)	GRANTS USED						GRANTS TO BE USED
		2018	2019	2020	2021	2022	2023	
2020	10,000,000			90,775	422,857	254,939	460,711	8,770,718
2021	2,000,000					-	(2,000,000)	-
2022	2,000,000					-	-	2,000,000
2023	2,000,000					-	-	2,000,000
TOTAL	16,000,000	-	-	90,775	422,857	254,939	(1,539,289)	12,770,718

It should be noted, as highlighted in the introductory section of these Notes to the Financial Statements, that the 'CITT Management Fund' derives from the grant pursuant to Article 49-bis of Law Decree no. 34 of 19 May 2020, converted with amendments by Law no. 77 of 17 July 2020, which provided for the establishment of the structure called 'Centre for Innovation and Technology

Transfer in the Life Science field', specifying that the Human Technopole Foundation must adopt specific organisational measures and dedicated management solutions, with the adoption of separate accounting for the use of the resources allocated for this purpose. The grant for the Centre for Innovation and Technology Transfer for the year 2020 was equal to



n.24/2020 art. 49 bis, the possibility of retaining the resources from the financial year 2021 is limited only to the financial year 2022 and to the charges incurred.

The class Provisions for risks and charges includes the item 'Other Provisions' with a balance of €1,301 to which the item 'Provisions for risks' is added for an amount of €315,553 related to provisions referring to disputes on procurement procedures for goods and services.

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
1,495,397	1,023,134	472,263
		SEVERANCE PAY
Value at beginning of year		1,023,134
Changes during the year		(88,549)
Accrual of the year		698,828
Use during the year		(140,679)
Other changes		2,662
Total changes		472,263
Value at end of year		1,495,397

PAYABLES

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
21,542,069	25,717,646	(4,175,578)

CHANGES AND MATURITY OF PAYABLES

The maturity of payables is broken down as follows:

	VALUE AT BEGINNING OF YEAR	CHANGE DURING THE YEAR	VALUE AT END OF YEAR	PORTION DUE WITHIN ONE YEAR	PORTION DUE AFTER ONE YEAR	OF WHICH WITH A REMAINING DURATION BEYOND 5 YEARS
Loans from banks	98	(98)	-	-	-	-
Trade payables	20,482,890	(4,255,623)	16,227,267	16,227,267	-	-
Tax payables	2,956,573	(971,536)	1,985,037	1,985,037	-	-
Payables to social security institutions	1,089,137	308,758	1,397,895	1,398,895	-	-
Other payables	1,188,949	742,921	1,931,870	1,931,870	-	-
TOTAL PAYABLES	25,717,646	(4,175,578)	21,542,069	21,542,069	-	-

'Trade payables' are recorded at nominal value and this item includes not only the value of payables for registered invoices, but also the amount of invoices

to be received for services pertaining to the financial year.

Total 'Trade payables' as at 31/12/2023 are broken down as follows:

DESCRIPTION	AMOUNT
Invoices for goods and services	6,266,899
Invoices to be received	9,960,368
TOTAL	16,227,267

The decrease in the item 'trade payables' compared to the previous year is also due to an improvement in average payment times due to the introduction of new business processes. The Human Technopole Foundation was thus able to meet the 30-day deadline for making payments to suppliers, as required by the Human Technopole Foundation's registration as a public body in the ISTAT (National Institute of Statistics) list.

The item 'Tax payables' only includes liabilities for certain and definite taxes. Tax payables include IRES tax payables in the amount of €7,622 and IRAP tax payables in the amount of €74,406. There are also tax payables for employees' IRPEF in the amount of €268,714 and withholding taxes in the amount of €33,979. It should be noted that the item 'other tax payables' is mainly composed of the VAT payable for December, which will be settled in January 2024 in the amount of 1,607,503.

The item 'Tax payables' as at 31/12/2023 is broken down as follows:

DESCRIPTION	AMOUNT
IRAP payable	74,406
IRES payable	7,622
Payables to tax authorities for withholdings on employee income	268,714
Payables to treasury for withholding taxes on self-employed income	33,979
Other tax payables	1,600,317
TOTAL	1,985,037

'Payables to social security institutions for employees and collaborators' include the amount

of social security contributions accrued and unpaid as at 31 December 2023.

Below are the details:

DESCRIPTION	AMOUNT
Payables to INPS	1,209,572
Payables to INAIL	9,062
Payables to PREVINDAI for employees	75,738
Payables to FONCHIM for employees	79,107
Payables to FASCHIM for employees	17,118
Payables to other pension institutions	7,298
PAYABLES TO SOCIAL SECURITY INSTITUTIONS	1,397,895

'Other payables' and 'Other payables for internal recharges' amounting to a total of €1,931,870, include residual payables, which by their nature do not fall under the previous items, including payables to Human Technopole Foundation

employees. In particular, the amount of payables related to leave accrued by employees but not taken was €1,001,408. It should be noted that the increase in the balance for 2023 is due to the increase in recruitment during the year.

BREAKDOWN OF PAYABLES BY GEOGRAPHICAL AREA

The breakdown of payables by geographical area as at 31 December 2023 is shown in the table below:

GEO-GRAPHICAL AREA	BONDS	CONVERTIBLE BONDS	PAYABLES FOR SHAREHOLDER LOANS	LOANS FROM BANKS	PAYABLES TO OTHER LENDERS	DOWN PAYMENTS	TRADE PAYABLES	PAYABLES REPRESENTED BY CREDIT INSTRUMENTS
Italy	-	-	-	-	-	-	14,623,896	-
EU	-	-	-	-	-	-	673,945	-
Non-EU	-	-	-	-	-	-	929,426	-
TOTAL	-	-	-	-	-	-	16,227,267	-

GEO-GRAPHICAL AREA	PAYABLES TO SUBSIDIARIES	PAYABLES TO ASSOCIATES	PAYABLES TO PARENTS	PAYABLES TO SUBSIDIARIES OF PARENTS	TAX PAYABLES	PAYABLES TO SOCIAL SECURITY INSTITUTIONS	OTHER PAYABLES	PAYABLES
Italy	-	-	-	-	1,985,037	1,397,895	1,931,870	5,314,802
TOTAL	-	-	-	-	1,985,037	1,397,895	1,931,870	5,314,802

ACCRUED EXPENSES AND DEFERRED INCOME

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	139,007,012	134,252,672	4,754,341

	ACCRUED EXPENSES	DEFERRED INCOME	TOTAL ACCRUED EXPENSES AND DEFERRED INCOME
Value at beginning of year	-	134,252,672	134,252,672
Change during the year	-	4,754,341	4,754,341
VALUE AT END OF YEAR	-	139,007,012	139,007,012

The item is broken down as follows:

DESCRIPTION	AMOUNT
Deferred income	7,614,573
Deferred income for equipment grants	131,392,440
Deferred income - others	-
TOTAL	139,007,012

The criteria adopted in the valuation and conversion of values expressed in foreign currencies for these items are set out in the first part of these Notes to the Financial Statements.

The portion of the capital grant (treated as advance revenue to be deferred) referring substantially to depreciable capital goods acquired during the year amounting to €131,392,440 was recognised in deferred income, in accordance with the indirect method disciplined by OIC 16.

PART C - INFORMATION ON THE INCOME STATEMENT

VALUE OF PRODUCTION

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	66,609,077	65,779,053	830,024

DESCRIPTION	31/12/2023	31/12/2022	CHANGES
Turnover from sales and services	-	-	-
Other revenues and income	66,609,077	65,779,053	830,024
TOTAL	66,609,077	65,779,053	830,024

The item 'Other revenues and income' is broken down as follows:

- ▶ **Operating grant - HT:** under art. 1, paragraph 121 of Law no. 232/2016: amounting to €48,148,019, relating to the portion of the operating grant, correlated in terms of accrual of the specific activities of the Human Technopole Foundation on account of the charges incurred (as provided for by accounting principle no. 1 for non-profit entities).
- ▶ **Operating grant - CITT:** under art. 49-bis Law Decree 34/2020, converted with amendments by Law No. 77/2020: amounting to €460,711, relating to the portion of the operating grant related to the financing of the 'Centre for Innovation and Technology Transfer in Life Sciences'. The total amount of the 2023 grant ex lege is €2,000,000. The amount under the heading 'Other revenues and income' constitutes the portion pertaining to the financial year ending 31.12.2023.
- ▶ **Capital grant - HT:** amounting to €15,802,019 relates to the capital grant pertaining to the year, calculated on the basis of the depreciation charged to the Income Statement and determined on the basis of the useful life of the assets acquired during the year and in previous years. The accounting of this grant derives from the application of the income method, according to

which the amount of the grant, recognised in the Income Statement under other revenues and income, is deferred to subsequent years on an accrual basis through the recognition of deferred income, with depreciation calculated on the gross cost of the assets equal to the grant portion for the year being recognised in the Income Statement.

- ▶ **Grant - National Facilities:** amounting to €683,965, relating to the operating portion of the grant and €51,057, relating to the capital portion of the grant, related on an accrual basis to the portion of the activity attributed to the National Facilities, on the basis of the costs incurred (as set forth in accounting principle no. 1 for non-profit entities).
- ▶ **Operating Grant - Other Entities:** amounting to €1,318,139, relating to the portion of operating grant paid by entities other than the MEF in connection with the management of specific scientific research projects.
- ▶ **Miscellaneous revenues and income:** amounting to €145,166, they refer mainly to revenues from the commercial activity carried out by the Human Technopole Foundation, which took the form of renting certain spaces in Palazzo Italia, as well as the share of revenues from the scientific project financed by the Sanger Institute.

COSTS OF PRODUCTION

	BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
	65,878,262	65,112,804	765,458
DESCRIPTION	31/12/2023	31/12/2022	CHANGES
Raw and ancillary materials and goods	10,179,848	8,923,279	1,256,569
Services	16,003,219	23,453,360	(7,450,141)
Use of third party assets	951,078	1,140,275	(189,197)
Wages and salaries	15,322,839	12,807,916	2,514,923
Social security contributions	4,401,184	3,563,014	838,170
Severance pay	1,028,831	862,395	166,436
Retirement benefits and similar	172,691	107,485	65,207
Other costs	427,791	311,518	116,273
Amortization of intangible assets	63,381	44,394	18,987
Depreciation of tangible assets	15,789,695	12,793,376	2,996,320
Other write-downs of fixed assets	-	-	-
Changes in inventories of raw, ancillary and consumable materials and goods	24,080	15,692	8,388
Provisions for risks	315,553	-	315,553
Other provisions	-	1,301	(1,301)
Sundry operating expenses	1,198,071	1,088,799	109,272
TOTAL	65,878,262	65,112,804	765,458

COSTS FOR RAW AND AUXILIARY MATERIALS, CONSUMABLES AND GOODS

They relate to the costs incurred for the procurement of consumables and are mainly related to the activities of the research centres, in particular the year 2023 compared to the year 2022 shows an increase of €3 million.

It should be noted that for the year 2023, lower electricity purchase costs totalling €1.7 million were incurred.

EXPENSES FOR SERVICES

With particular reference to costs for services, the amount of €16,003,219 consists of the following items:

EXPENSES FOR SERVICES	AS AT 31.12.2023
EURO	AMOUNT
Technical, administrative and legal advice	798,442
Software support and maintenance services	3,350,763
Insurance	350,187
Employee remuneration	773,187
Bodies and Committees Fees	1,090,027
Maintenance and repairs	2,071,869
Other research support services	2,205,505
Training	335,726
Communication and publications	578,578
PhD Students Costs	1,452,609
Other service costs	2,846,633
Selection and Publication Services	149,691
TOTAL	16,003,219

The most significant items in 'Expenses for services' are shown below.

- ▶ The item 'technical, administrative and legal consultancy' includes expenses related to engineering and design amounting to about €112 thousand, administrative and personnel support services amounting to about €427 thousand, activities related to occupational safety amounting to about €39 thousand, and legal services amounting to about €195 thousand.
- ▶ 'Software support and maintenance services' largely concern costs incurred for SAP system development and the purchase of licences amounting to approximately €1.1 million and for software and equipment support and maintenance amounting to €2.2 million.
- ▶ Fees for Bodies and Committees include fees for the Supervisory Board, Management Committee, Scientific Committee, Supervisory Body, Board of Auditors amounting to approximately €960 thousand plus social security charges.
- ▶ The item Maintenance and Repairs mainly includes costs related to building maintenance

for about €1.3 million and maintenance of scientific instruments for about €741 thousand.

- ▶ The item other research support services mainly includes costs incurred for external genomic sequencing and proteomic data generation services associated with 'health data science' projects amounting to €832 thousand, 'Population and medical genomics' projects (Molisani project) amounting to €676 thousand, and other residual services. It should be noted that the research support services, compared to the year 2022, suffered a significant decrease of €6.4 million due to lower proteomic data generation services amounting to €4.8 million, lower activities on the Molisani project amounting to €700 thousand and the conclusion of the Troina project (Longitudinal profiling of high-throughput brain organoids for the deconvolution of neurodevelopmental disorders in cohorts organised by the Associazione Oasi Maria Santissima di Troina IRCCS, Sicily) for a reduction of about €1 million.

- ▶ The costs incurred for training refer to compulsory and optional courses.
- ▶ 'Communications and publications' expenses refer to the purchase of scientific and electronic books in the amount of €335 thousand, costs for press reviews in the amount of €106 thousand, subscriptions to publications, newspapers and magazines in the amount of €58 thousand, and expenses for scientific publications in the amount of €58 thousand.
- ▶ PHD costs refer to costs related to scholarships provided by the Human Technopole Foundation.

- ▶ Other service costs include costs incurred for campus building security and control services amounting to about €479 thousand, cleaning costs amounting to about €157 thousand, catering services amounting to about €481 thousand, travel costs amounting to about €517 thousand, and costs for organising events and meetings amounting to about €359 thousand.
- ▶ Costs related to the selection of employees are reclassified in the selection and publication services.

PERSONNEL COSTS

This item includes all employee expenses, including merit improvements, category upgrades, contingency payments, the cost of untaken holidays

and provisions required by law and collective agreements.

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
21,353,337	17,652,328	3,701,009

The change reflects the increase in the number of employees hired during the year.

AMORTISATION/DEPRECIATION OF INTANGIBLE/TANGIBLE ASSETS

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
15,853,076	12,837,770	3,015,307

Amortisation/Depreciation has been calculated on the basis of the useful life of the asset and its operation during the production phase.

The balance as at 31/12/2023 is mainly composed of the following amortisation/depreciation items:

- ▶ Amortisation of concessions, licences, trademarks and similar rights amounting to €45,040;
- ▶ Depreciation of buildings amounting to

€2,072,919; Depreciation of plant and machinery amounting to €335,089;

- ▶ Depreciation of laboratory equipment amounting to €9,341,160;
- ▶ Depreciation of other assets amounting to €4,038,108.

SUNDRY OPERATING EXPENSES

The item Sundry operating expenses includes costs incurred in the amount of €987 thousand related to the ECF programme, Early Career Fellowship, through which research projects in the fields of

Genomics, Biology and Health Data Science are supported. The Human Technopole Foundation funded 5 young researchers for the year 2022 and 2 researchers for the year 2023. The programme

runs for 5 years. Each year, researchers are awarded a scholarship worth up to €200,000.

In addition, this item includes costs incurred in connection with the purchase and payment of revenue stamps and the incurrence of taxes and duties such as IMU and TARI.

Below are the changes in the item:

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
1,198,071	1,088,799	109,272

FINANCIAL INCOME AND EXPENSES

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
1,391	10,777	(9,386)

DESCRIPTION	31/12/2023	31/12/2022	CHANGES
Income other than above	-	-	-
(Interest and other financial charges)	-	3,313	(3,313)
Exchange rate gains (losses)	1,391	7,464	(6,073)
TOTAL	1,391	10,777	(9,386)

INCOME TAXES, CURRENT AND DEFERRED

BALANCE AT 31/12/2023	BALANCE AT 31/12/2022	CHANGES
694,085	617,441	76,645

DESCRIPTION	31/12/2023	31/12/2022	CHANGES
Current taxes	694,085	612,057	82,028
IRES	243,950	236,328	7,622
IRAP	450,135	375,729	74,406
Deferred (prepaid) taxes	-	-	-
IRES	-	-	-
IRAP	-	-	-
TOTAL	694,085	612,057	82,028



Pursuant to Article 2427, paragraph 1, no. 14, of the Italian Civil Code, it should be noted that there are no temporary differences recognisable for deferred taxation purposes.

DETERMINATION OF IRES

INSTITUTIONAL ACTIVITY	FINANCIAL YEAR 31/12/2023
Income from buildings	317,657
IRES rate	24%
IRES INSTITUTIONAL ACTIVITY	76,238
COMMERCIAL ACTIVITY	FINANCIAL YEAR 31/12/2023
A) Value of production	717,304
5) Other revenues and income	717,304
B) Costs of production	(18,503)
Miscellaneous costs	(15,046)
Share of cadastral income	(3,457)
Increasing variation	
Business income	698,801
IRES rate	24%
IRES COMMERCIAL ACTIVITY	167,712
IRES TOTAL	FINANCIAL YEAR 31/12/2023
IRES Institutional Activity	76,238
IRES Commercial Activity	167,712
IRES FOR THE YEAR	243,950

DETERMINATION OF IRAP

INSTITUTIONAL ACTIVITY		FINANCIAL YEAR 31/12/2023
Personnel and staff costs		
- Gross taxable income		16,567,416
- Deductions		(5,728,545)
Net taxable income		10,838,871
IRAP rate		3.9%
IRAP INSTITUTIONAL ACTIVITY		422,716
COMMERCIAL ACTIVITY		FINANCIAL YEAR 31/12/2023
A) Value of production		717,304
B) Costs of production		(14,249)
IRAP recoveries		
Taxable IRAP		703,055
IRAP rate		3.9%
IRAP COMMERCIAL ACTIVITY		27,419
IRAP TOTAL		FINANCIAL YEAR 31/12/2023
IRAP Institutional Activity		422,716
IRAP Commercial Activity		27,419
IRAP FOR THE YEAR		450,135

IRAP has been determined on the basis of the provisions concerning non-business entities, while IRES has been calculated considering that the real estate owned by the Human Technopole Foundation

contributes to the formation of income on the basis of the cadastral results, without deduction of expenses or other specific negative components.

PART D - OTHER INFORMATION

Introduction, Notes to the Financial Statements

EMPLOYMENT FIGURES

Reference is made in full to what has already been outlined in the Management Report.

The composition of the workforce as at 31/12/2023 is shown below; staff members were included in the Human Technopole Foundation's workforce through recruitment advertisements published on

the Human Technopole Foundation website and on major international recruiting sites (Linkedin, Springer Nature, Eurojobsites).

The average company workforce, broken down by category, changed as follows compared to the previous year.

STAFF	31/12/2023	31/12/2022	CHANGES
Senior managers	37	37	-
Middle managers	61	58	3
Office workers	179	155	24
Blue-collar employees	-	-	-
Others (apprentices)	3	-	3
TOTAL	280	250	30

In the management of labour relations, reference was made to two National Collective Labour Agreements (hereinafter referred to as CCNLs) for pay and regulatory aspects: (i) for employees

with executive status, to the CCNL INDUSTRY EXECUTIVES; (ii) for other qualifications, to the INDUSTRIAL CHEMICAL FACTORIES CCNL.

	SENIOR MANAGERS	MIDDLE MANAGERS	OFFICE WORKERS	OTHER EMPLOYEES	TOTAL EMPLOYEES
Average number 2023	38.1	61.2	165.6	1.16	266.06

FEES, ADVANCES AND LOANS TO DIRECTORS AND STATUTORY AUDITORS AND COMMITMENTS UNDERTAKEN ON THEIR BEHALF

	SUPERVISORY BOARD	MANAGEMENT COMMITTEE	BOARD OF AUDITORS
Fees	420,000	100,968	40,065
Advances	-	-	-
Receivables	-	-	-
Commitments undertaken on their behalf for guarantees issued	-	-	-

COMMITMENTS, GUARANTEES AND POTENTIAL LIABILITIES NOT REPORTED IN THE BALANCE SHEET

As at 31.12.2023, commitments related to open orders amounted to €47,538,194 and commitments related to pending purchase procedures amounted

to €20,179,653, for an overall total of €67,717,847.
Details can be found on the next page:



VALUE OF OPEN ORDERS AS AT 31.12.2023

TOTAL CAPEX	13,406,885
TOTAL OPEX + PHD	34,131,308
GRAND TOTAL	47,538,194
Of which	
Laboratory furniture	-
Scientific equipment	5,977,167
Specific data centre and information technology equipment	353,085
Improvements to Campus and existing buildings	3,458,353
South Building	3,618,280
Molisani project	2,275,636
Troina project	-
Rti al maviva	-
Maintenance of scientific equipment	3,127,909
Early Career Fellows Programme	5,012,834
Phd students scholarship	3,769,192
Campus facilities and existing buildings	7,825,274
Data centre and information technology specific services	2,563,116
Science library	397,721
Technical assistance and non-scientific professional services	7,443,574
Materials and services of a scientific nature	1,716,052

VALUE OF CAPEX PROCEDURES IN PROGRESS AS AT 31.12.2023

TOTAL CAPEX	20,179,653
of which	
Small laboratory equipment and furnishings	669,668
National Facilities equipment	4,179,720
Data centre - equipment upgrade	9,841,008
Improvements to Campus and existing buildings	975,258
Provision of additional shelters	4,514,000

In addition, bank guarantees were provided for a total amount of €540,000, broken down as follows:

AMOUNT [€]	BENEFICIARY	EXPIRY
540,000	ENEL	01.02.2024

RELATED PARTY TRANSACTIONS

The entity has not entered into any transactions with related parties.

INFORMATION ON AGREEMENTS NOT DISCLOSED IN THE BALANCE SHEET

Reference is made to what has already been pointed out in the Management Report and to what has been described under 'commitments not reported in the Balance Sheet' above.

SUBSEQUENT EVENTS

No significant events occurred after the end of the financial year.

INFORMATION ON DERIVATIVE FINANCIAL INSTRUMENTS PURSUANT TO ART. 2427-BIS OF THE CIVIL CODE

The Human Technopole Foundation does not hold derivative financial instruments.

INFORMATION UNDER ART. 1, PARAGRAPH 125-BIS OF LAW NO. 124 OF 4 AUGUST 2017

Pursuant to Article 1, paragraph 125 of Law No. 124 of 4 August 2017, in compliance with the transparency obligation, we report that grants were received from the Ministry of Economy and Finance during the financial year in the following amounts:

- ▶ €136,500,000 as residual grants for the year 2019;
- ▶ €30,000,000 as the share of grants for the year 2020;
- ▶ €30,000,000 as residual grants for the year 2021;

- ▶ €40,986,337 as residual grants for the year 2021;
- ▶ €140,300,000 as grants for the year 2023.

Finally, it should be noted that the Human Technopole Foundation has accrued operating grants, not yet materially received, in the amount of €143,727,226.69, relating to the years, 2018, 2020 and 2022.

OTHER INFORMATION

The table below summarises the Income Statement for the Human Technopole Foundation's commercial activities.

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
A) VALUE OF PRODUCTION	97,133	98,864
1) Turnover from sales and services	-	-
2) Changes in inventories of work in progress, semi-finished and finished products	-	-
3) Changes in contract work in progress	-	-
4) Increases in fixed assets for internal work	-	-
5) Other revenue and income:	97,133	98,864
a) Various	97,133	98,864
b) HT grants:	-	-
- of which Operating grants HT	-	-
- of which HT Capital grants	-	-
c) CITT grants	-	-
- of which CITT Capital grants	-	-
- of which Operating grants CITT	-	-
d) National Facilities grants	-	-
e) other entities grants	-	-
- of which other entities capital grants	-	-
- of which other entities operating grants	-	-
B) COSTS OF PRODUCTION	620,171	583,531
6) Purchases of raw materials, consumables and goods	(112)	(5,551)
7) Expenses for services	259,439	207,479
8) Costs for use of third party assets	-	-
9) Personnel expenses	73,197	68,808
a) Wages, salaries	55,613	51,744
b) Social security contributions	13,625	13,176
c) Severance pay	2,964	2,876
d) Pensions and similar costs	-	12
e) Other costs	995	1,000

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
10) Amortisation, depreciation and write-downs	276,219	256,480
a) Amortisation of intangible assets	-	-
b) Depreciation of tangible assets	276,219	256,480
c) Other write-downs of fixed assets	-	-
d) Write-downs of current receivables and cash and cash equivalents	-	-
11) Changes in inventories of raw, ancillary and consumable materials and goods	-	-
12) Provision for risks	-	-
13) Other provisions	-	-
14) Other operating costs	11,428	56,314
Difference between value and costs of production	(523,037)	(484,667)
C) FINANCIAL INCOME AND CHARGES	-	953
17) Interest and other financial charges:	-	-
- from subsidiaries	-	-
- from associated companies	-	-
- from parent companies	-	-
- other	-	-
17 bis) Foreign exchange gains and losses	-	953
D) VALUE ADJUSTMENTS TO FINANCIAL ASSETS	-	-
Pre-tax profit	(523,037)	(485,620)
20) Income taxes for the year	195,131	186,270
a) Current taxes	195,131	186,270
b) Deferred taxes	-	-
c) Deferred tax assets	-	-
d) Income (expenses) from joining the tax consolidation/tax transparency scheme	-	-
21) Profit/(Loss) for the year	(718,169)	(671,890)

Paragraph 3 Article 49-bis of Decree-Law No. 34 of 19 May 2020, converted with amendments by Law No. 77 of 17 July 2020, in relation to the development of the 'Centre for Innovation and Technology Transfer in the Life Sciences', specifies: "The Human Technopole Foundation shall adopt specific organisational measures and dedicated

management solutions, with the adoption of separate accounts relating to the use of the resources allocated for this purpose."

The table below summarises the Income Statement for CITT:

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
A) VALUE OF PRODUCTION	460,721	254,939
1) Turnover from sales and services	-	-
2) Changes in inventories of work in progress, semi-finished and finished products	-	-
3) Changes in contract work in progress	-	-
4) Increases in fixed assets for internal work	-	-
5) Other revenue and income:	460,721	254,939
a) Various	10	-
b) HT grants:	-	-
- of which Operating grants HT	-	-
- of which HT Capital grants	-	-
c) CITT grants	460,711	254,939
- of which CITT Capital grants	-	-
- of which Operating grants CITT	460,711	254,939
d) National Facilities grants	-	-
e) other entities grants	-	-
- of which other entities capital grants	-	-
- of which other entities operating grants	-	-
B) COSTS OF PRODUCTION	460,721	254,939
6) Purchases of raw materials, consumables and goods	2,196	-
7) Expenses for services	226,893	130,867
8) Costs for use of third party assets	179	-
9) Personnel expenses	231,196	123,947
a) Wages, salaries	195,994	114,143
b) Social security contributions	25,298	6,774
c) Severance pay	6,258	1,568
d) Pensions and similar costs	957	534
e) Other costs	2,689	928
10) Amortisation, depreciation and write-downs	-	-
a) Amortisation of intangible assets	-	-

INCOME STATEMENT (VALUES IN EURO)	31/12/2023	31/12/2022
b) Depreciation of tangible assets	-	-
c) Other write-downs of fixed assets	-	-
d) Write-downs of current receivables and cash and cash equivalents	-	-
11) Changes in inventories of raw, ancillary and consumable materials and goods	-	-
12) Provision for risks	-	-
13) Other provisions	-	-
14) Other operating costs	257	125
Difference between value and costs of production	-	-
FINANCIAL INCOME AND CHARGES	-	-
17) Interest and other financial charges	-	-
- from subsidiaries	-	-
- from associated companies	-	-
- from parent companies	-	-
- other	-	-
17 bis) Foreign exchange gains and losses	-	-
D) VALUE ADJUSTMENTS TO FINANCIAL ASSETS	-	-
Pre-tax profit	-	-
20) Income taxes for the year	-	-
a) Current taxes	-	-
b) Deferred taxes	-	-
c) Deferred tax assets	-	-
d) Income (expenses) from joining the tax consolidation/tax transparency scheme	-	-
21) Profit/(Loss) for the year	-	-

These financial statements, consisting of the Balance Sheet, Income Statement and Notes to the Financial Statements, give a true and fair view of

and correct financial position as well as the economic result for the year and corresponds to the accounting records.

For the MANAGEMENT COMMITTEE
Chairman
Prof. Marino Zerial

For the SUPERVISORY BOARD
Chairman
Prof. Gianmario Verona

Approved by the Supervisory Board on 22 April 2024.

Independent Auditors' Report on the Integrated Report

Fondazione Human Technopole

Independent Auditors' Report on the
Integrated Report 2023

AMN/VDN/git - RC118222023BD3384

BDO



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20131 Milan

Independent Auditors' Report on the Integrated Report 2023

To the Management Committee of the Human Technopole Foundation

We have been engaged to perform a limited assurance engagement on the Integrated Report of Human Technopole Foundation for the year ended on December 31st, 2023

Responsibilities of the Directors for the Integrated Report

The Directors of Human Technopole Foundation are responsible for the preparation of the Integrated Report in accordance with the "GRI Sustainability Reporting Standards (GRI Standards)" issued by the GRI - Global Reporting Initiative, as described in the paragraph "Methodology" of the Integrated Report identified by them as reporting standards.

The Directors are responsible for that part of the internal control that they consider necessary to enable the preparation of an Integrated Report that is free from material misstatements, whether due to frauds or errors.

The Directors are also responsible for the definition of the objectives regarding the sustainability performance and the reporting of the achieved results, as well as for the identification of the stakeholders and the significant matters to report.

Auditors' independence and quality control

We are independent in accordance with the ethics and independence principles of the Code of Ethics for Professional Accountants (including International Independence Standards) (IESBA Code) issued by the International Ethics Standards Board for Accountants, based on fundamental principles of integrity, objectivity, professional competence and diligence, confidentiality and professional behaviour.

Our firm applies International Standard on Quality Management 1, which requires the firm to design, implement and operate a system of quality management including policies or procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirement.

Auditors' responsibility

Our responsibility is to express, on the basis of the procedures performed, a conclusion about the compliance of the Integrated Report with the requirements of the GRI Standards. We carried our work in accordance with the criteria established in the International Standard on Assurance Engagements 3000 (Revised) - Assurance Engagements other than Audits or Reviews of Historical Financial Information ("ISAE 3000 Revised"), issued by the International Auditing and Assurance Standards Board (IAASB) for limited assurance engagements. This standard requires that we plan and perform the engagement to obtain limited assurance whether the Integrated Report is free from material misstatement. A limited assurance engagement is less in scope than a reasonable assurance engagement carried out in accordance with ISAE 3000 Revised, and, consequently, does not enable us to obtain assurance that we would become aware of all significant matters and events that might be identified in a reasonable assurance engagement.

ari, Bologna, Brescia, Cagliari, Florence, Genoa, Milan, Naples, Padua, Palermo, Rome, Turin, Verona,

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Iscritta al Registro dei Revisori Legali al n. 167911 con D.M. del 15/03/2013 G.U. n. 26 del 02/04/2013
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Page 1 of 2



The procedures performed on the Integrated Report were based on our professional judgement and included inquiries, primarily with company's personnel responsible for the preparation of the information included in the Integrated Report, document analysis, recalculations and other procedures in order to obtain evidences considered appropriate.

In particular, we have performed the following procedures:

1. analysis of the process relating to the definition of material aspects included in the Integrated Report, with reference to the criteria applied to identify priorities for the different stakeholder categories and to the internal validation of the process results;
2. comparison of economic and financial data included in the specific paragraph of the Integrated Report with those included in the Financial Statements of the Human Technopole Foundation;
3. analysis of processes that support the generation, collection and management of data and information to the department responsible for the preparation of the Integrated Report. In particular, we have performed interviews and discussions with the management of Human Technopole Foundation to gather information about the accounting and reporting systems used in preparing the Integrated Report, as well as on the internal control procedures supporting the gathering, aggregation, processing and transmission of data and information to the department responsible for the preparation of the Integrated Report.

Furthermore, for the most important information, taken into consideration the activities and the characteristics of the Company:

- a) with reference to the qualitative information contained in the Integrated Report, we carried out interviews and we have acquired supporting documentation to verify their consistency with the available evidence;
- b) with reference to quantitative information, we carried out both analytical procedures and limited checks to ascertain, on a sample basis, the correct aggregation of data..

Conclusion

Based on the work performed, nothing has come to our attention that causes us to believe that the Integrated Report of Human Technopole Foundation for the period ended on December 31st, 2023 is not prepared, in all material respects, in accordance with the "GRI Sustainability Reporting Standards (GRI Standards)" issued by the GRI – Global Reporting Initiative, as stated in the paragraph "Methodology" of the Integrated Report.

Milan, June 25th, 2024

BDO Italia S.p.A.


Andrea Meneghel
Partner

September 2024

HUMAN TECHNOPOLE

Viale Rita Levi-Montalcini, 1
MIND Area
20157 Milan Italy

RISK MANAGEMENT TEAM & INTEGRATED REPORT - FINANCE AREA

GRAPHIC PROJECT

Visualmade, Milan

IMAGES

Human Technopole Archive

COVER

Magnification of a 'rosette', characterised by neural progenitor cells arranged radially around a lumen, highlighted by the expression of the markers Sox2 (magenta) and Nestin (cyan). These structures represent an intermediate stage of neural differentiation from pluripotent stem cells and are used to study the mechanisms of neurogenesis or as a model to reproduce the complexity of the nervous system in vitro.

Image acquired by the National Facility for Genome Engineering and Disease Modelling.

For comments, requests, opinions and suggestions for improvement on HT's sustainability activities and the information contained herein, please contact HT's Finance Department by sending an email to: ht-dept-finance@fht.org

www.humantechnopole.it

