

INESC TEC 2023-2030

Our Future Together

Strategic Plan



INESC TEC was born as a spin-out of INESC following a change in its ownership and governance model. The original DNA has evolved while the matrix of a private, non-profit institution stemming from the university to leverage its missions was kept.

INESC's original motto portrayed a vision, Vencer o Adamastor, a metaphor for the audacity and knowledge needed to help Portugal to break out from its severe development limitations through science, technology and innovation. Many years before science emerged as a political priority with the first Minister for Science and Technology in Portugal, this vision, an open-eyes dream, was actually INESC's strategy.

From its roots and over nearly four decades, INESC TEC engaged in more or less profound strategic reflections on important institutional pillars, namely the relations with the higher education institutions, organisation of science, innovation activities, international networking and nurturing of start-ups. A truly comprehensive strategic plan, with the right balance of breadth and depth, was nonetheless never developed.

The construction of the strategic plan that is now endorsed builds on the strong motivation and the rich and diverse experience that the Board of INESC TEC managed to convene. Some inspiring international benchmarks have been analysed initially, and internal and external stakeholders have been involved and consulted. Aware of the limitations of the exercise, we trust that the deployment of the strategic plan will pay off in lessons learned, allowing us to build on them as critical improvements.

We are profoundly grateful to our community for their deep engagement with the preparation of this Strategic Plan and we are determined to sustain this momentum. The mobilisation of their energy and enthusiasm for the following steps of making this plan a reality will no doubt be the most critical foundation for its success.

The Board of Directors

Purpose, Vision, Mission, Values //1

INESC TEC Now and Next //2

The Challenges facing our Core Sciences //3

Societal and Transversal Challenges //4

Scientific Strategy //5

Innovation Strategy //6

Cross-cutting Themes //7

Enablers //8

Defining Success //9



OUR PILLARS TOWARDS THE FUTURE

Founded in 1985 as the Porto site of a national INESC, and since 1998 as an independent private non-profit association, INESC TEC's unique profile is rooted in its history and in the context of its inception.

Our foundational positioning consisted of closely coupling academic research with a commitment to transferring knowledge to industry. From the very beginning, we clearly saw the benefits of integrating both activities along a knowledge value chain, with upstream research enabling the transfer of knowledge to society and the economy, and downstream interactions enabling higher levels of relevance and sparking new and multi-disciplinary research.

As Portugal changed in the consolidation of democracy and the accession to the European Economic Community, and as the country's Science, Technology and Innovation System grew and transformed, INESC TEC also changed and evolved, but without losing the essence of this original matrix. Our uniqueness has always relied on an intrinsic multi-disciplinarity and a positioning bridging the creativity of academia, in a structured and driven approach, towards industry and society at large.

We have never been alone in our journey, and our history and purpose are deeply intertwined with those of our academic associates. As set out in our bylaws, our purpose is to enhance their involvement and intervention in the development of the economic and social fabric, thus contributing to improve the performance and competitiveness of companies and institutions.

More than three decades later, our drive has not waned, and our ultimate goal remains the same. As Associate Laboratory, we are committed to carrying out excellent research, attracting, developing, and retaining talent, standing out in the international arena and delivering key contributions to public policy. As Technology and Innovation Centre, we are dedicated to the production, dissemination, and transmission of knowledge, aimed at companies for economic value creation.

Keeping with that same DNA, that same drive and that same ultimate goal, as our context and our role in that context evolve, we are challenged to also evolve our strategy, right from the basic pillars of our purpose, mission, vision and values.

OUR PILLARS TOWARDS THE FUTURE



PURPOSE

To create a fulfilling and sustainable future through impactful science, technology, and innovation.



VISION

To be an inspiring and empowering force, driving the science and technology of digitally-enabled systems into overcoming society's challenges.



MISSION

As a free-thinking and diverse community, we take on bold science, technology, and innovation challenges, empowering talent, collaborative ecosystems, and public policies that make a difference in our economy and society.



OUR PILLARS TOWARDS THE FUTURE



VALUES

RIGOUR AND EXCELLENCE

We thoroughly embed rigour in all our work, from ideation to realisation to evaluation.

INTEGRITY, TRANSPARENCY, AND ETHICS

We are true to our principles and act with transparency and compliance with ethical standards.

CREATIVITY, BOLDNESS, CURIOSITY, AND INNOVATION

We explore new areas to advance science and innovation, with bold curiosity and accepting the risk of failing as intrinsic to creating new things.

FREEDOM TO CREATE AND THINK

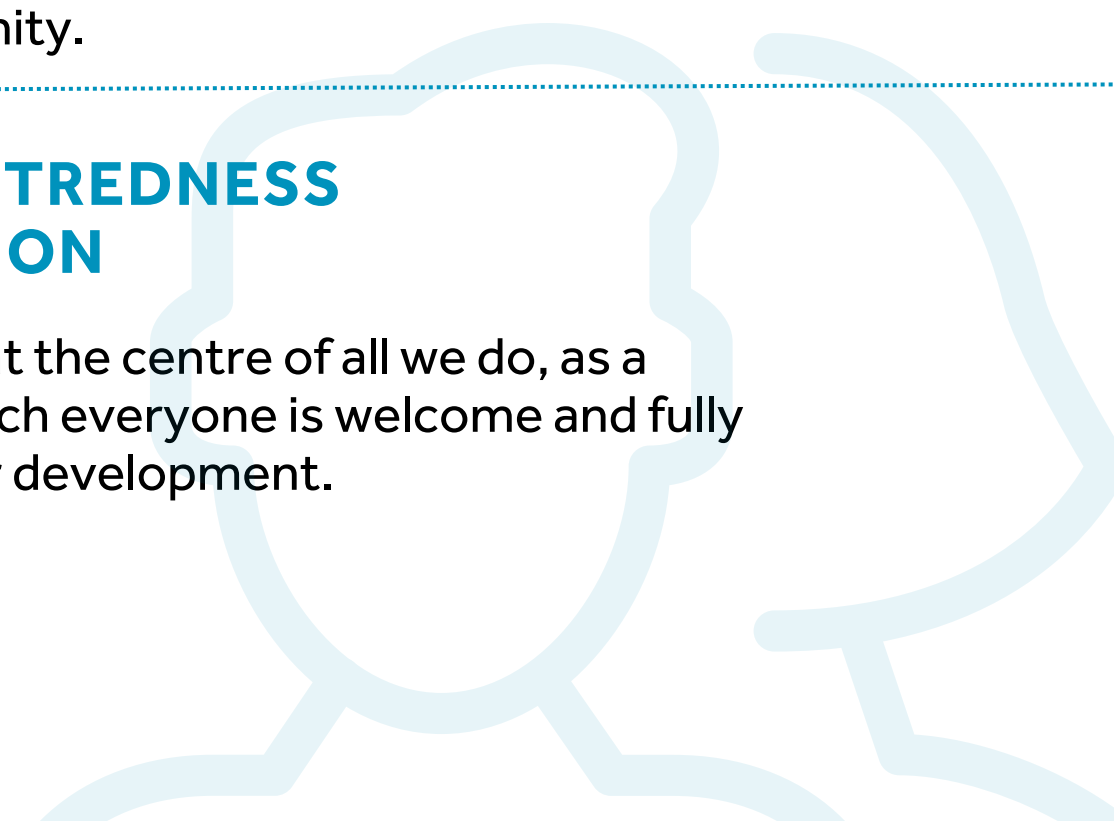
We are autonomous to pursue our intellectual agendas, free of unreasonable interference.

COLLABORATION

We share all our successes and challenges, with each other and our partners, as a cohesive community.

PEOPLE-CENTREDNESS AND INCLUSION

We place people at the centre of all we do, as a community in which everyone is welcome and fully supported in their development.





Our progress in the years ahead will be strongly determined by multiple factors in our external context and by our key internal capabilities and areas of opportunity that hold the promise of bringing that desired progress to fruition. These critical aspects must be considered as we shape our strategic thinking and orientations.

We begin their presentation by describing the recent trajectory of both INESC TEC and the National Science, Technology, and Innovation System, which is helpful as an initial background to better understand INESC TEC in the present.

Then, as the result of a comprehensive multidimensional and multilevel analysis, we introduce the contextual factors that we expect to be most influential on INESC TEC in the following years, grouped into the following five categories: climate, energy, and natural resources; sociodemographic trends; political and economic outlook; increasingly pervasive technology; and national science, technology, and innovation policy.

Finally, we outline eight themes of focus highlighted in a diagnostic of internal areas, where significant progress has already been achieved, and further progress will also be strongly beneficial: international recognition; research environment; collaboration with industry; openness to collaboration and co-creation; strategy; people management; organisational structure; and funding portfolio.

RECENT TRAJECTORY





INTERNAL

Over the last decade, INESC TEC experienced significant development and growth, driven by a goal of international affirmation in its science and technology domains of specialisation.

During this period, several research centres that had joined the institution around 2010 became fully integrated, and a new centre was also created.

To better reflect its broadened geographic scope, with a significant presence extended to the cities of Braga and Vila Real and its international standing and ambition, the institute's name changed from INESC Porto to INESC TEC - Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência (Institute for Systems and Computer Engineering, Technology and Science).

The organisational structure evolved to accommodate new scale, complexity, and ambition levels. The R&D activities have been carried out in thirteen R&D centres that report to the Board of Directors. The scientific strategy and coordination have been developed within four structures called Scientific Domains. The articulation of innovation activities towards the main application markets has been assured by another set of initiatives called TEC4. The support services have also evolved, to encompass technology licensing, funding opportunities, and international relations. The creation of the Data Protection Officer role, and a representation in Brussels, jointly with the other INESC institutes, are also worthy of note.

		2011	2022
	Integrated human resources	513	932
	Academic staff	133	161
	R&D Employees	40	147
	Grant holders	388	264
	Administrative and technical support	19	54
	Affiliated researchers	-	68
	Activity funding	11M€	23M€
	National programmes	4.8M€	10M€
	Direct services	2.6M€	3.8M€
	European programmes	1.5M€	8.2M€
	Other Fundings	2.4M€	0.6M€
	Publications in indexed international journals	199	465
	First Priority Patent Applications (New inventions)	-	5

RECENT TRAJECTORY

EXTERNAL

Over the previous decade, Portugal's gap with the EU has widened in R&D expenditure (% of GDP), from 0.4 pp in 2009 to 0.6 pp in 2021. The country has, however, seen one of the most significant increases in high-tech employment, approaching the EU average in 2021. According to the European Innovation Scoreboard 2022, Portugal is still a moderate innovator, performing at 85.8% of the EU average but increasing at a lower rate. The only region in Portugal outpacing the average performance increase of the moderate innovators group is the North Region.

A key novelty in the past decade was the creation of national and regional smart specialisation strategies. Still, the exercise in Portugal has arguably resulted in the choice of an excessively large number of focus domains. The first Roadmap of Research Infrastructures of Strategic Interest was launched in 2013, and a new capacity-building program for Technology and Innovation Centres was established in 2017. In 2020, the most recent call for evaluation and application of research units to the recognition as Associate Laboratories was held.

A new scientific employment policy was launched in 2016, providing dedicated incentives for researcher recruitment, and scientific employment and career development. The Research Grant Holder Statute received significant modifications in 2019, sharpening its focus on supporting advanced training.

During the last decade, the national RDI fabric has become more competitive in the EU funding landscape – Portugal had a higher success rate in Horizon 2020 (14.0%) than the EU average (12.7%) and, for the first time, was able to secure more EU competitive funding than its absolute contribution to the program budget.

The new EU funds programming period (2021-2027) was marked by a focus on delivering practical solutions to societal challenges, and a structuring of the research and innovation cycle and technology transfer activities. This brought an increased emphasis on multidisciplinary approaches and increased the pressure to align multilevel use of funding sources, for efficiency and efficacy in attaining politically defined goals.

EXTERNAL CONTEXT & INFLUENCE

External factors

INESC TEC

Climate, energy, and natural resources

Climate change consequences and awareness are accelerating, and more robust climate policies and markets will increasingly demand related Research, Development and Innovation (RDI)[1]. The transition's uneven costs will especially hurt specific industries and geographies in the short and/or long term. Raw materials and energy supply/demand dynamics are causing scenarios of scarcity. More efficient and alternative resources, processes, solutions, and business models will be required, but struggle with rigid attitudes, conservative industries, and protectionist states.

[1] European Commission (2023), A Green Deal Industrial Plan for the Net-Zero Age, https://commission.europa.eu/system/files/2023-02/COM_2023_62_2_EN_ACT_A%20Green%20Deal%20Industrial%20Plan%20for%20the%20Net-Zero%20Age.pdf.

Sociodemographic trends

Lowering birth rates, ageing, and increased migration[2] will require more diverse organisations. Fast-changing job profiles and youth expectations are increasingly challenging talent attraction and retention, including for students. A low proportion of women studying and taking up jobs in STEM subjects persists. Research and academic careers have been static and losing attractiveness, potentially hampering excellence in training, research, and innovation. Institutional innovation and a stronger societal orientation may be important opportunities for Higher Education Institutions (HEIs) to fight the loss of attractiveness of static research and academic careers.

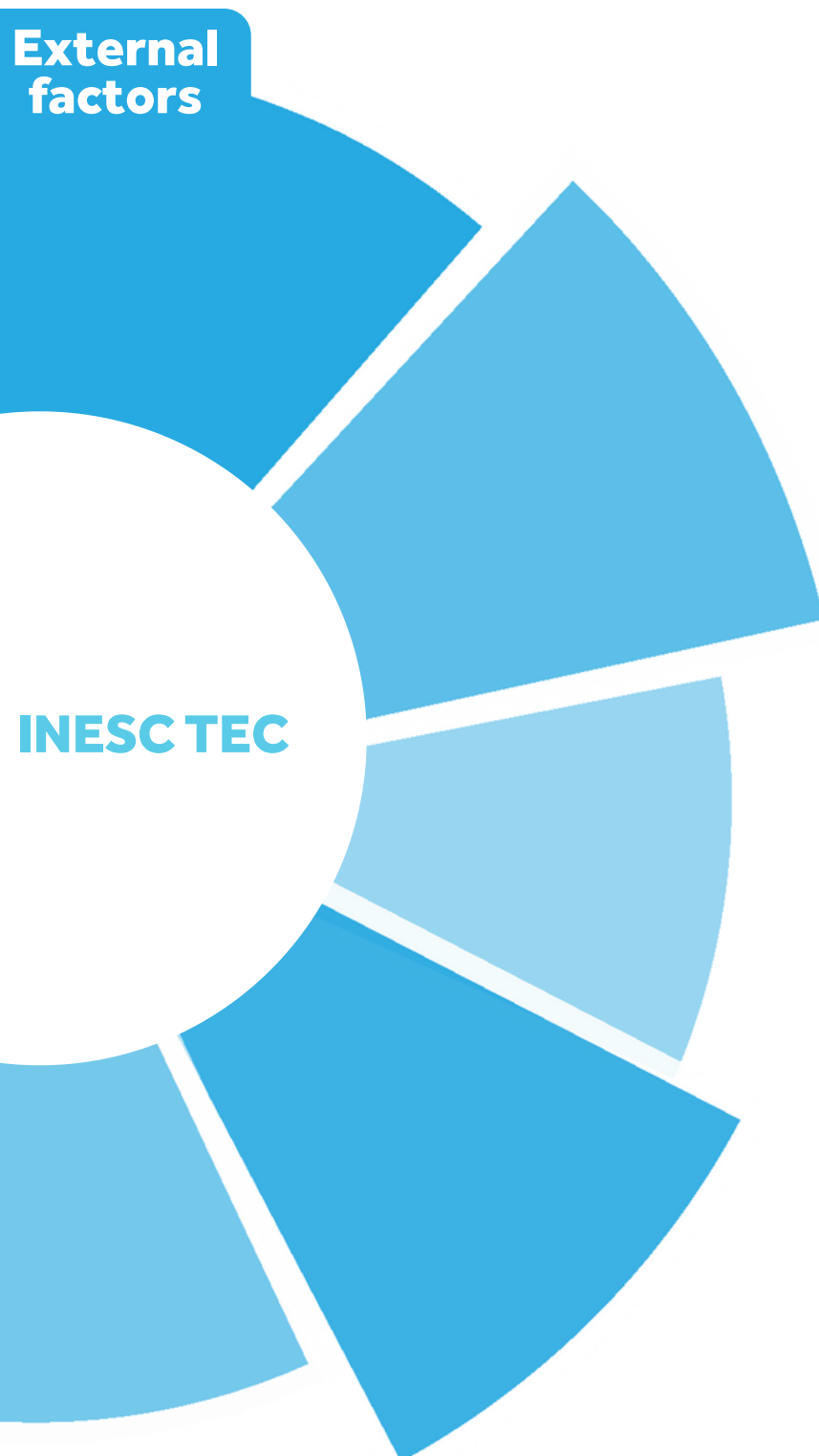
[2] Peixoto, J., Craveiro, D., Malheiros, J., Oliveira, I. T. (orgs.) (2017), Migrações e Sustentabilidade Demográfica: Perspetivas de Evolução da Sociedade e Economia Portuguesas, Fundação Francisco Manuel dos Santos, Lisboa, <https://www.ffms.pt/pt-pt/estudos/migracoes-e-sustentabilidade-demografica>.

Political and economic outlook

The geopolitical repositioning of the EU, US and China threatens broader international cooperation and progress on global challenges, even if the EU remains firmly committed to addressing them[3]. On the other hand, new opportunities for cooperation within the EU are emerging, especially involving partnerships with Eastern European countries, and with a heightened focus on societal impact, advocating overall a more responsible and human-centric RDI. However, critical structural weaknesses of the Portuguese economy, from capital and management to attractiveness for talent and external outlook, remain and specifically threaten to make the internal market for innovation even more fragile.

[3] Analysis and Research Team, General Secretariat of the Council of the European Union (2023), Forward look 2023, https://www.consilium.europa.eu/media/61563/forward-look-2023-external_final.pdf.

EXTERNAL CONTEXT & INFLUENCE



Increasingly pervasive technology

The accelerated change and diffusion in the technologies underlying the mutually enabling digital and climate transitions[1], as well as the biological-digital interfaces, will open opportunities across science, technology, and business models, many intersecting different domains and favouring multidisciplinary. These transitions will face skilled workforce gaps, while at the same time, in the case of digital technologies, continuing significant deskilling processes. Legal, regulatory, and ethical frameworks continue to lag behind technology, and significant discrepancies across countries persist, increasing risks and hurting innovation. Risk mitigation may benefit from aligning RDI with anticipated frameworks and influencing national transpositions of EU directives. A shift in priorities towards non-economic and societal values will favour new organisational and social behaviours, namely towards responsible innovation and ethical awareness and training.

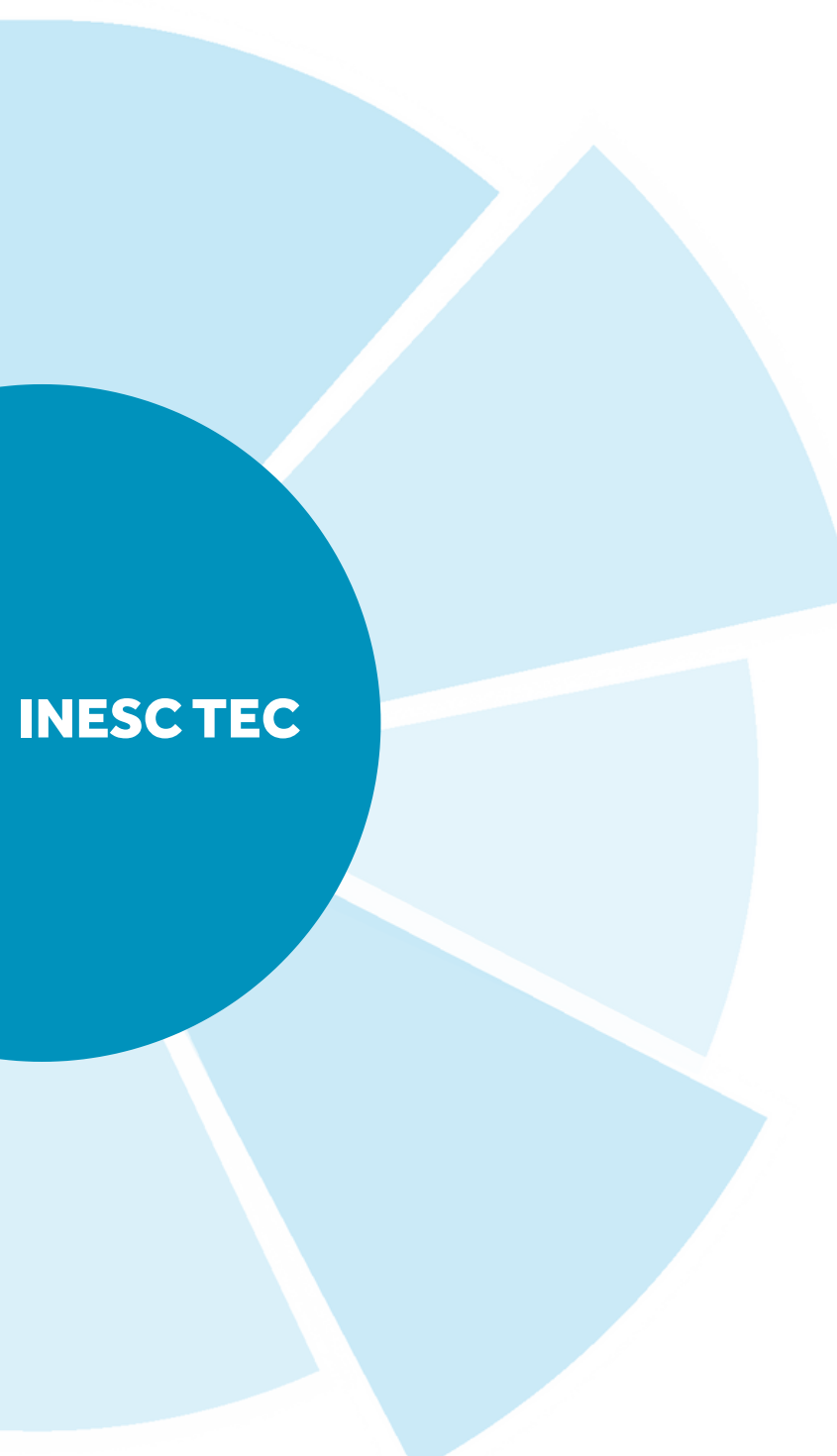
[1] European Commission (2022), Strategic Foresight Report: Twinning the Green and Digital Transitions in the New Geopolitical Context, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0289>.

National science, technology, and innovation policy

Portugal has a fragmented science and technology system[2], with uncoordinated underlying policies and programs, and a dependence on increasingly at-risk structural funds. This has been leading to reduced strategic capacity and agility, significant inefficiencies, and redundancy. The effectiveness of public RDI funding in Portugal is partly frustrated by its susceptibility to political cycles, unpredictable and severe oscillations, and heavy administrative burden. Underlying these challenges is, in part, a relationship that has seen much progress, but still has much untapped potential, between Portuguese society and science and innovation. INESC TEC's resilience in this context has been enabled by a diverse funding portfolio, which could be additionally leveraged by external improvements.

[2] OECD (2019), OECD Review of Higher Education, Research and Innovation: Portugal, OECD Publishing, Paris, <https://doi.org/10.1787/9789264308138-en>.

INESC TEC'S STRENGTHS & KEY DEVELOPMENT ACTIONS



International recognition

International leadership in multiple scientific areas, recognition for impact in several national sectors (e.g., energy, manufacturing, and sea), and standing of teams highly skilled at bridging science and innovation



Several areas with the potential to achieve highest international levels of research, publication and recognition



Collaboration with industry

Strong collaboration in multiple sectors, including with SMEs and start-ups, especially at the national level, with high-quality results and support from dedicated structures

More opportunities may be reached by expanding and stabilising the core teams working in this area, while strengthening the capacity to identify impact pathways for R&D results, at both national and international level, and raise practices and outcomes to international reference levels

Research environment

Freedom of thinking and research, self-responsible creativity and initiative, openness and constructive feedback, continuous improvement, and multicultural and multidisciplinary teams, leveraging a solid institutional framework



Potential in advancing cooperation between distinct research centres, collaborating with other disciplines beyond the scope of INESC TEC, growing areas of critical mass, expanding multiculturality, and creating more dynamic internal opportunities for researchers

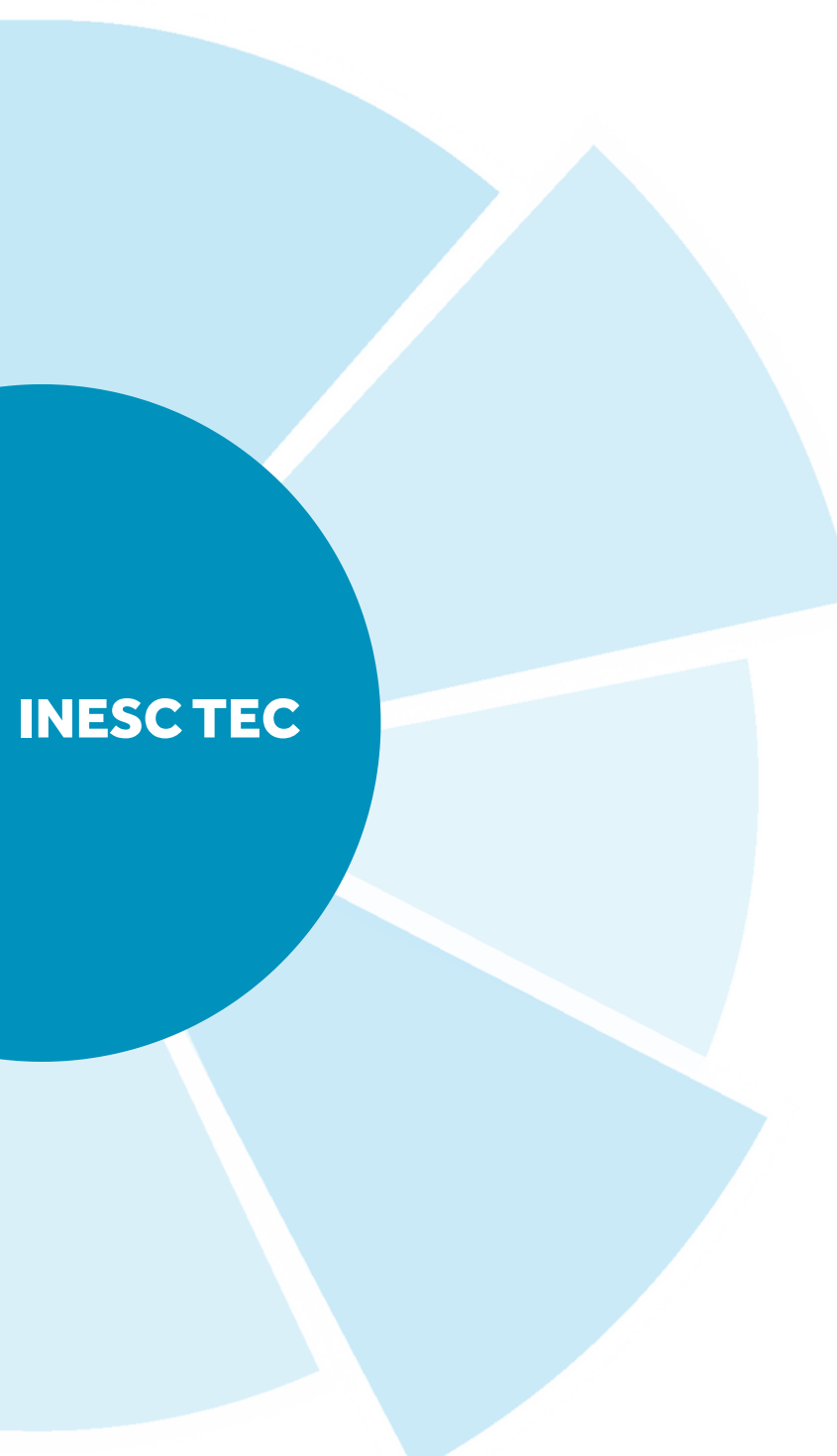


Openness to collaboration and co-creation

Extensive network of partners, participation in high-relevance national and international associations, close work with public agencies, and consistent presence in media and events

Potential benefits from increased systematisation of these activities, and improved information sharing and communication, namely in the scope of the dialogue with policy makers and the public

INESC TEC'S STRENGTHS & KEY DEVELOPMENT ACTIONS



Strategy

Specific structures for scientific coordination and market articulation, Scientific and Business Advisory Boards, and support in critical areas such as integrity, transparency, and ethics, diversity and inclusion, social responsibility, conflict of interest, and intellectual property



Requirement for strategic longer-term vision, planning and alignment, including for the relationships with key stakeholders, such as HEI associates and local communities



Organisational structure

Comprehensive and professional organisational structure and support services, appropriate means for coordination and improvement, well-managed shared infrastructures

Opportunities in greater standardisation of processes, supported by automation and information systems, capacity building for individuals and teams, creation of more places and moments for interchanges across the organisation, and the upgrading of spaces, infrastructures, and their management

People management

High number of permanent contracts (including PhDs), especially attractive for researchers at the initial stages of their careers (first five years), several supportive policies and measures in place, namely the Diversity and Inclusion Commission and the Gender Equality Plan



Potential in acting ever more effectively in dimensions of gender equality (internally and externally), onboarding effectiveness, career paths, personal and professional development, performance evaluation, leadership renewal, well-being, remote and hybrid work, sense of belonging, and benefits beyond wage competitiveness

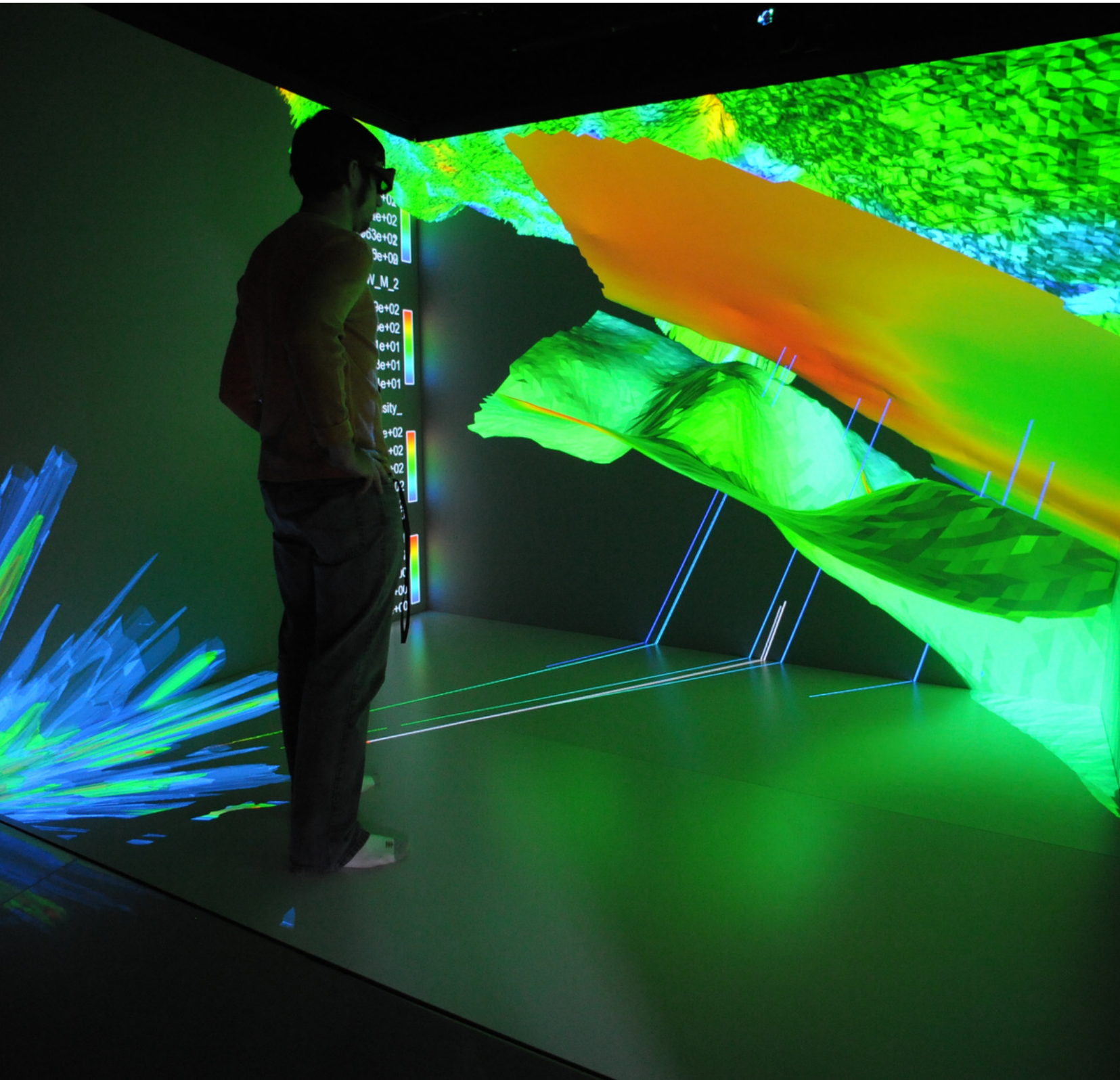


Funding portfolio

Diversified and balanced funding portfolio, which has been vital for INESC TEC's resilience

Challenged to enable longer-term operational planning, even if reduced base funding limits long-term strategies and strategic research, and better exploit philanthropic funding and some categories of industry collaborations

//3 The challenges facing our core sciences



Our economy and society are being profoundly transformed by digital sciences and technologies, i.e., “Information and Communication Science and Technologies (...) and their software and hardware aspects”, including, among others, “computer science, automation, robotics, signal processing, networks and digital communication, modelling, simulation and supercomputing.”[1]

Digitally-enabled systems, ranging from digital to digitally-enabled technologies, and from purely technical systems to the sociotechnical systems that integrate those technologies and people and organisations, have become vital in many aspects of the modern economy and society and are our main focus at INESC TEC.

Our core sciences are playing a pivotal role in this transformation. The opportunities ahead of us are strongly linked to progress in our research areas, often in interaction with other disciplines and influencing multiple application areas. As a result, our strategy for the years ahead must position our science and innovation to contribute to this transformation and empower both people and the organisations as full participants.

“**From Pervasive Intelligence to Global Comprehension**”, the incredible progress being made towards the widespread use of digital sensing and instrumentation technologies has rekindled our ambition to fully comprehend the world and prioritise sustainability in the application of science and technology.

This is to be achieved through comprehensive and high-precision digital models that take into account ever more extreme environments and assumptions while making long-term preservation and improvement of the work inherent to the design.

To this end, we identify four strategic scientific challenges that crosscut our scientific domains and are decisive to our vision: digital models, trustworthy technology, tackling the extreme, and sustainable transformation.

These crosscutting challenges are introduced next. They complement a broader set of domain-specific challenges, to shape the scope of our scientific domains, as presented later in our Scientific Strategy.

[1] INRIA (2013), Towards Inria 2020 Strategic Plan, <https://www.slideshare.net/INRIA/inria-strategic-plan>

FOUR CROSS-CUTTING CHALLENGES

DIGITAL MODELS

Bringing comprehensive, high-precision digital models of physical entities into the lab has been a major scientific goal for the past two decades. With the advances in pervasive intelligence, which take data collection, processing, and transmission virtually anywhere, the ambition to create more and more complex digital twins has greatly increased, making it a priority in the EU's research agenda. Not surprisingly, two of the largest EU-funded projects are meant to create advanced digital twins: of the human brain (EBrains) and of the Earth (DestinE). The envisioned digital models of the future anticipate unique opportunities to defy INESC TEC's multidisciplinary research, challenging all scientific domains at the theoretical and systems levels. Future digital twinning platforms will encompass a complete computing cycle from sensing, edge computing, big data management and processing for analysis, training, inference, and forecasting, to visualisation and actuation, pushing the state-of-the-art in both the functional and non-functional dimensions.

TRUSTWORTHY TECHNOLOGY

Societies have become increasingly dependent on digital technologies in recent years. The ever-growing complexity of systems based on such technologies, associated with capabilities that in some cases already transcend those of humans, requires the ongoing transformation to be based on technology that has proven reliable, secure, and ethical. Trustworthiness is manifold, needs to be an integral part of technology right from its inception, and often clashes with other important goals, leading to challenges at several stages. Such challenges include designing for proven correctness, fault and tamper tolerance, protection of sensitive data, and adherence to legal and ethical principles and norms.

TACKLING THE EXTREME

Our sciences frequently encounter extreme assumptions and design spaces, due to the pervasiveness of digital technologies, which are becoming increasingly distributed, intelligent, and autonomous. Extremes can take various forms, such as uncooperative, dangerous, or even hostile natural and industrial environments, high-risk activities, nanosecond decisions, or massive sets of entities or data. A challenge often inherent to extreme environments is the impossibility of proper experimentation and testing. This can be due to the risks and costs of accessing such extreme conditions, legal or ethical impediments, or even the target scenarios not existing yet. Such characteristics require the definition of novel design methods and tools for delivering trustworthy, robust, and self-adaptive solutions. Synthetic modelling techniques, as well as full-fledged virtual environments, will be crucial for the establishment of such processes.

SUSTAINABLE TRANSFORMATION

Since its creation, INESC TEC has significantly influenced the technological advancement of the country's economy and society. Our core sciences are positioned to play an essential role in the ongoing digital, energy and green transitions over the coming years, given the current commitments to the country's Recovery and Resilience Plan, with natural spillovers to the numerous international research and innovation projects in which INESC TEC participates. A significant challenge to our research lies in prioritising the long-term preservation and improvement of social, economic, and environmental systems within the delicate balance of concurrent goals for each specific problem. This entails understanding the complex interactions between technology and the natural and social worlds, embedding reduced resource consumption and waste generation concerns into scientific activities, and exploring alternative economic models.



Our society faces multiple major social, economic, political, and cultural issues – **societal challenges** shaped by contemporary megatrends, such as climate change, increasing demographic imbalances, shifting health challenges, or accelerating technological change and hyperconnectivity, among others.

The sciences and technologies of digitally-enabled systems have a vital role in addressing these challenges, and INESC TEC has been fully committed to that endeavour. We have historically engaged with multiple societal challenges, with consequential, although partial, contributions, often in cooperation with other relevant partners.

As a multi-disciplinary and multi-sectorial science and innovation organisation, we are particularly well positioned to play a more ambitious role in leveraging our ability to develop a proper understanding of these challenges, and orchestrate the design and development of effective approaches to address them.

In addition to these societal challenges, the massive digital transformation occurring in our economy and society, and the associated pervasiveness of digital and digitally-enabled technologies, raise a second set of **transversal challenges** that will influence and require careful consideration in our activities.

SOCIETAL CHALLENGES

Grand Challenges, which include the UN's Sustainable Development Goals, the EU's Societal Challenges, or other challenges defined at the national or regional level (e.g., associated with Smart Specialisation strategies), all share the following characteristics: they call for combined efforts from multiple sectors of the economy and society; and they must be addressed with novel scientific and technological developments across various areas of knowledge, integrated into innovative products, processes, services and business models.

Complementarily, the acceleration of scientific and technological development, and the need to integrate a multitude of areas into innovation processes, increasingly call for the ability to address the **entire innovation cycle**, including fundamental and applied research, validation and demonstration, industrialisation and market uptake, and education and training, among others, with unprecedented levels of coordination and efficiency.

Organisations that work across **multiple areas of knowledge** and economic activity, and have a broader coverage of the innovation cycle, are uniquely positioned to understand those challenges and their scope (namely in terms of themes and scale), and to orchestrate the design of related solutions, as well as their development and transition to implementation (Figure 1).

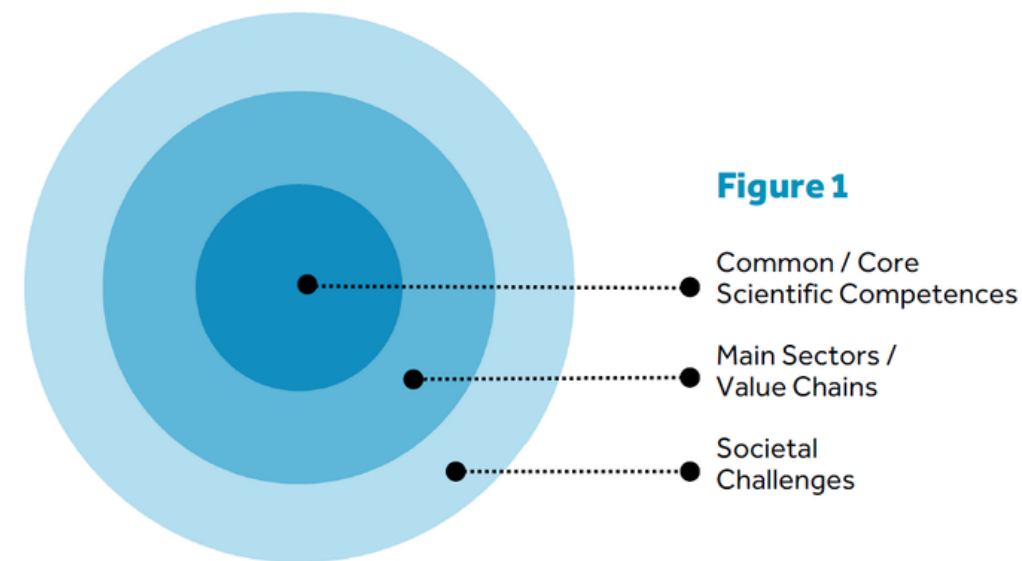


Figure 1

INESC TEC is particularly **well positioned** as one of these organisations: it features solid expertise and teams in multiple areas of knowledge (its Scientific Domains); it addresses several economic sectors, ranging from energy to industry, and from sea to agriculture and health, among others, with specific intelligence and coordinating structures (the TEC4 initiatives); and it has deep know-how and experience in bridging innovation gaps, acting across most of the innovation cycle, and combining technological development and uptake with education and training activities.

In this role, INESC TEC may establish the capability to mobilise **other key relevant stakeholders**: the research community, to perform excellent science under multidisciplinary initiatives, targeting relevant challenges, and bridging to industry partners for exploitation; the business community, to benefit from a boost to its innovation efforts, integrating science and technology developments and highly-skilled human resources, aligned with societal challenges; the political level, to facilitate broader impacts from the bridged efforts of the two communities, as well as develop and implement evidence-based challenge-oriented policies; the citizens, who are touched by these challenges, to benefit directly as they are addressed, and indirectly from sustainable development efforts across multiple dimensions.

INESC TEC has already been addressing and contributing to multiple challenges, but only partially, without a broader integrated strategy. A preliminary mapping of this coverage is presented in Table 1, inspired by the Societal Challenges adopted by the EU for H2020.

The highlights included in the table demonstrate the potential of this strategic direction, and illustrate the **high level of potential synergies** between research areas and between sectors. This ongoing work will be further developed, and a strategy will be prepared to position INESC TEC as a leading organisation, capable of working at the desired holistic level, in a selected number of these challenges.

CHALLENGES OF HIGH POTENTIAL RELEVANCE FOR INESC TEC

Societal Challenges		Main Sectors	
Societal Challenges	Main Innovation Challenges	Main Sectors (Technology/services providers)	INESC TEC's Main Research Areas
Food security, sustainable agriculture and forestry, blue bioeconomy	<ul style="list-style-type: none"> • Food Security • Product traceability 	<ul style="list-style-type: none"> • Agriculture • Agro-food and processing industry • Transportation, logistics, distribution 	<ul style="list-style-type: none"> • Operations management, logistics • AI, machine learning, blockchain • IoT
Health, demographic change and wellbeing	<ul style="list-style-type: none"> • Sustainable Health • Healthy Lifestyle 	<ul style="list-style-type: none"> • Health • Agro-industry • Fitness 	<ul style="list-style-type: none"> • Smart sensors • Modelling and simulation • AI, bioinformatics
Sustainable energy	<ul style="list-style-type: none"> • Power system with 100% renewable energy • Consumer empowerment 	<ul style="list-style-type: none"> • Electricity systems • Gas systems 	<ul style="list-style-type: none"> • Security of supply • Microgrids & MegaGridsmulti-energy systems • Large electrolyser management and control
Green, integrated mobility	<ul style="list-style-type: none"> • Connected, cooperative and automated mobility • Multimodal transport and logistics • Safety and resilience 	<ul style="list-style-type: none"> • Energy systems, batteries • Transportation • Telecommunications 	<ul style="list-style-type: none"> • 5G and beyond • Vehicle-to-vehicle communications • AI, cybersecurity
Climate action & resource efficiency	<ul style="list-style-type: none"> • Ocean, rivers and ports waste removal • Sustainable access to raw materials 	<ul style="list-style-type: none"> • Ports • Environment • Mining 	<ul style="list-style-type: none"> • Customised robotic platforms • Sensor fusion and perception • Underwater positioning and navigation
Secure societies	<ul style="list-style-type: none"> • Border management • Resilient infrastructure 	<ul style="list-style-type: none"> • Transportation and logistics • Defence, public administration • Utilities 	<ul style="list-style-type: none"> • 5G and beyond • Encryption and biometrics, cybersecurity • Autonomous systems
Inclusive, innovative and reflective societies	<ul style="list-style-type: none"> • New strategies and governance structures • Open, social and public sector innovation 	<ul style="list-style-type: none"> • Industry • Public administration • Cultural heritage 	<ul style="list-style-type: none"> • Innovation management, open innovation • Gamification • Virtual reality, computer vision

Table 1 - Highlights of Societal Challenge coverage potential

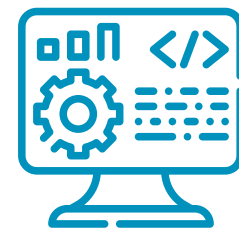
TRANSVERSAL CHALLENGES

In addition to Societal Challenges, our activities in the years ahead will be strongly influenced by a set of Transversal Challenges related to expectations from the economy and society that emerge from digital transformation and the associated massive utilisation of digital and digitally-enabled technologies.



Infrastructures

An ever-growing demand for computation and a digital sovereignty mandate require improved capabilities to design and implement hardware infrastructures, including technologies that range from existing IoT and network devices, CPUs, and GPUs, to new paradigms, such as quantum computing.



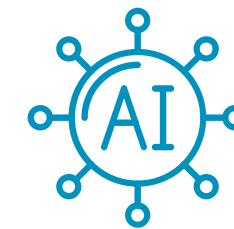
Software methods

Digital infrastructures require engineering methods capable of delivering reliable, secure, and interoperable software systems, while containing development and maintenance efforts through standardisation, reuse, and automation. Broader access to software development and usage may benefit from low code frameworks and user-centric design, respectively.



Global, open, massive data

Systems and services scalability goes hand in hand with globalisation, but often faces conflicting requirements, such as regional privacy frameworks. Similarly, data openness in public services is increasingly at odds with privacy threats enabled by data cross-analysis. The EU has launched Common European Data Spaces, to facilitate data pooling and sharing, bringing together data infrastructures and governance frameworks. The increasing volumes of data also call for improved information management.



Ethics and AI

Data-driven decision support in AI has proved decisive in many sectors, raising ethical concerns related to manipulating data from large fractions of users, and to responsibility under increasing system autonomy. These require the enforcement of ethical principles in aspects such as bias, explainability, or even system purpose.

OUR SCIENTIFIC ORGANISATIONAL MODEL



Scientific research sets the foundations for INESC TEC's mission. Science significantly impacts culture, civilisation, technology, and human, social, environmental, and economic progress. INESC TEC's success and sustainability are an outcome of the quality of its scientific research.

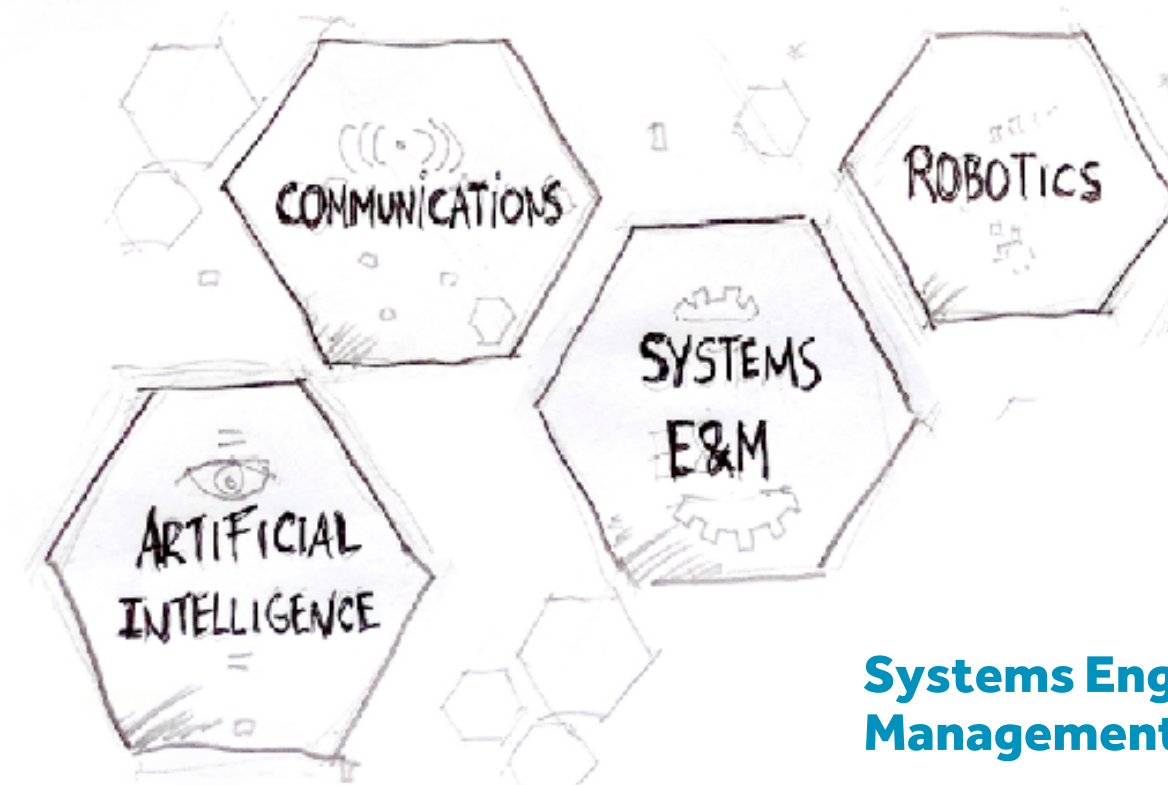
In INESC TEC's scientific organisational model, scientific research is planned and carried out in its R&D Centres, continuously building on the freedom and independence of researchers. The centres are the core organisational units of INESC TEC, with established scientific competences, focused on research, development, and innovation activities. Each centre manages its human, financial, and infrastructural resources with autonomy and accountability to the Board of Directors. With multi-objective management in each centre, this organisational model is the fertile ground for the distinctive multidisciplinary nature of INESC TEC and is at the root of its sustainable growth.

INESC TEC organises its scientific research to maximise its collective impact at the national and international levels, while cherishing individual scientific success. The institute has transitioned from an earlier model with Research Clusters based on scientific affinities between centres to a more comprehensive and inclusive model that better captures the dynamics and multidisciplinary nature of the activities of the centres and individual researchers. This shift to established Scientific Domains aims to improve scientific cohesion and make it easier to communicate with the community beyond INESC TEC. External scientific acknowledgement is vital for organisations that aspire to be global RDI hubs.

This recognition will improve through a more accurate perception of the research conducted at the institution, its multidisciplinary fabric, and the strategic planning underpinning the activities in the different Scientific Domains.

Each Scientific Domain connects INESC TEC researchers regardless of their centre and identifies the institution's competencies in the field. The Scientific Domains thus become forums for discussing and planning INESC TEC's research trajectory, and platforms for strategising, with short to medium to long-term goals leading to measurable results.

Building on the contributions from individual researchers and centre coordinators, a thorough and participative analysis was conducted that led to the current selection of eight Scientific Domains. Naturally, research at INESC TEC varies from basic to applied, and from established and well-known topics in which INESC TEC is internationally renowned, to strategic topics nearing critical mass. We believe that the selected Scientific Domains strike the appropriate balance between essence, recognition, and ambition.



Communications

Digital network communications underpin the Internet and the myriad of services we increasingly depend on. Their continued improvement and breakthroughs will be indispensable for the widespread digital transformation and the control of extreme environments presenting major threats or opportunities.

Pressing challenges for all kinds of digital networks include enabling ever-increasing bandwidth-intensive and latency-sensitive applications and ensuring high levels of secure data transmission while being highly energy- and spectrum-efficient, in the case of wireless systems.

Artificial Intelligence

Artificial Intelligence is a decades-old scientific domain that has recently boosted its importance and impact on science, the economy, and society. Mainly stemming from Computer Science, AI has strong influences from other scientific fields, namely mathematics, neuroscience, linguistics, psychology, philosophy, and physics.

In the 21st century, AI has made significant advances, particularly in areas dominated by machine learning and, more specifically, deep learning. These include natural language processing, computer vision, content generation and recommender systems. Artificial Intelligence is already having a significant impact on many industries, including healthcare, energy, finance, transportation, and manufacturing, and is also playing an increasingly important role in our everyday lives, from virtual assistants to online recommendation systems. The symbolic legacy of AI is also very significant, with roots in mathematical logic, linguistics, and psychology. Currently, symbolic approaches open avenues for explainability and transparency in AI systems.

Besides the fundamental need for large amounts of high-quality data (for correct application), the growing influence of Artificial Intelligence calls for swift advances in the trustworthiness of the delivered tools, chiefly the interpretability of predictions and decisions, generalisation to unseen and even unpredictable situations, and robustness to biased data or unethical results.

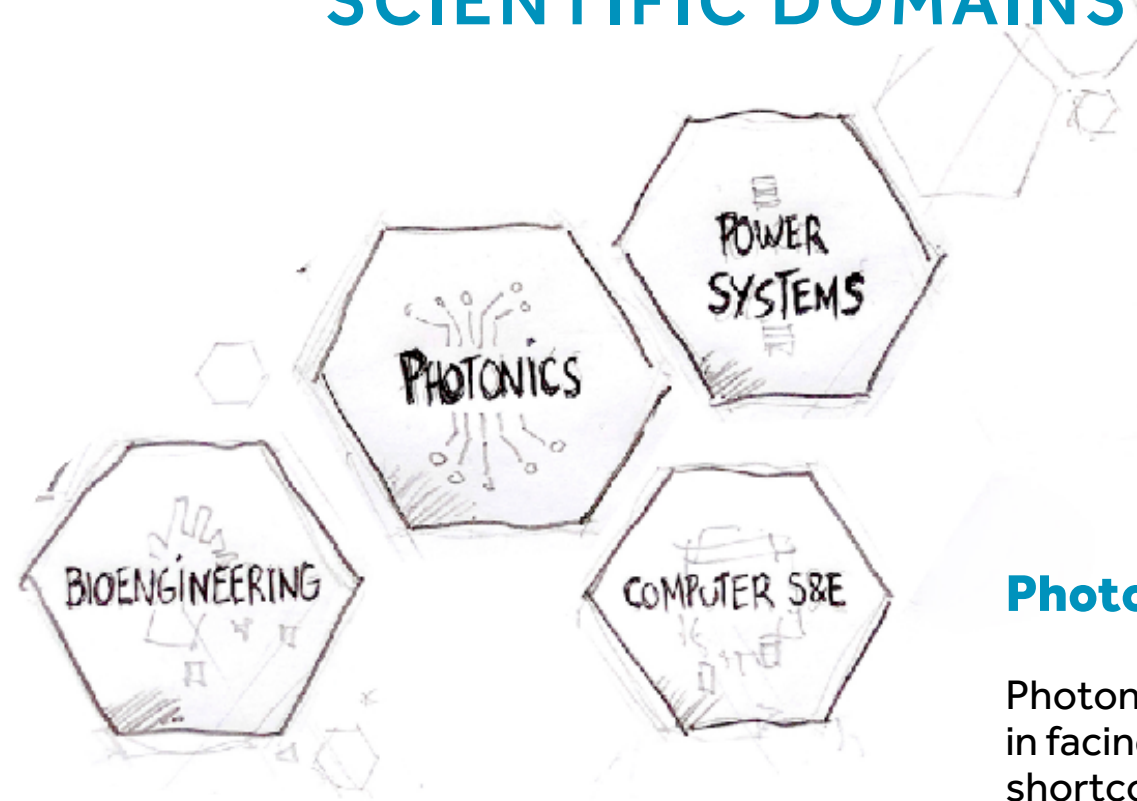
Robotics

As robots become smarter, more autonomous, valuable for various purposes, and increasingly interactive with humans, novel and unforeseen challenges emerge. Making complex robotic systems easier to program and use, endowing robots with capabilities to operate in complex and dynamic environments or allowing autonomous robots to work in areas shared with humans are examples of problems that need new tools and paradigms.

Systems Engineering and Management

Systems Engineering and Management research seeks to advance the design, implementation, and improvement of systems for decision support, human-centred operations, intelligence, technology management, and innovation.

Significant challenges arise from optimisation in complex organisations and networks at multiple levels, customer-centric service design, and technology-based innovation management and policy, targeting improvements in business performance, productivity, innovation, resiliency, and economic, social, and environmental sustainability.



Bioengineering

Bioengineering is a rapidly growing and evolving domain at the intersection of engineering and life sciences. It combines fundamental engineering principles, practices, and technologies in medicine, biology, environment, and health sciences to provide effective solutions to problems in these fields. The domain addresses the development of mathematical theories and models, physical, biological, and chemical principles, computational models and algorithms, devices and systems for the early detection and diagnosis of different types of diseases, ageing-related impairments, rehabilitation, occupational health and wellness, and environmental-biology interactions, among others.

Photonics

Photonics is widely recognised as pivotal in facing several technological shortcomings, namely in medicine, telecommunications, and computing. Drawing from the world of electronics and using methods like signal and data processing and sensor fusion, optical devices and processing techniques can enable real-time diagnosis and therapy at the nanoscale, long-term sensing and monitoring of extreme natural and industrial environments, and ultra-efficient on-chip networks.

While linear optical elements can be used to implement basic quantum gates, research on nonlinear systems is expected to produce advanced quantum gates, essential for implementing large-scale quantum algorithms.

Computer Science and Engineering

Computers, ranging from ever so scaled-down programmable devices, the ubiquitous smartphones to supercomputers currently capable of performing more than a trillion operations per second, have become a central, and increasingly indispensable, component of everyday life. Computer science and engineering are the linchpins to the unstoppable evolution of computing and enable its application to an ever-growing plethora of computer-based solutions.

Additionally, computer systems in crucial sectors such as utilities, healthcare, transportation, and finance present new, often unanticipated, risks that defy our knowledge and present hard and intricate challenges associated with interoperability, scalability, security, and criticality. Worldwide, computing systems in organisations account for over 10% of all global energy consumption and approximately 2% of global CO₂ emissions, making the sustainability of much of our innovation also a significant challenge.

Power and Energy Systems

Research in Power and Energy Systems envisions to support the full and enduring decarbonisation of society, an overarching objective of the EU, which intends to become the first climate-neutral continent by 2050. This transformation will only occur by adopting a multidisciplinary strategy that acts on the whole energy value chain, planning and operating it across multiple energy carriers, infrastructures, and users, in an integrated, interconnected, and digitalised energy market.

This strategy will be anchored on the electrification of society, massive integration of renewable energy sources and energy efficiency, requiring the combination of physical representations and data-driven methods for modelling and optimising energy systems, leveraging emerging technologies and interoperability. This requires significant advances in the state-of-the-art and a combination of new computational, hardware and regulatory solutions.

MULTIDOMAIN SCIENTIFIC IMPACT

Today's Grand Challenges, such as resilient responses to climate change, the decarbonisation of the economy, and the design of sustainable circular solutions, business models and value chains, present demanding multidisciplinary research challenges.

INESC TEC draws on the expertise of its scientists in different fields to assemble multidisciplinary teams to tackle large-scale, time-sensitive projects addressing critical social and economic needs quickly and successfully with lasting impacts. This INESC TEC hallmark stems from its diversity, critical mass, and intrinsic purpose to cover the full knowledge value chain. Joining internal efforts contributes to promoting the impact of research achievements. Moreover, INESC TEC stands at the forefront of science by actively seeking multidomain solutions for complex problems, contributing to its continuous reinvention.

Recent examples are the EU-funded projects InterConnect and EU-Scores joining researchers from Communications, Computer Science and Engineering, Power and Energy Systems, Photonics, Robotics, and Systems Engineering and Management.



While the objective of scientific excellence calls for long-term, focused efforts and investments, and the respective discovery process demands a high degree of freedom and is unpredictable regarding its results and impacts, innovation is a more target-oriented activity, requiring a solid understanding of the challenges or problems it aims to address, the articulation with a more diversified group of stakeholders and, frequently, the integration of multidisciplinary knowledge and technologies.

Combined with the acceleration of scientific and technological development, this demands from organisations such as INESC TEC (targeting the production and delivery of science-based innovation, with economic and social impact), the capability to address the entire innovation cycle (either leading some of the steps or with a supporting role).

Moreover, the fact that digital technologies are at the core of INESC TEC's research and innovation activities (one of the most cross-cutting horizontal domains and, currently, the most relevant innovation enabler) provides the appropriate context and the right tools to develop highly relevant, impactful, and innovative solutions, resulting from both the incorporation of advanced and sophisticated technologies and their cross-fertilisation to a large number of other sectors or applications.

To tackle this innovation challenge, INESC TEC defines five main areas of intervention:

- Market-pull innovation:** align our strategy with relevant challenges of the main economic sectors.
- Knowledge management and valorisation:** paving the way to take full advantage of the cross-sectorial nature of its research results.
- Entrepreneurship support:** boosting scientific knowledge valorisation and upgrading Portugal's economic fabric.
- Advanced training and capacitation:** developing the conditions for an adequate knowledge transfer, absorption, and transformation into impactful innovations.
- Large-scale innovation strategies:** increase the level of intervention and impact, from sectors to societal challenges.

It is also part of INESC TEC's innovation strategy to have an active role in the definition and implementation of relevant public policies and programmes (such as the national and regional smart specialisation strategies and the related funding instruments for research and innovation), and of collective initiatives (like clusters), thus contributing to the development of more complete and efficient innovation eco-systems.

MARKET-PULL INNOVATION



TEC4AGRO-FOOD's main objective is co-creating the digital (r)evolution in agro-food and forestry through research and technological development in digital technologies and robotics, tackling the following main challenges: Food security and safety; Sustainable intensification of production; Climate change; Pests and Diseases; Rational use of resources (water; energy; phytopharmaceuticals; soil; macronutrients); Bioeconomy.



TEC4ENERGY targets the main challenges of the energy sector (electrical and gas networks) such as decarbonisation, electrification, and digitalisation, addressing areas like Power Systems Planning & Reliability, Distributed and Energy Management Systems, Network Automation, X-Energy Management Systems, Multi-Energy Networks, Renewable Energy Sources and Distributed Energy Resources Integration and Electricity Markets and Regulation. TEC4ENERGY plans to encompass also the challenges and opportunities opened by the RePowerEU Plan, namely on the increase of flexibility for power system planning and operation, the COM(2023) in what concerns adjustments of regulations for the electricity market design and contribute actively for the R&I implementation plan of ETIP SNET Roadmap, supporting in this way the development of policy solution for the energy sector in Portugal and Europe.

As a leading research and innovation organisation in the digital area, INESC TEC articulates its intervention in the market from both the supply and demand sides, meaning:

- Working with digital technology developers and providers, such as telecom operators, software houses or hardware companies (the supply side), collaborating in the development of new technologies, products, services and business models, mobilising competences and highly skilled researchers, and addressing transversal challenges resulting from the development and adoption of digital technologies.
- Boosting the modernisation of the other sectors of the Portuguese economy, such as Agro-food, Energy, Health, Industry, and Sea, among others (the demand side), by developing and supporting the adoption of innovative digital solutions.
- Promoting the creation of new companies and sectors, when deemed necessary, particularly in the most disruptive areas.

INESC TEC created the TEC4 ("TEChnologies FOR ...") internal initiatives as an organisational approach aiming at structuring and promoting the market-pull innovation process, targeting specific economic sectors. Each TEC4 addresses the market's regional, national, international or global/societal challenges by mapping its short, medium and long-term needs (strategic agenda and roadmap) with INESC TEC scientific and technological competences and experience.

The following are the main challenges from the most relevant economic sectors targeted by INESC TEC, resulting from work developed by the respective TEC4, in close collaboration with the Centres and external partners.

MARKET-PULL INNOVATION

TEC4 **HEALTH**

TEC4HEALTH targets the healthcare and well-being sectors and the following challenges: 1. Active and healthy ageing, so that a high quality of life accompanies the increase of life expectancy; 2. Personalised medicine and biomarkers, for people increasingly needing of target therapies according to their genotypic and life characteristics. Novel automatic methods will help identify data patterns for differentiated and timely diagnoses; 3. The area of pharmacology, medicines and advanced therapies due to the new knowledge brought by genetics, bioinformatics and systems medicine; 4. Digital health and medical technologies (with a substantial role in hospital support systems, namely departmental systems, clinical records, etc.), gained importance in new areas such as disease prevention and patient literacy, envisioning a future with a relevant degree of self-management of health; 5. Management and logistics in healthcare, to ensure efficient and effective delivery, including access to care, resource allocation, and optimal use of technology and human resources.

TEC4 **INDUSTRY**

TEC4INDUSTRY's scope covers complex and multidisciplinary challenges in manufacturing industry and retail, in large companies and SMEs, towards: 1. a resilient Industry, with the ability to resist and react quickly to context changes, which may be technological, natural, political or public health; 2. a digital Industry, with a solid commitment to digitalisation, taking advantage of all the potential of digital technologies to develop new products, services, processes and business models; 3. a sustainable Industry, where companies are active agents of Circular Economy, minimising the use of materials and other resources, namely energy, incorporating recycled materials, capturing and reusing of CO₂, introducing new materials, extending the life span of products, etc.; 4. an industry with added value, where the application of specialised know-how and cutting-edge technologies in the creation of products, processes and services, will have a solid potential to guarantee sustainable growth and high economic value to Portugal.

TEC4 **SEA**

TEC4SEA addresses the innovation challenges posed to industries within the Economy of the Sea or Blue Economy, facing a considerable number of challenges, driven by the increasing world population, urbanising and ageing, the pressure on global food supplies, increasing demand for metals and minerals, energy demand and energy transition, climate-ocean interactions and climate changes, geopolitical tensions, increasing technological revolutions among others. It covers a wide range of established and emerging industries such as marine living resources (fisheries and aquaculture), extraction of non-living resources (minerals, oil & gas), marine renewable energies, desalination of water, maritime or fluvial transport, as well as coastal and maritime tourism. Examples of activities directly related to the marine environment include processing food of marine origin, marine biotechnology, shipbuilding and repair, port activities, technologies and equipment, defence, and security for the Sea environment.

TEC **PARTNERSHIPS**

Apart from providing typical "TEC4" services to the other sectors addressed by INESC TEC (such as Construction, Aerospace, Finance, Transports, and Telecom, among others), **TECPARTNERSHIPS** has the challenge of identifying companies and other entities with the potential to become INESC TEC strategic partners for knowledge transfer and valorisation, particularly in the ICT domain, such as hardware systems providers or software houses, among others. This objective calls for defining market segmentation criteria, such as sectors, type, and size of the companies, identifying fitting companies, public data collection and analysis, and developing contacts to evaluate the potential. This will contribute to enlarging and diversifying the portfolio of customers and partners at national and international levels.

KNOWLEDGE MANAGEMENT, VALORISATION AND ENTREPRENEURSHIP

Knowledge Management and Valorisation

INESC TEC plans to extend the scope of its Technology Licensing Office (TLO) to include also the following activities:

1. Raise awareness in the whole institution of the strategic role of Intellectual Property (IP) in the current Knowledge Economy paradigm and how IP is the most suitable tool to enable Society to benefit from the generated knowledge;
2. Track and monitor research project development, namely their deliverables and milestones planning and execution;
3. Hold regular meetings with project coordinators, aiming at early detection of promising results and support their formalisation, using a simplified template;
4. Train and support researchers on how to formalise the results of research activities in the right way and timing, including all kinds of results with the potential to impact society positively;
5. Develop and manage a market-driven IP portfolio according to precise criteria;
6. Format and publicise the exploitable results of INESC TEC's research activities adequately for valorisation and further exploitation (including licensing and utilisation as pre-existing know-how in later projects);
7. Promote regular meetings with experts and potential customers/partners in the different areas, aiming to identify and quantify the suitable exploitation strategies and market needs to which INESC TEC IP is fit for the purpose;
8. Training of new IP and tech transfer executives to the ecosystem since there are no formal programmes available and this knowledge and experience are scarce.

Support to Entrepreneurship

Considering that the creation of new spin-off companies always played a relevant role in INESC TEC's valorisation strategy, particularly in emerging, deep tech areas, and in line with the new TLO's strategy for knowledge management and valorisation, a new initiative will be developed, under its coordination, aiming at:

1. The development of new or improved methodologies and tools to support pre-incubation and management services, to be used by all participants in these processes, independently of their organisational unit;
2. The selection of the people (including experts) in charge of each internal and external process (if necessary);
3. The coordination of all activities and processes, particularly regarding information collection and analysis and also milestones monitoring, control and follow-up;
4. The implementation of a platform for knowledge storage and sharing.

With this approach, INESC TEC expects to increase its already existing capability to promote and support technological entrepreneurship, mainly by doing it more efficiently and effectively, and to increase the weight of the corresponding income in the organisation's funding sources.

TRAINING AND LARGE-SCALE INNOVATION STRATEGIES

Advanced Training and capacitation

INESC TEC already provides the market with more than 250 highly skilled people yearly (PhD and MSc). It will continue to develop its methodologies and practices in this area and use them to support innovation and reinforce its links with the market.

Complementarily, the ongoing technological revolution calls for awareness and capacitation actions for the people already active in the market, at all levels, particularly in the case of SMEs, overwhelmed with an immense flow of information regarding new technologies, solutions, and concepts.

INESC TEC will address this challenge by providing short-term courses, targeting mainly the management level (CEO and first-tier managers), aiming at informing them of the new technologies, their current and future characteristics and performances, and how they impact the respective areas of intervention. By combining education and training competences with hands-on experience (namely using its laboratories) and adequate contents and formats, INESC TEC plans to develop a comprehensive and flexible offer of information and capacitation actions and modules, either to be delivered by the organisation alone or integrated with complementary actions, in collaboration with other entities. These actions will also contribute to identifying new partners, new projects and innovation opportunities, thus feeding the research and innovation strands.

Large-scale Innovation Strategies: from Sectors to Societal Challenges

TEC4s can already integrate INESC TEC's diversified scientific and technological expertise to address problems and needs from different economic sectors. Complementarily, these sectors must find ways to contribute to addressing societal challenges, typically multi-sector, multi-thematic, large-scale endeavours.

In a similar way to what was done in the past to tackle innovation challenges from particular sectors, INESC TEC plans to target now societal challenges directly, covering all their dimensions and complexity, by building capabilities and defining strategies and action plans capable of mobilising the relevant knowledge domains, business sectors and stakeholders.

This will allow the organisation to capitalise on its diversified base of scientific and technological expertise, the links with a large number of partners, networks and sectors and also on its capabilities to address a wide part of the innovation cycle, aiming at more sophisticated and higher added value challenges and projects.



Several cross-cutting themes permeate the core dimensions of INESC TEC's strategy and operations, often resurfacing throughout the strategic plan. Their explicit consideration provides a framework to integrate those dimensions better and propose additional and interlinked activities that will help increase the breadth and long-lasting impact of INESC TEC's RDI activities. Due to their importance in framing what we aim for in the years ahead, these cross-cutting themes are detailed in our strategic plan, adopting a stakeholder-oriented perspective.

Due to INESC TEC's foundational nature, [our relationship with Higher Education Institutions \(HEIs\)](#) is the first cross-cutting issue we focus on. This relationship defines, to a large extent, who we are, and is the backbone of how we organise ourselves. Therefore, the 2023-2030 strategic plan must be aligned with the strategic plans of our associate HEIs.

INESC TEC is also its people, taken as individuals and members of a cohesive community. Therefore, the [individual experience](#) and the [community experience](#) are two horizontal themes that have an important place in our strategy because engaging in excellent and impactful research requires 1) providing every individual in our organisation the chance and motivation to fulfil their expectations and achieve their goals, and 2) fostering a work environment that welcomes diversity, stands for inclusion, and pushes us to take action on the global stage.

[Societal impact](#) emerges as the fourth theme. Scientific curiosity and freedom of research are central values that we strategically articulate with the societal significance that ultimately drives us. Moreover, INESC TEC searches for societal impact in a broader sense, as a contributor to formulating and enacting public policies in education, public service, science and technology, or energy transition and climate change, among others.

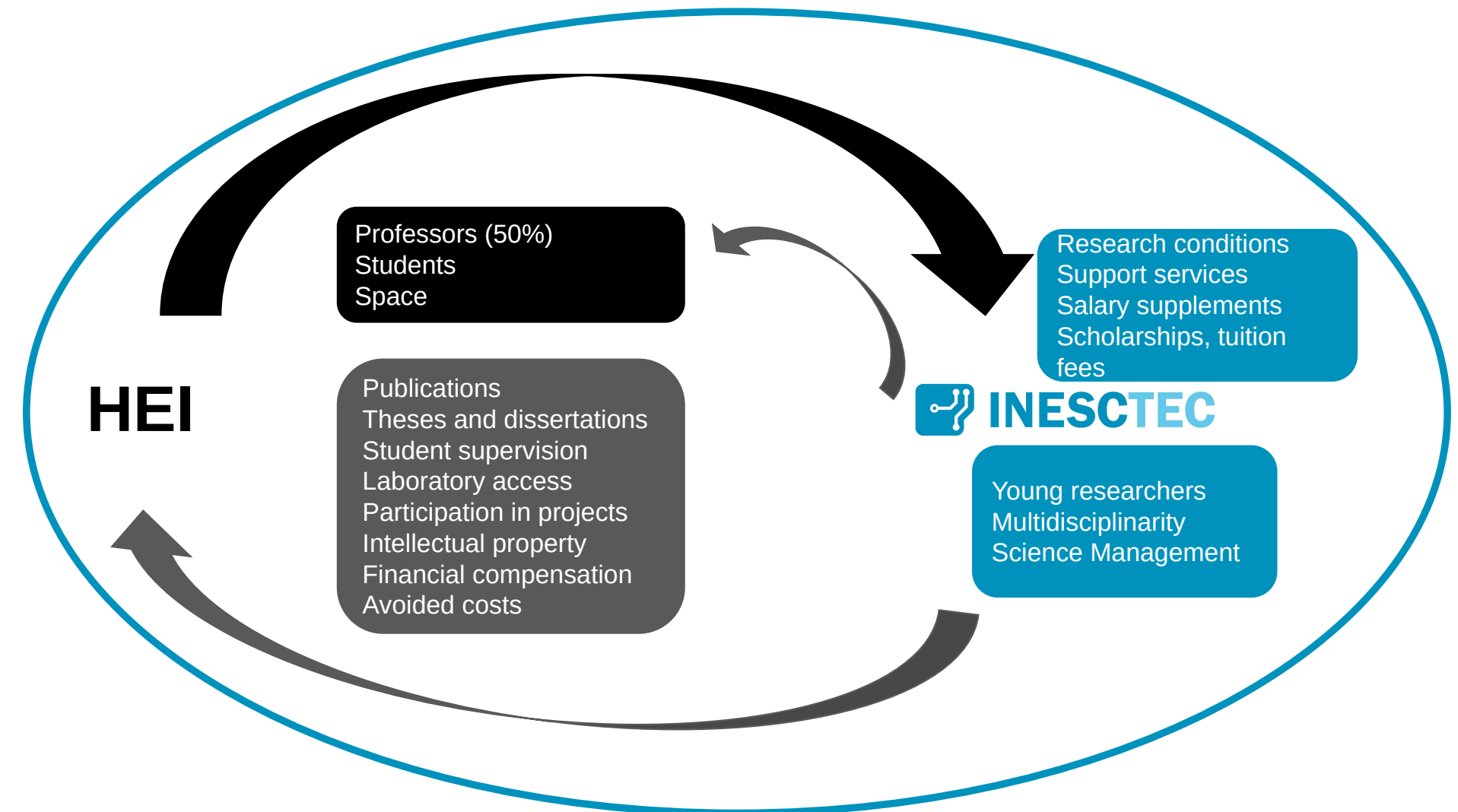
BACKGROUND

The roots of INESC are solidly entrenched in HEIs, as it is the offspring of a group of faculty members willing to develop the second (research) and third (societal outreach) missions of HEIs as a team, in a coordinated way, with a long-term perspective, and within an institutional environment facilitating such endeavour.

After the reorganisation that led to the creation of INESC Porto, later renamed INESC TEC, this became crystal clear by choosing the legal form of a non-profit private association whose associates are HEIs and INESC, itself an association of Portuguese HEIs and large private companies.

The associates act through the General Council, appointing the Board of Directors and other statutory bodies, and annually approving the activity plan and budget, and the activity and financial reports. **INESC TEC is, thus, an instrument for the associate HEIs to leverage their missions.**

The individual association of HEI faculty to INESC TEC is a voluntary decision. The HEI assigns them to INESC TEC to undertake their research and third mission activities integrated into its organisational dynamics.



RELATIONSHIP WITH HEI

BACKGROUND

When joining an INESC TEC research centre, faculty are offered good working conditions and access to labs, facilities and the support of professional services that allow them to focus on research and team supervision. Overall, the centres include more than 200 contracted researchers (40% with a PhD) who reinforce the teams and enable INESC TEC to run larger projects involving different kinds of partners, thereby multiplying faculty intervention capacity.

The scale and diversity of most centres enable an idea born out of fundamental research to be further developed through applied research projects, and the results ultimately be transferred to a company or inspire the creation of a spin-off, among other knowledge valorisation pathways. The competencies acquired in the process are highly valued by the companies which propose new joint projects or hire involved students. [The impact of technology transfer on the economy and society is vital](#) to fulfilling the HEI's third mission and improving its recognition.

The fact that several centres bring together [faculty from different HEIs](#) is an effective way to implement multi-institutional collaboration in practice, with all the benefits arising from the resulting scale and the cross-fertilisation between different research cultures.

By hiring young researchers at the beginning of their careers, helping them level up their CVs, and, sometimes, becoming HEI faculty members, INESC TEC contributes to [attracting and maintaining those researchers in the HE ecosystem and rejuvenating it](#).

Being home to research centres from different disciplines, INESC TEC is widely acknowledged for its capability to coordinate large multidisciplinary projects – to a large extent, thanks to its organisational model – ultimately benefiting all its associate HEIs.

PRIORITIES

- Reinforce the cooperation between INESC TEC and associate HEIs to expand the range of opportunities for joint intervention in addressing significant societal challenges;
- Continuously ensure a [trusted and win-win relationship](#) between INESC TEC and associate HEIs, namely by periodically revisiting collaboration agreements;
- Strengthen the [education-research nexus](#) by embedding research results into HEI courses and allowing HEI students to undertake their academic works in the scope of research and industry-led projects at INESC TEC;
- [Further automate reporting channels](#), ensuring that all faculty scientific and innovation results are also assigned to the corresponding HEI.

INDIVIDUAL EXPERIENCE

BACKGROUND

INESC TEC has a **complex, multi-status people structure**, composed of HEI faculty, RDI and services employees, grant holders and trainees, and supervised students, each of them having their specific status, typical needs, and professional ambitions. Aware that the engagement of its talented people is the most critical factor of its success, INESC TEC has been reinforcing a people-centred working environment, where each individual matters and is the focus of the institution's attention and concern.

The attitude and expectations of younger generations towards work and life, in general, urge us to be more and more flexible and open-minded, rapidly adapt to new challenging forms of work, and deal with inter-generation work relations. The **individual experience** dimension places **people at the centre of INESC TEC's strategy**, as the actors of its purpose, vision and mission and as direct beneficiaries of its success. Our talented, engaged, bold and diverse workforce is the collective strength that makes us so unique. Therefore, we are committed to providing the means for every individual to grow and evolve in a fulfilling and meaningful way, so that our researchers and faculty, students and grant holders, and technical and administrative staff can contribute and strive in a genuinely creative, collaborative, and mission-driven work.

In this people-(re)centred environment, the individual experience feeds into the community experience we want to create and sustain.

PRIORITIES

- Provide **the appropriate people management framework** to support every individual to grow and evolve fully, enabling the coexistence of different personal and professional development pathways;
- Encourage the enhancement of personal skills, caring about matching everyone's potential to opportunities to contribute to collective fulfilment, and be recognised and rewarded;
- Understand and **continuously adapt** to the younger generations' expectations, as well as to new forms of work, while promoting the engagement of senior and international staff;
- Promote **well-being and work-life balance**, and especially support parental or care responsibilities and flexibility for family duties, regardless of gender, job, position and status, and create appropriate mechanisms to identify individual psychological or material difficulties early and proactively offer support to overcome them;
- Apply appropriate mechanisms to collect perceptions and **understand the needs** of diverse people in terms of age, culture, nationality, ethnic origin, background, disability, sexual orientation, religion, etc., such as the D&I Survey, so that everyone feels welcome, accepted, and valued.

For researchers:

- Harmoniously **combine the organisational model with the researchers' freedom** to create and think, empowering them to determine and pursue their intellectual agendas autonomously;
- Endeavour to act individually with integrity, openness, transparency, independence, and compliance of research with **fundamental ethical principles**, as provided for in the Code of Ethics of INESC TEC.

For faculty:

- Plan for time to create innovative ways to **incorporate research results in their teaching and learning** processes;
- Increase communication and proximity between services and faculty, to avoid bureaucratic relationships

For students:

- Create more opportunities for **students of different programs to experience involvement in research** teams

BACKGROUND

Community experience is about [the organisation's ability to unite its people in a diverse, multicultural, multi-institutional, and multidisciplinary environment](#) under a sense of belonging and collective, distinctive identity. It is about making INESC TEC a real home for excellent research and impactful science-based innovation, where anyone would like to work, study, research, collaborate and innovate, where curiosity, creativity, and critical thinking are praised and fostered across all layers of the institution, and personal fulfilment is regarded as pivotal for the institution to attain its strategic goals. The community experience determines, to a large extent, how INESC TEC projects itself in local, regional, national, and international communities. We pride ourselves in being an outward-looking organisation, engaging in responsible research and various internationalisation activities.

[Multidisciplinarity](#) and [diversity & inclusion \(D&I\)](#) stand out as foundational values. INESC TEC's almost four-decade-long journey attests to the importance of a multidisciplinary and diverse research environment for ideas to flourish and thrive. A key source of diversity is our multi-institutional profile, with faculty from different academic institutions and geographic locations coming together under the same roof, enriching INESC TEC's vision. Transparency, accountability, and solidarity are deep-seated in the community's mindset, holding the organisation together.

In addition to scientific diversity, we have and support a diverse workforce, with gender equality emerging as a priority. Action plans and other instruments have been developed and are regularly reviewed and updated to guarantee an equitable and sustainable work environment with no place for bias or discriminatory practices.

Our diversity, whatever its source may be, is a strength. It allows us to dive deep into complex societal problems and understand them beyond our expertise, develop trusted partnerships with external stakeholders, venture into uncharted territories, foster intercultural literacy among our people, and build the organisation's [international profile](#).

PRIORITIES

- Implement internal policies promoting a [positive work environment](#) where individuals feel part of a community supportive of team spirit and collaboration;
- Cultivate an [inspiring, discovery and learning environment](#) where a critical- and free-thinking, venturesome, and creative community can thrive;
- Have a targeted [international recruitment](#) strategy to attract high-quality researchers and staff whilst developing the current team by expanding their intercultural knowledge and allowing them to engage in [international mobility](#) experiences;
- Commit to [gender equality](#) promotion across INESC TEC's policies and culture, and increase gender balance and representation through the Gender Equality Plan;
- Commit to interculturality to foster the inclusion of different cultural backgrounds, languages and religions;
- Ensure that individuals with disabilities or impairments are not prevented from accessing a place or a document or undertaking a task freely and independently by implementing [universal accessibility](#).
- Implement the measures inscribed in the Diversity & Inclusion Program and related Action Plan;
- Improve [equity and transparency](#) in resource allocation decision-making, a precondition for achieving solidarity;
- Encourage the participation of every individual in our organisation in broad consultation processes, and give voice to minorities;
- Aim for [relevance in our Science and Technology \(S&T\)](#) by carrying on being a multidisciplinary community and engaging in responsible research and innovation;
- Raise INESC TEC's [visibility as an inclusive and diverse organisation](#) to enhance its global reach and be a hosting and partner institution of choice for the research community worldwide.

BACKGROUND

INESC TEC's vision is "to be an inspiring and empowering force, driving the science and technology of digitally-enabled systems into overcoming society's challenges."

Therefore, we focus on deeply understanding the medium- to long-term challenges of this and forthcoming generations, keeping in mind today's most relevant development agendas to develop purposeful, ground-breaking solutions for problems in our local economy, the country, and the world.

Through the research we conduct, we hope to [change the world for the better](#). This attitude is rooted in our deep and enduring sense of community and reflects our Public Interest status: being part of a local, regional, national, and international community, we work to make a positive, impactful contribution to society. The focus and breadth of our research mean we are ideally placed to tap into some of the most significant challenges our society must deal with, from digital to energy transition, to climate change or resilient societies.

[We seek to create societal impact in many different ways](#): from hosting and supervising Master's and PhD students to taking in talented individuals from various fields of expertise, professional pathways, and cultural backgrounds, coordinating research and consultancy projects with multiple partners or engaging with policymakers to encourage the uptake of our research findings and evidence towards the design of transformative public policies.

Additionally, by making room for key cross-cutting issues in our strategic thinking, we commit ourselves to [continue converting our research excellence into societal impact](#).

PRIORITIES

- [Align our capabilities](#) with key regional, national and EU agendas where S&T emerge as central pillars. This alignment, which also extends to the UN Sustainable Development Goals, is highly contingent on ensuring our active participation in national and international thematic associations, high-level networks and forums relevant to our Scientific Domains and application areas;
- Contribute to [implementing current policy priorities and shaping future public policies](#) tackling critical societal challenges, by nurturing a science-policy interface, supporting open access to our research findings and evidence, and acting as consultation S&T partners for policy and decision-makers, building on the support of the recently created Public Policy Office;
- Continue to engage in [purposeful national and international relationships](#) with actors across academia, research, industry and business environments and public administration, supporting mutual understanding towards co-creation practices to develop targeted breakthrough solutions for the most complex societal challenges;
- Further [embed entrepreneurship in the organisation's culture](#), namely by continuously encouraging researchers to work with the Licensing Service, the Funding Opportunities Office, the TEC4s and the most appropriate external actors to find ways for our research results to progress along the value chain, reach the market and be impactful;
- Raise the profile of our [research and leadership role in specific domains](#) through continuous high-quality and creative engagement with the public, with a unique position for science communication and storytelling, which can help deconstruct scientific terminology and make the value and impact of our research more tangible to society;
- Focus on [critical cross-cutting themes](#) to support flagship initiatives along with non-governmental organisations, public sector agencies and social enterprises, fostering Science for Social Good.



Science and innovation are complex and challenging endeavours. Scientific recognition and impact, and the ability to successfully support private and public organisations in innovation, require international excellence. They entail researchers working at the frontiers of knowledge in our Scientific Domains, international institutional recognition and credibility, state-of-the-art research and innovation infrastructures, and the appropriate funding sources.

Delivering on this ambition requires the strategic support of a set of critical enablers. These include [talent attraction and development](#), as part of the policies for the most crucial factor at INESC TEC – human resources; the plans and goals for [internationalisation](#); the approach to managing research and innovation [infrastructures](#); [digital technologies](#) as an enabler for RDI; [funding sources](#) and strategies to implement the strategic plan and to ensure the institute’s long-term sustainability; and principles for [governance and leadership](#).

TALENT ATTRACTION AND DEVELOPMENT

BACKGROUND

INESC TEC wants to be a place where researchers and support staff are engaged in collaborative research and innovation with societal impact, express their full creativity, feel happy to work, have autonomy, and can choose their career paths. These are meaningful and critical aspects to increase motivation and, consequently, improve performance.

The institute's human resources policy has been undergoing a **profound change** to meet the needs arising from the growth in its activity over the last years. The strategy for this area will focus on the main pillars of human resources management: attraction, onboarding, performance appraisal, training, and career. In parallel, INESC TEC is also actively committed to its recognition with the European Commission's "HR Excellence in Research Award" towards aligning its HR policies with the principles set out in the HRS4R "Charter & Code".

A **people-centred design** will be followed, where feedback, well-being, diversity, equity, and inclusion are crucial aspects, and contribute to improving engagement, reducing turnover and keeping teams motivated.

PRIORITIES

- **To attract highly talented researchers and support staff**, a set of benefits beyond competitive salaries will be constantly updated, helping to meet their ambitions from the moment they first join INESC TEC. The attraction policy will cover both talented young researchers, including students for whom INESC TEC will continue to pay tuition, and high-calibre senior scientists, who develop frontier knowledge and innovative solutions, and act as mentors to younger researchers, supporting them in developing excellent scientific practices, and project management and communication skills. Work-life balance and flexibility associated with remote work are essential ingredients to appeal to younger researchers
- **Training and development of staff** bear in mind the creation of excellent researchers, creative inventors, entrepreneurial managers, and skilled support staff through a systematic annual process that includes i) strategy and a budget; ii) guaranteeing the fulfilment of legal requirements; iii) considering training as a complementary benefit, a differentiating factor and a competitive advantage in talent attraction and retention; iv) avoiding technical obsolescence (reskilling). We will seek on-the-job learning opportunities to meet our staff's unique needs and challenges. Particular attention will be given to training managers to lead empathetically, encouraging open dialogue and promoting personal and professional wellness.
- **Career definition at INESC TEC** will be based on a dynamic of growth and transformation and on the concern to provide our staff with growth opportunities, creating learning contexts that will allow them to acquire knowledge and skills to perform functions with increasing levels of responsibility. The goal is to have the right people in the right places, performing the right functions. This also implies empowering individuals to reach their full potential and ensuring effective performance as an asset to the individual and the institution.
- **A new performance appraisal system** will be crucial to motivation. One of the fundamental aspects is to listen, understand and provide regular feedback on what is done well and on improvement opportunities. The performance appraisal process at INESC TEC will be based on objectives defined for a given period and competencies. A 270-degree appraisal approach will consider feedback from the appraiser, appraisee, peers and subordinates. It will consider the following dimensions: scientific excellence, involvement in R&D projects, dissemination, support of industrial partnerships, and involvement in collective or managerial functions.
- Finally, INESC TEC will strongly invest in **diversity, equity and inclusion** by nourishing a culture where everyone feels they can express their whole self at work and by bringing people from diverse backgrounds and experiences together, also as a means to encourage innovation and retain high-performing talent.

INTERNATIONALISATION

BACKGROUND

Internationalisation has been a cornerstone of INESC TEC's growth and will remain centre-stage for fulfilling its strategy for 2030. In a world more connected and interdependent than ever, where societal challenges transcend national borders, undertaking **impactful science without engaging in international collaboration is unrealistic**.

As an enabler for a longer-term strategy, INESC TEC's internationalisation vision is grounded on the notion that the science we commit to undertake and transfer to society through technology transfer, advanced consulting and training, and spin-off creation must be impactful, i.e., **advance the frontiers of knowledge and contribute to social and economic welfare**.

Moreover, the scientific areas INESC TEC embraces are pervasive and ubiquitous, understandably pushing the institution to **operate globally and partner with very different stakeholders**, from universities to other research centres, companies, non-profit institutions, and public administration.

The International Relations Service will assist the institution in its expansion beyond domestic borders. It was created to accelerate the shift to a more structured and focused action underpinned by top management strategic guidance – yet, flexible enough not to jettison individual-led efforts, which have brought the institution far on the global stage. Its activities span three operational areas: International Collaboration, International Mobility, and International Culture. INESC Brussels Hub ensures a professional representation of the INESC institutes' research interests in Brussels. It facilitates high-level connections and opportunities for collaboration with leading European research organisations and industry partners.

PRIORITIES

- **Develop and strengthen high-impact international partnerships** across academia and industry in scientific or application areas where INESC TEC is an acknowledged and well-respected player, taking advantage of the institution's listening posts in Brussels and South America (INESC P&D Brasil), and long-standing trusted partners in other geographies.
- **Develop a network of international partners** with whom we can collaborate and advance in our core areas, aiming to become a global player and deliver impactful knowledge and results.
- **Grow the number of European flagship research and innovation projects coordinated by INESC TEC to sustain high-profile research and collaboration** and reinforce the institution's visibility at the international level. These will provide evidence of INESC TEC's competence, credibility and trustworthiness.
- **Increase the number of direct research and consultancy contracts** with foreign companies across the globe, using our success stories with several industries in Portugal and Europe to market our RDI and project management competencies. The ultimate goal is to have high-impact projects and increasingly diverse project and funding portfolios.
- **Formulate a targeted international recruitment strategy** to attract the best talent and allow our current staff to expand their intercultural knowledge and engage in international mobility experiences.
- **Step up INESC TEC's communication and visibility** as a leading research and innovation organisation at the international level and as an inclusive and diverse organisation, able to navigate different intercultural settings to enhance its global reach and be an institution of choice for researchers and scholars worldwide.

RESEARCH AND INNOVATION INFRASTRUCTURES

BACKGROUND

Impactful science, technology and innovation require state-of-the-art scientific and technological infrastructures. They are especially relevant as part of the collaborative, multidisciplinary, multi-institutional ecosystems capable of addressing societal challenges.

INESC TEC has over twenty [state-of-the-art laboratories](#) supporting research and technology transfer activities. Some of them are considered by FCT, following a demanding competitive process, as part of the National Roadmap for Research Infrastructures of Strategic Interest. These provide facilities, resources, and related services that scientific communities use to develop cutting-edge research and innovation, encompassing research installations, arrays of scientific equipment, collections, archives and databases, computational systems, and communication networks for open access. Some are single-sited, and others are distributed over several locations.

Most of these state-of-the-art laboratories are under the responsibility of single research centres, and some are a collaboration between several centres, that support their operation and define their development strategy according to the innovation cycles they foresee. This approach has led to some replication and redundancy of human and material resources, which frequently is [economically inefficient and limits the cross-fertilisation of scientific knowledge and engineering](#).

PRIORITIES

- [Maintain the available infrastructures up to date](#) and launch new ones when gaps are identified, to fulfil their essential role in supporting research activities and innovation and engaging the industry.
- [Reinforce infrastructures' business models](#). Research at national and European levels indicates that the sustainability of these infrastructures requires making them available to support different activities, including research, collaboration with industry, experimentation of innovative solutions by technology-based and user companies, and, also critical, training and education activities, including advanced training courses for the upskilling and reskilling of industrial partners.
- [Improve governance and operations](#). Following the current reorganisation of the Scientific Domains of the institution and TEC4s, the foreseen strategy is to evolve the current centre-based model to a more collaborative one, that explores synergies across INESC TEC. This strategy may bring more of the management of infrastructures to an institutional level, reducing operational costs through more dedicated and professional management, and avoiding replication and obsolescence of material and human resources.
- [Develop new transversal services](#), from software to hardware, taking advantage of the different competences in these infrastructures, to allow researchers to focus on their RDI activities and reduce the financial effort necessary to keep the infrastructures at the state-of-the-art.

DIGITAL TECHNOLOGIES

BACKGROUND

Computer science is a core research domain for four INESC TEC centres. But due to its relevance in dealing with such a generic capacity as information processing, it became an enabler for almost any other area where automation of information processing is essential, due to the size of the data involved, the reduction of human intervention in repetitive processes, or the complexity of the analysis. This is the case from electrical energy distribution to manufacturing industries, health to education, and banking to Public Administration.

The size and centrality of the current [digital transformation](#) programs mean that traditional information systems design and implementation are increasingly relevant for many organisations.

The addition of sensor and actuator networks and the ability to process real-time data streams led to the concept of the [digital twin](#), a digital model of a situation of interest like a factory, the traffic in a city, or a natural ecosystem, that supports the fusion of monitoring, simulating, and controlling that situation.

A significant concern in the digital transformation endeavour is [cybersecurity](#). Though sometimes seen as a non-functional requirement, failures in information security can potentially have highly damaging outcomes, from operational disruptions to heavy personal data protection fines. Incorporating ever-evolving security practices and technologies in all the steps of information systems development is thus crucial to establishing the digital portfolio as an enabler.

Moving traditional information systems to the [cloud](#), though only sometimes leading to cost reductions, clearly changes the requirements on internal IT people and infrastructures. Retaining ownership of data and agency in processes demands the ability to mobilise competent professionals to develop back-end and front-end systems using [agile methodologies](#). Extensive Internet of Things systems, social networks, and software-as-a-service business models are intrinsically cloud-based systems, even more dependent on those methodologies. The shortened software development cycle is made possible by automating the pipelines of designing, developing, testing, and deploying functionalities, which is the job of [DevOps](#), integrating software development and IT operations.

The extraordinary increase and sophistication of data acquisition devices (document and 3D scanners, digital pictures, audio, and video, sensor networks, GPS, CT, MRI and other medical imaging devices), combined with the ability to store, process, and share those [big data](#) sets, led to a fast development of the data analysis area. The combination of statistics, informatics, and new methodologies with specific domain knowledge became known as [data science](#). New algorithms for correlation, classification, prediction, anomaly detection, or image and signal processing led to the development of [data mining tools](#) applied in many different contexts. The addition of [machine learning](#) and artificial intelligence techniques, mainly based on neural networks and deep learning architectures, made real the prospect of systems that learn from the use and improve their response. The wide range of sectors where these techniques are being successfully applied led to a certain commoditisation of data science, and the specification of methodologies and pipelines of machine learning operations called MLOps that can be seen as enablers for studies in medical diagnosis, autonomous vehicles, assisted decision-making, or the automation of text generation based on large language models.

The realisation that [artificial intelligence](#) and autonomous systems may significantly impact individual persons, companies, and even the whole society demands that making those techniques available as enablers for application in other sectors is accompanied by a digital ethics screening. [Digital ethics](#) concerns include avoiding bias in data sets and algorithms, requiring explanations of the conclusions, discussing responsibility in case of harmful results, or mitigating the digital divide. The potential for accelerated disruption of traditional business models, reshaping work organisation and rethinking education is too significant to allow ignoring digital ethics.

PRIORITIES

- [Identify research and innovation topics and services](#) relevant to the several INESC TEC areas to leverage them through the creation of DevOps and MLOps pipelines.
- [Dissemination of privacy-preserving computational architectures](#) able to deliver digital transformation improvements while respecting the GDPR.
- [Promotion of digital ethics awareness](#) initiatives, from avoiding biases in data sets and algorithms to critically analysing and interpreting the results.

FUNDING SOURCES

BACKGROUND

The primary funding sources to be considered should be aligned with the mission of the institution and the strategic goals established for the 2023-2030 period and should be able to support the different activities planned, from basic science to innovation and the setup and operation of its research and innovation infrastructures.

National and European funding sources cover a wide range of activities of the innovation cycle and are essential for the institute's resilience. The overall framework of national programmes supports a wide range of activities, ranging from research and experimental development to demonstration and innovation, and investment is well designed. However, unfortunately, it suffers from **excessive bureaucracy and a lack of planning** of calls for proposals. In addition, the **reduced base funding** for research and innovation limits long-term objectives and the capability to invest in strategic research activities.

The **perspective of a significant reduction of the structural funds in the North region**, in the medium term, with the consequent reduction of the availability of national funds, reinforces the need for diversifying the institute's funding sources, with a particular emphasis on European programmes and private funding.

PRIORITIES

- **Further diversify the institute's funding sources.** To address the usual uncertainty of funding available for research and innovation activities at the national and international level and its typical framing in specific time horizons defined by framework programmes, it is essential to diversify the funding sources considered at any given time. The risk of reduction of structural funds in the North Region increases the need for this diversification.
- **Increase the volume of international competitive research funding.** Horizon Europe will be essential, as the EU's critical funding programme for research and innovation, aims to reinforce the EU's competitiveness and growth in a changing environment where sustainable development is the critical focus. This collaboration enhances institutional involvement with state-of-the-art science and technology, pushing human resources to attain the highest standards of international recognition.
- **Increase the funding captured for research activities.** Competitive funding, mainly from FCT, is essential in promoting research activities and strengthening vital internal competences, in the institute's Scientific Domains. We should increase the investment in basic European research funding under Horizon Europe Pillar I Scientific Excellence, including ERC Grants. These programmes require a higher level of maturity in research areas, paving the path to scientific excellence.
- **Increase the number and volume of contract research and advanced consulting and training projects with companies and other organisations.** Direct contracts with industry and public administration in multiple national and international sectors aim to support innovation, promote technology transfer and create real impact, including the development of SMEs and start-ups.
- **Promote major contracts with industry and philanthropic funding.** Besides contributing to the diversification of funding sources, these projects will aim to improve the institute's visibility and recognition at the national and international levels.
- **Strategically invest the available base funding.** The base funding is competitive at a national institutional level. It provides resources for strategic investment in new areas and talent attraction, with two main streams, the first to support research (Pluriannual programmes from FCT) and the second to support innovation and the interfacing with industry (managed by ANI under the Interface programme). These programmes are critical to support the generation of basic knowledge and technology, including supporting internal seed projects, the institute's capacitation, its internationalisation and the development of innovation partnerships and ecosystems.

GOVERNANCE AND LEADERSHIP

BACKGROUND

INESC TEC's organisational structure will drive a visionary look into the future and optimally address its objectives, size and scope of activity, while promoting agility, efficiency and effectiveness. It will encourage participation in decision making, transparency and will be supported by a solid internal culture.

The **Centres are INESC TEC's R&D organisational core units**, each focused on specific scientific and technological areas, and linking locally with HEIs. Each Centre is responsible for its planning, strategy, and resources, reporting directly to the Board of Directors regarding budget, scientific, and innovation performance.

The **scientific strategy and coordination** will be assumed by the coordination structures called **Scientific Domains**, which will be responsible for structuring the institute's research competences, challenges and strategy, facilitating strategic thinking, trajectory monitoring, and science communication.

The **TEC4 initiatives articulate INESC TEC's activity towards its main market sectors** and address current societal challenges, defining market strategies and planning the interaction with major application areas. A TEC4 initiative establishes a network of external contacts and a dialogue with industrial and institutional partners, bringing research challenges and opportunities back to multiple Centres.

PRIORITIES

- **Develop a culture of collaborative science and innovation.** INESC TEC's activity is highly multidisciplinary. Promoting a culture of collaboration across the institute will be necessary, making it easy and natural to establish dynamic teams to address specific challenges, being scientific or innovation related.
- **Develop strong partnerships and participate in relevant networks.** INESC TEC will reinforce the existing partnerships and develop new ones with leading research organisations and technology-based companies to enable impactful research and innovation. Participation in Scientific Networks, European Technology and Innovation Platforms and related associations, EIT Knowledge and Innovation Communities, and Clusters and Industrial Associations will enable research and support the diffusion of results.
- **Develop a culture of responsibility, ensuring compliance with legal, regulatory and ethical frameworks.** Ethics, and compliance with legal, regulatory, and ethical frameworks are essential pre-conditions for all research work at INESC TEC. AI and robotics are just examples where ethical principles need to be present in all research. In all relations with external bodies conflicts of interest must be analysed and managed. Specific internal committees will define relevant policies and monitor and manage these processes.
- **Promote social and environmental responsibility.** Incorporate social and environmental responsibility in the institution's organisational culture and practices. All activities will be conducted to generate a minimal environmental impact and energy neutrality. A contribution to social causes and initiatives will be promoted at INESC TEC. Research on the circular economy, energy and green transition will be pursued.
- **Promote diversity and inclusion.** Building on a practice of compliance with non-discrimination and equality rules, INESC TEC will commit to building a diverse and inclusive community, in line with the signed Portuguese Diversity Charter. Gender equality, the inclusion of people with disabilities, and ethnic and cultural diversity will be key priorities.
- **Develop a strong internal culture and sense of belonging.** INESC TEC is a large, diverse, and distributed community of around one thousand people, including HEI faculty, RDI and services employees, grant holders and trainees, and supervised students. With its main sites in Porto, Braga and Vila Real, and more than 20 countries represented in our community, special attention will be given to internal communication and interaction at all levels and locations to ensure a strong internal culture and sense of belonging.
- **Develop professional and efficient internal services.** Highly skilled and efficient support services will support INESC TEC's activities in Business Development, Organisation and Management, and Technical Support aspects, enabling smooth and impactful research work. Organisational processes will be optimised and documented for improved efficiency and quality.



Defining **what success in executing our strategic plan will look like** must bring together the most long-term foundations of our strategy, as expressed in our Purpose, Vision, Mission and Values, and the diagnosis of the challenges and opportunities that lie ahead for us, as well as the priorities and actions that we will embrace in our science and innovation activities, and the means to do so.

Our framework to do so establishes **five core strategic commitments** of our community for the following years, essentially **originating in our Vision and Mission**, and a set of **strategic objectives** for each strategic commitment, associated with our diagnosis of challenges and opportunities, and the multiple components of our strategy, as described in the plan. For each strategic objective, we propose a small set of related **key indicators and targets**, to monitor the effectiveness of our endeavours, and the **programmes and initiatives** that we aim to implement.

Drawn from our Vision to be an inspiring and empowering force driving science and technology into overcoming society's challenges, we defined the first three fundamental and strategic commitments towards 2030. Furthermore, anchored in our Mission, we set up two additional commitments that ground our ambitions in distinctive capabilities of INESC TEC, which are vital assets that we will keep developing in the following years.

The **primary responsibility for oversight and delivery of the Strategic Plan will lie with INESC TEC's Board of Directors**. Overall, the Board's responsibilities regarding the Strategic Plan will span from strategic planning, communications, initiative management and best practice sharing, to scorecard management, organisation alignment and strategy review.

OUR FIVE STRATEGIC COMMITMENTS

1. Excel and innovate across the missions of academia, harnessing the collective strength of our community

We will excel and innovate across all our work, from research and innovation to our distinctive contribution to education and to the collaboration between academia and the economy and society – to be a community that inspires and empowers. Our international standing will be underpinned by the individual and collective merit of our talented and diverse community, to which we will provide the fullest support in their personal and professional growth, while cultivating a freethinking and inclusive environment.

2. Make an impact on the toughest challenges of our time in science, technology, and society, through bold creativity and transformative action

We will take on the toughest challenges, through transformative science and technology. We will work hard, acting in the public interest, contributing to both the implementation of current policy priorities and the shaping of future policies tackling key societal challenges. We will be boldly creative, blending novelty, freedom, and action through endeavour and a relentless focus on excellence.

3. Increase our relevance by closely integrating across science and innovation, disciplines, and ecosystems.

We will act in an integrated manner across the knowledge value chain, researching and developing technology-based systems, and fostering sustainable innovation. Our paths to solutions will build on an integrated multidisciplinary approach. Striving for impactful innovation, jointly with our stakeholders, we will strengthen the technology and innovation capabilities of the ecosystems that we are a part of.

4. Cultivate an attractive, people-centred and talented community

We will attract and retain world-class talent, motivating, recognising, and fully supporting individuals in their personal and professional growth. We will expand the diversity of our talent and be a welcoming home for international researchers, cultivating an inclusive and freethinking environment. We will promote a good working environment, fostering team spirit, engagement and social responsibility. We will value and endeavour to act with openness, transparency, and independence and compliance of research with ethical principles.

5. Strive for a sound, sustainable and effective operational model

We will strive for sustainability and resilience in our economic model, to provide our community the best conditions to create new knowledge and deliver impact to society. We will promote and contribute to environmental sustainability. We will provide excellent facilities. We will cultivate a discovery and learning environment, enabling our critical, free-thinking, venturesome, and creative community of talent to thrive.

//9 Defining Success

STRATEGIC OBJECTIVES & INITIATIVES - OVERVIEW

STRATEGIC COMMITMENT	STRATEGIC OBJECTIVES	KEY INDICATORS	TARGETS	PROGRAMMES & INITIATIVES
1. Excel and innovate across the missions of academia, harnessing the collective strength of our community.	Raise the contribution and visibility of our research	Number/PhD and proportion of publications in leading journals and conferences	3% increase/year 1 pp increase/year	<ul style="list-style-type: none"> . More ambitious involvement in PhD programmes . Increase the enrolment of PhD students . Promote publications in high-ranked journals . Promote an open science policy (harvesting data to/from international repositories, support for open data and research across all activities)
		Number/PhD and proportion of PhDs defended with at least one publication in a leading journal or conference	3% increase/year Converge to INESC TEC proportion in 2030	
		Number and/or proportion of open access publications	Converge with proportion of funding that supports open access in 2030	
	Increase our involvement in the leadership of scientific initiatives	Editorial roles in leading journals and conference proceedings	3% increase/year	<ul style="list-style-type: none"> . Foster a stronger international recognition of INESC TEC researchers
		New fellowships of learned societies	One new fellowship every year	
		New major or high-prestige grants	Increase by one the number of new grants every year	
	Improve the base conditions for technology commercialisation	First patent grants	Double in five years	<ul style="list-style-type: none"> . Boost IP valorisation . Raise the levels of technology transfer practices and outcomes to those of international references
	Develop closer and deeper relationships with our innovation partners and the broader community	Major contracts with industry	One new contract every year	<ul style="list-style-type: none"> . Foster the expansion and stabilisation of core teams . Establishing a steady portfolio of flagship industry-funded strategic research programs . Implementation of tools to increase the systematisation of collaboration and cocreation activities . Benefiting the local communities we are a part of, e.g., by expanding social responsibility projects that leverage specific capabilities such as internships and fellowships
		Proportion of research projects with public engagement	1 pp increase/year	
	Provide innovative learning experiences	Students involved in R&D projects all across the organisation	1 pp increase/year	<ul style="list-style-type: none"> . Joint post-grad programmes . Collaborative R&I projects with HEIs . Set up a student-focused initiative . Create programmes for the co-design of advanced training with HEI . Develop a structured area of executive training with industry
		New executive training programmes	Launch a new one every year	
	Increase the international embedment of our community	International senior researchers	1/4 by 2030	<ul style="list-style-type: none"> . Create new opportunities for mobility of researchers
		International visiting senior researchers	7/year by 2030	
		Proportion of researchers enrolled in international mobility programmes	Increase to 1/7 by 2030	
	Reinforce strategic alignment and close collaboration with HEI	Number of new or renewed resource sharing agreements with HEI	100% by 2027	<ul style="list-style-type: none"> . Periodically revisit the definition of the terms of collaboration with HEI associates . Further automation of the reporting channels between INESC TEC and HEI associates
		Proportion of scientific results of INESC TEC integrated researchers affiliated with a HEI effectively incorporated in that HEI reports		

//9 Defining Success

STRATEGIC OBJECTIVES & INITIATIVES - OVERVIEW

STRATEGIC COMMITMENT	STRATEGIC OBJECTIVES	KEY INDICATORS	TARGETS	PROGRAMMES & INITIATIVES	
2. Make an impact on the toughest challenges of our time in science, technology, and society, through bold creativity and transformative action.	Develop impactful research and innovation aligned with the SDGs	Number of projects addressing SDG or other grand challenges	2/3 project alignment with SDGs and other EU and international grand challenges	<ul style="list-style-type: none"> . Annual qualitative analysis report of R&I impact . Monitoring and mapping of project activity with SDGs and other EU and international grand challenges 	
	Increase our contribution to regional and national R&I-based sustainable growth	Contributions to key RIS and EIS indicators	Aligned with convergence to European average	<ul style="list-style-type: none"> . Map and analyse correlation of key RIS and EIS indicators with INESC TEC indicators in Scoreboard relevant categories: HR, Attractive Research Systems, Linkages and Environmental Sustainability 	
	Better align and deliver R&I with industry's needs	Number of national and international projects in partnership with industrial players Number of national and international research contracts with industrial players	Increase 20% by 2030	<ul style="list-style-type: none"> . Develop Multiannual Strategic Research and Innovation Agendas, in collaboration with industrial players and other stakeholders, for all core areas . Develop Technology Roadmapping for key challenges crucial for the competitiveness of private and public entities . Foster the expansion and stabilisation of core teams . Implementation of tools to increase the systematisation of collaboration and cocreation activities 	
	Contribute to the digitalisation of public administration	Number of projects that respond to digitalisation needs of public administration Number of projects in partnership with regional and national authorities	At least 3 strategic project collaborations by 2030	<ul style="list-style-type: none"> . Create a multidisciplinary taskforce to identify and develop solutions for increased collaboration with public administration organisations and the development of support technologies for their modernisation and digitalisation of public services 	
	Raise our contribution to inform debates on issues that matter to society	Policy organisations engaged Policy briefings Policy outcomes and impacts	Grow annually to 20 in 2027 Grow annually to 5 in 2027 Grow annually to 10 in 2027	<ul style="list-style-type: none"> . Expansion of the Public Policy Office's activities to foster the engagement of our community with the public and policy makers, enhancing the impact of our work, and contributing to regional, national and international policy agendas 	
	Engage in direct dialogue with the public	Schools engaged Programmes in topical science and technology issues Proportion of research projects with public engagement	One new school every year One new program every year Grow 1 pp/year	<ul style="list-style-type: none"> . Set up a student-focused initiative . Expand our science communication capability . Foster the expansion and stabilisation of core teams 	
	Communicate scientific and technological achievements and their impact	INESC TEC magazines issued	4 per year in 2027		<ul style="list-style-type: none"> . Contribute to the greater scientific literacy of citizens based on the dissemination and communication of science and technology. . Evolve our communication capability to be able to bridge between the complexity, uniqueness, and dynamics of INESC TEC and an increasingly intricate and competitive communication landscape. . Specifically address different markets: the specialized international arena; the policy-makers in science, technology and innovation; talent recruitment targets for research and innovation at under and post-graduation level; secondary school's students, with an emphasis on "girls for STEAM at INESC TEC".
		Participation in high-profile international trade fairs and events	5% yearly increase		
		Mainstream media and national television appearances	3% yearly increase		
		International specialised media appearances	Grow annually to 10 in 2027		
		Average reach per organic publication on the social media channels of the institution (LinkedIn, Twitter, Instagram and Facebook)	Average growth rate of 40% across the four channels until 2030		
		Laboratory visits and technology open-days	4-10 visits per year for each major laboratory/TEC4		
	Summer schools and roadshows to secondary schools	Grow annually to 10 in 2027			

//9 Defining Success

STRATEGIC OBJECTIVES & INITIATIVES - OVERVIEW

STRATEGIC COMMITMENT	STRATEGIC OBJECTIVES	KEY INDICATORS	TARGETS	PROGRAMMES & INITIATIVES	
3. Increase our relevance by closely integrating across science and innovation, disciplines, and ecosystems.	Build stronger knowledge-based and multidisciplinary R&I ecosystems	Number of Multi-scientific domain national and international initiatives	Increase multidisciplinary research projects and innovation outputs 30% by 2030	. Promote new initiatives to enhance internal collaboration between research centres	
		Number of Multi-Stakeholder national and international initiatives			
		Proportion of research and technology infrastructure use time by external entities	Increase of 20% by 2030		. Strengthen collaboration with, and increase participation of, local, regional and national affiliated INESC TEC industrial and HEI partners as a means to reinforce the regional and national innovation ecosystem and develop strong R&I and market uptake complete value-chains
		Number of projects in partnerships with other INESC institutes			
	Develop better linkages between knowledge production, development, and market uptake	Number of development and demonstration projects resulting from previous internal research projects	Increase of 20% by 2030	. Increase contract research with industry	
		Number of spin-offs; Number of persons employed by the spin-offs			
		Number of technology-based products and services licensed to industry			
	Increase strategic integration in national and international tech-intensive value-chains	Number of memberships in EU Public-Private Partnerships (PPPs)	Adhere to 3 EU PPPs in 5 years	. Promote participation in EU Public-Private Partnerships	
		Number of projects resulting from PPP memberships	At least one project per EU PPP		
	Promote our pro-active participation in R&I agenda-setting at regional, national and EU level	Number of participations in regional and national S3 and other R&I related advisory roles	Increase number of engaged researchers by 20%	. Increase interventions in R&I advisory roles at European, national and regional levels	
		Number of participations in EU R&I related advisory roles	Increase number of engaged researchers by 20%		
		Number of (co)authorships of official regional and national R&I-related strategies and reports	At least 1 co-authorship per core INESC TEC area		
		Number of (co)authorships of official EU R&I-related strategies and reports	At least 1 co-authorship per core INESC TEC area		
	Increase our international networking, leadership and competitiveness	Number of leading roles in EU PPPs and international networks	Increase of 20% by 2030	. Strengthen the intervention of the International Relations Service in the areas of International Collaboration, International Mobility, and International Culture. . Implement a Monitoring unit in INESC Brussels HUB to promote INESC TEC's R&I engagement in EU agenda-setting, promote strategic positioning, multilevel alignment and international project integration.	
		Number of high-visibility international events			
		Number of EU projects approved in coordination role	1/3 by 2030		
		Revenue in EU projects			
		Number of international projects (extra-EU)	Increase of 20% by 2030		. Identify international (non-EU) opportunities and support the R&D centres in the preparation of proposals, including consortium spotting and specific guide for applicants.

//9 Defining Success

STRATEGIC OBJECTIVES & INITIATIVES - OVERVIEW

STRATEGIC COMMITMENT	STRATEGIC OBJECTIVES	KEY INDICATORS	TARGETS	PROGRAMMES & INITIATIVES
4. Cultivate an attractive, people-centred and talented community	Improve attraction and retention of world-class talent	Employee satisfaction Index Proportion of employees trained	Increase of 10 pp by 2030	. Launch the restructuration of the prioritised Strategic HR areas (Recruitment, Performance Assessment, Training, Careers, Employee Lifecycle)
		Average applicants per position	Increase 20% by 2030	. Launch initiatives aimed at tackling new issues raised by remote work
		Employee Turnover Rate Absenteeism rate	Decrease of 10 pp by 2030	. Support of the line management and leadership in onboarding of new employees, setting clear targets, mentoring, and career guidance
	Ensure opportunities and recognition for career achievements	Pace of career advances for INESC TEC research staff	Mean time of 5 years	. Implement an explicit career development support policy
		Proportion of employees with disabilities or impairments	Increase of 2 pp by 2030	. Implement policies and actions to foster diversity and inclusion, namely the Diversity and Inclusion Program and Action Plan
	Expand the diversity of our community	Proportion of foreign integrated researchers Proportion of foreign PhD students	1/4 by 2030	. Strengthen the breadth of nationalities in INESC TEC's community
		Proportion of women in scientific positions	1/3 by 2030	. Implement and monitor the Gender Equality Plan . Increase of the presence of women in research and leading positions
		Proportion of women in decision-making positions	40% by 2030	. Implement internal mechanisms to foster recruitment and promotion of women
		Proportion of researchers enrolled in mobility programmes	Increase to 1/4 by 2030	. Create new opportunities for sharing and mobility of researchers (internally and externally)
		Employee engagement indicator (e.g. Employee Net Promoter Score (eNPS))	Score above 40 by 2030	. Implement actions to strengthen transparency in the institution and the community's engagement
	Provide a more dynamic and fulfilling working environment	Number of initiatives fostering openness to society and social responsibility	Launch a new one every year	. Implement employees' satisfaction and well-being study on a yearly basis . Promote openness to society and increase the impact of social responsibility initiatives
		Number of initiatives conducive to research integrity, ethics and open science	Launch a new one every year	. Implement actions to foster an environment conducive to research integrity, ethics and open science

STRATEGIC COMMITMENT	STRATEGIC OBJECTIVES	KEY INDICATORS	TARGETS	PROGRAMMES & INITIATIVES
5. Strive for a sound, sustainable and effective operational model	Strengthen the sustainability and resilience of our economic model	International competitive research funding Major contracts with industry and philanthropic funding	1/3 by 2030 5% by 2030	<ul style="list-style-type: none"> . Promote growth of activity in key areas . Promote diversification of the funding model
	Promote and contribute to environmental sustainability	Proportion of reduction of carbon footprint Number of environment-related technologies	30% reduction by 2030 30% increase by 2030	<ul style="list-style-type: none"> . Develop and publish "Impact and Sustainability" plan and report . Promote environmental sustainability as a cross-organisational theme
	Improve quality, management and usage of our infrastructures	Investment in infrastructures	30% increase by 2030	<ul style="list-style-type: none"> . Develop and implement Research and Technology infrastructures use and access policies . Evolve our internal digital infrastructure to better match the needs of our current and future work in the scope of the digital transformation
	Strengthen the distinctive aspects of our institutional model	Proportion of execution of the strategic plan	At least 95% execution by 2030	<ul style="list-style-type: none"> . Launch of initiatives to ensure strategic alignment . Undertake key management initiatives to continually enhance the efficiency, effectiveness and agility of our internal services, and ensure their alignment with the evolving needs of our community . Strengthen the contributions of advisory boards and councils to strategic options

Strategy Management and Review

The Board will ensure the integration of the Strategic Plan with other components of our strategic delivery framework, including: annual planning and reporting; Scientific Domain and TEC4 strategies; Board agendas for missions and areas of intervention and responsibility; and institution-wide applications and commitments as R&D Unit, Associate Laboratory, and Technology and Innovation Centre. The overall delivery of the Strategic Plan will emphasise coordination across the organisation and be carried out at a speed of implementation that is manageable for our community.

A formal strategic plan review process will be in place, to regularly assess and set the direction for delivery, and report and interact with the General Council, the Scientific and Business Advisory Boards, the Scientific Council, and our community.

The execution of the Strategic Plan will be monitored using the quantitative indicators outlined above, complemented by the achievement of significant milestones in programs and initiatives, qualitative reporting of progress through impact case studies, as evidence of outcome delivered, and annual discussions with the most important external stakeholders of INESC TEC.

INESC TEC is engaged with recently launched efforts by EARTO on impact assessment for RTOs, and by the Coalition for Advancing Research Assessment, through which we have committed to working together in the near future with other organisations, at the national and international level, to revise and improve our systems and practices for the assessment of research, researchers and research organisations. As a result of this foundational work, our Strategic Plan will benefit in the future from improvements to this initial proposal on how to define and measure our success.



**WE ARE SCIENCE.
WE ARE TECHNOLOGY.
WE ARE INNOVATION.
WE ARE INESC TEC.**