

The Technological Plan
4 years of Implementation

Introduction to the Report Presented at the Technological Plan Consultive Council

9th of July, 2009



PLANO
TECNOLOGICO
PORTUGAL
A INOVAR...

In the last four years the Advisory Council of the Technological Plan has held eight presential meetings. At all the meetings, the Advisors were presented with a **comprehensive evaluation of the Plan's implementation and evolution**. These evaluations were widely disseminated in the media and made available for consultation at the site of Technological Plan.

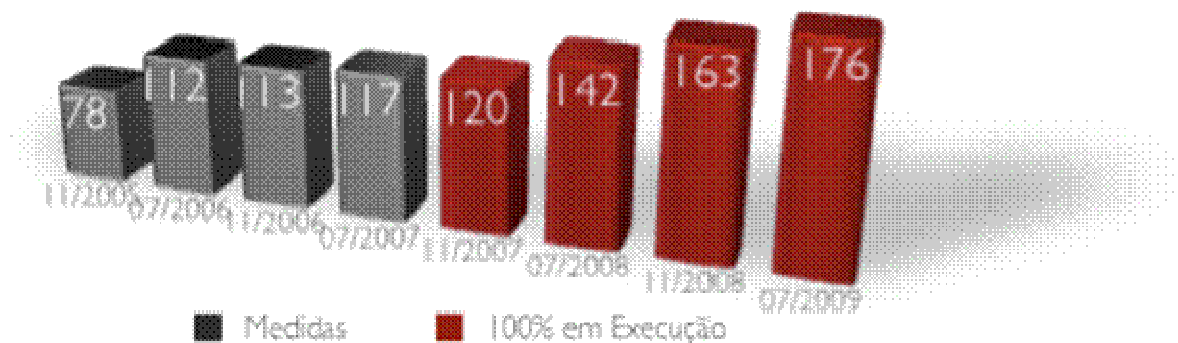
Over the four years, the Technological Plan has been implemented in vary diverse conjunctures. However, as this is a structural agenda the coordinating team and the Advisory Council have always understood that while the Plan should be sufficiently flexible to be framed in the conjunctural challenges, it should not be distanced from the strong lines for **structural change** that justify it and give it meaning and opportunity.

It should not be distanced and it has not been distanced. **Portugal's recent progress in international rankings of reference demonstrates that the persistent effort is bearing fruit.**

At the seventh Advisory Council held in November 2008, the Coordination of the Technological Plan was urged by the council members to make the last Consultative Council in this legislature a time to assess the outcome and define **new challenges**, renewing the ambition of the Technological Plan.

We wish to give the right response to the challenge set. In doing so, we also want to underline the exacting work undertaken and the availability of the members of the Advisory Council of the Plan Technological and of the Focal Point Network that executed and accompanied the agenda in the four different Ministries. Much of what has been achieved would have been impossible without their contribution.

The implementation report to be distributed by the council members describes the **176 measures in course**. With rare exceptions, the nature of these measures is ongoing and the majority has been planned in the context of the programming period of the National Strategic Reference Framework. (NSRF 2007 – 2013).



Accordingly, the Technological Plan agenda, which will be subject to an evaluation test and democratic legitimation in the legislative elections on 27th September, can be adjusted and reoriented but it has a **strong dynamic component that will be structurally projected in the economy and Portuguese society.**

This was the framework in which we understood the suggestion of the Technological Plan council members to make the eighth meeting a time for **renewed ambition**.

Portugal and the Portuguese **today are facing a global crisis with great determination**. This determination has allowed some of the most perverse effects of the economic situation to be kept to a minimum and have led to the beginnings of the first signs of hope and recovery.

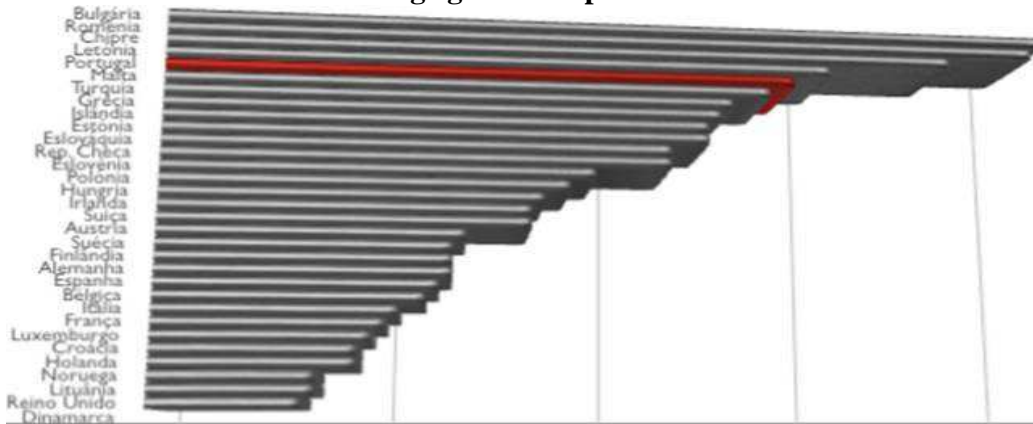
The decision to implement a Technological Plan, as a political idea, pledge for action and mobilizing agenda of Portuguese society, has enabled the **competitive base of the Portuguese economy to be improved** and relevant progress to be made in its preparation for the new economic and social challenges set by globalization.

In the competitiveness ranking from the Institute for Management and Development (IMD), Portugal is placed as one of the five European countries that have shown the greatest improvement, belonging to a group that enjoys the company of reference countries like Finland and Sweden; it is also classified as the **most competitive of the Southern countries**, ahead of Spain, Italy and Greece.



The European Innovation Scoreboard 2008 (EIS2008) revealed that Portugal was also the **5th best European country for making progress in innovation**, and is even in first place in crucial indicators like the qualification of human resources and private investment in research and development.

European Innovation Scoreboard 2008 Annual average growth in performance innovation



Economic history has taught us that the countries that are able to progress consistently in the **growth and quality of jobs**, are the first to advance in the innovation and competitiveness indicators.

The Technological Plan expresses the ambition to affirm Portugal as a **networking country** in the context of networking Globalization and as a country that is capable of creating and disseminating new solutions and new concepts.

RECOGNITION OF POLES AND CLUSTERS

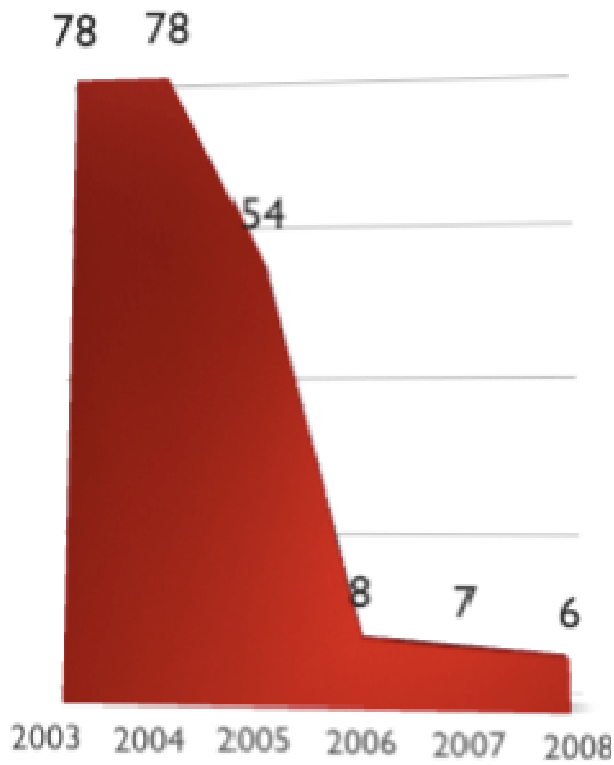


After decades of sterile debate on their outcome, Portugal today has 11 recognized **competitiveness poles and 8 clusters** covering such decisive areas as information and communication technology, new energies, health, fashion, mobility, new materials, agro-food, the sea and tourism, among others.

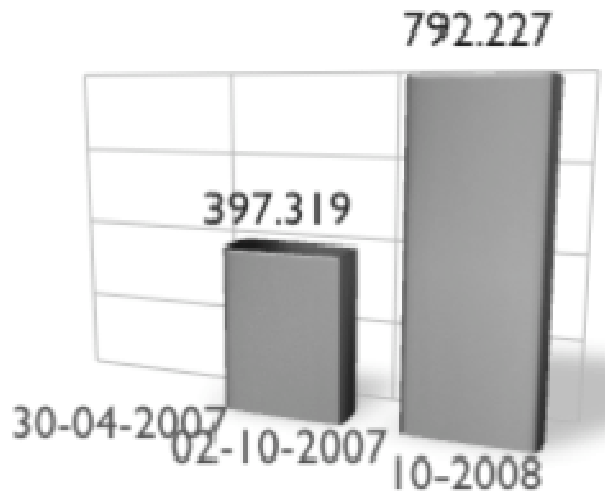
A business environment has been created bordering on the most sophisticated found at world level. In two pioneering projects, the **on the spot company initiative** has allowed 70,000 company start-ups in an average time of 42 minutes, has doubled the number of

companies with broad band access and roughly 800,000 have adhered to the dematerialization communication model of simplified business information (IES).

Days to start up a company



IES declarations delivered

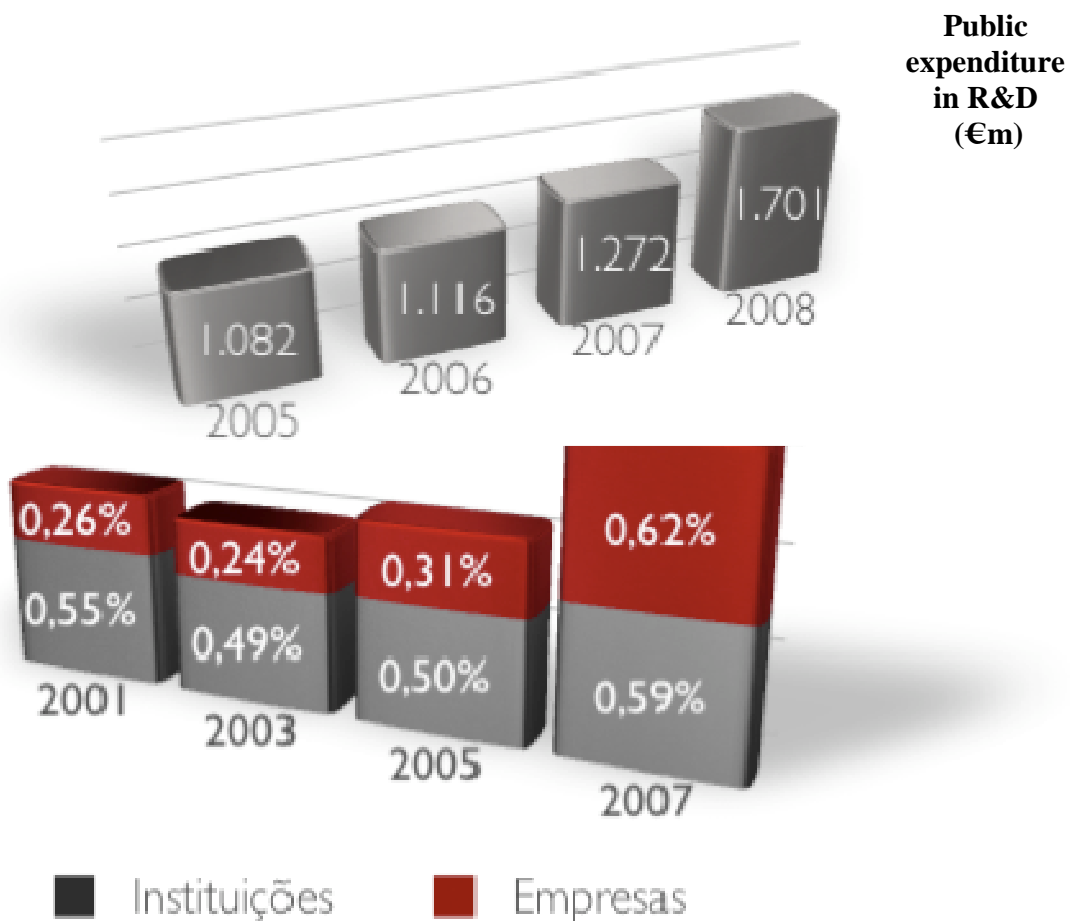


Overall R&D expenditure in Portugal represents over 1.2% of national GDP for the first time, equaling or surpassing levels already reached by Spain, Italy or Ireland.

R&D expenditure grew in both the public and private sector. However, it was particularly significant in companies where expenditure more than doubled in recent years. For the first time, business R&D expenditure was higher than the sum of all other sectors: universities, State and private non profit institutions.

The **number of companies with R&D activities doubled** in the last four years and the number of researchers working in companies more than doubled between 2005 and 2007 with the figure now reaching around 10,000.

The increase in the R&D expenditure also reflects the **priority given to scientific and technological development**. This has been accompanied by a boost in the number of researchers in the working population where the figures went from 3.8% in 2005 to 5% in 2007, nearing the European average. There is now one researcher for every 200 workers and the percentage for 2009 is estimated to go up to 6%. **The number of researchers in Portugal has doubled in 10 years** and 44% are women. Portugal today is one of the very few developed countries where there are as many women as men working in scientific research.



Roughly **13,000 PhD researchers were also registered in R&D centers** (measured in terms of “equivalent to full time”) in 2007, which is up 20% on 2005. Since 2007, approximately 2000 new doctoral scholarships have been awarded annually which is double the number for 2005.

A program has been implemented for the **hiring of 1000 PhD researchers**, thus boosting the capacity of national institutions and their international competitiveness and contributing decisively to the rejuvenation of the research teams hired by these institutions.

An innovative support program was launched for **invited chairs** with co-financing by companies operating in Portugal. Ten chairs have already been launched in diverse areas including: Biodiversity, Renewable Energies, Telecommunications, Information Technologies, Innovation and Operation Management. National scientific production has risen 18% in the last two years, measured in terms of the number of internationally referenced scientific publications. Two of the 5 most cited scientific articles in the EU were written with the collaboration of Portuguese authors.

There has also been a **sharp rise in the PhDs** granted and recognized by Portuguese universities: roughly 1500 new PhDs a year, about half of which are in the science and technology areas.

The number of Portuguese patents published in the European register is 2.3 times higher than in 2005 (86 patents in 2008), while the number of patents registered in the United States more than trebled between 2005 and 2008. Moreover, 139 patents were submitted by universities and research centers in 2008 which is nearly three times more than in 2005.

The scientific and technological development process in Portugal has also been accompanied by the **growing internationalization of academic institutions**, particularly stimulated by the strategic alliances made in Portugal with institutions of great international relevance e.g. MIT, Harvard, CMU, Austin in the United States and Fraunhofer in Germany, and supported by industrial affiliation programs.

Among other aspects, in 2008/2009 the **MIT-Portugal Program involved a total of 154 doctoral students** in the areas of sustainable energy and transport systems, in the application of stem cells and tissue engineering to regenerative medicine, as well as in the development of new products for mobility systems and medical equipment. The **program with Carnegie Mellon University involved 40 PhD students** in emerging aspects of information and communication technologies while the University of Texas in Austin cooperation program involved 50 PhD students working in interactive digital contents, advanced computing and mathematics.

The international partnership Program also includes the development of **specific post-graduation courses with high international recognition** that impact the specialized

training of senior management in Portugal and in the development of research nuclei, involving the largest enterprises operating in Portugal.

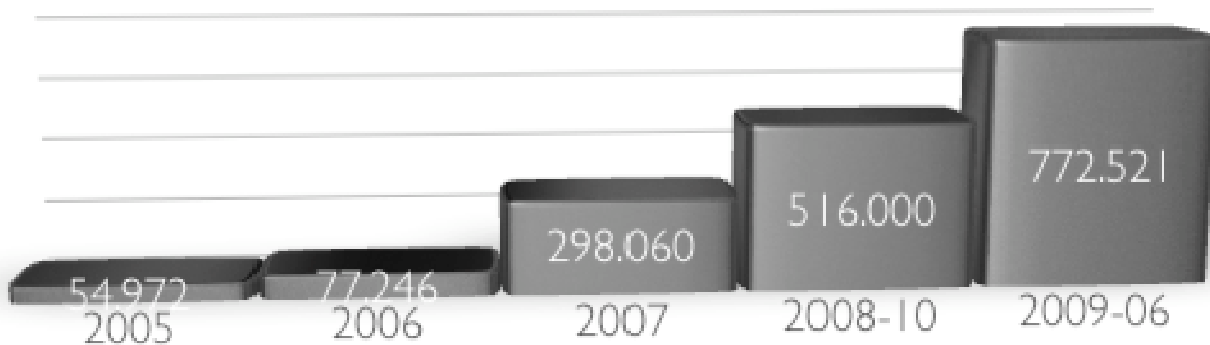
A joint **MBA** program has been launched with **MIT for the training of top managers**; this began in January and involves a total of 77 students in executive masters in the areas of sustainable energy and transport systems and also in product development and advanced production systems.

In a similar way, the **program with** the University of Carnegie Mellon has already involved 32 students in executive masters in software engineering, in information and communication networks and security and in the development of interactive digital contents.

Also in the context of the boosting and internationalization of the national scientific and technological capacity, the **International Iberian Nanotechnology Laboratory (INL)**, which is in the setting up phase, will be inaugurated in Braga in summer 2009 and is expected to affirm itself as an international institution of excellence.

The **first Fraunhofer Institute in Europe outside of Germany** - “Fraunhofer Portugal Research” - is also being set up in Porto at the Engineering Faculty and will work in the area of information and communication technologies.

Enrolments in the New Opportunities

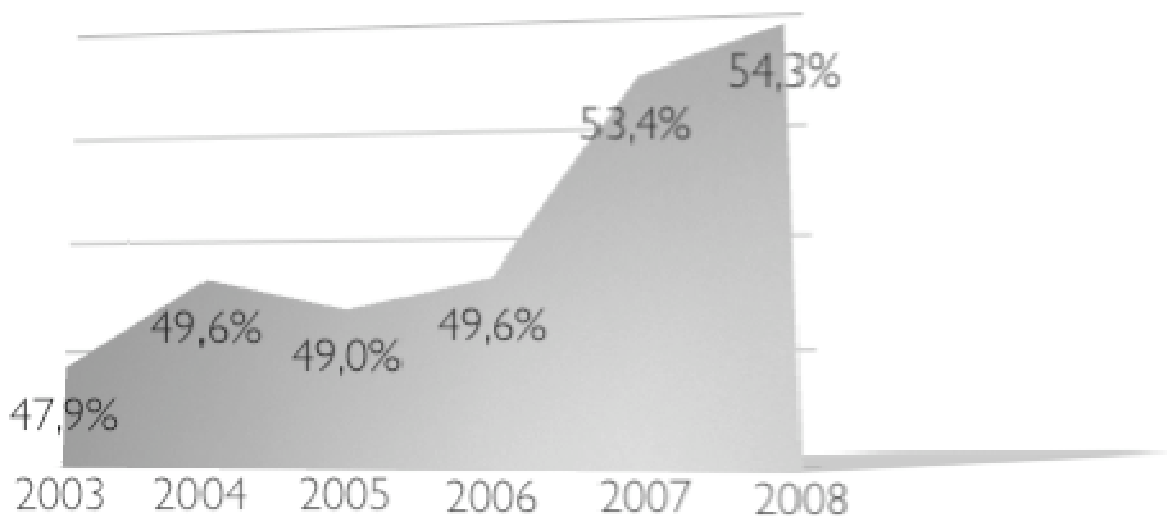


In the field of qualifying the Portuguese population, improvements have been made on many fronts. Firstly, the qualification of the working population through programs of great scope like the “**New Opportunities**” where more than 200,000 Portuguese have already retrained or obtained competency certificates and another 800,000 are undertaking a skills recognition and validation process, in dynamics supported by the work of around 500 New Opportunities Centers.

Focus goes also to the qualification of the public administration, the reform of which was considered a reference by the OECD. In the field of technological modernization, it holds the **third place in the European Commission ranking on the availability and sophistication of on-line public services.**

Other data strengthen the remarkable progress made in qualifications and help explain the EIS2008 report that places **Portugal as the country in the EU 27 that made the greatest relative progress.**

Population aged 20-24 yrs with Secondary Education (%)



The downward trend in the admission of students in higher education has been inverted and the entry of students over the age of 23 years has gone from just 551 in 2005 to 11,773 in 2008 as a result of special access tests. There was a rise of approximately 30% in first year students enrolled in science and technology courses. There has also been a **decline of roughly 30% in the drop out rate** from basic and secondary education.

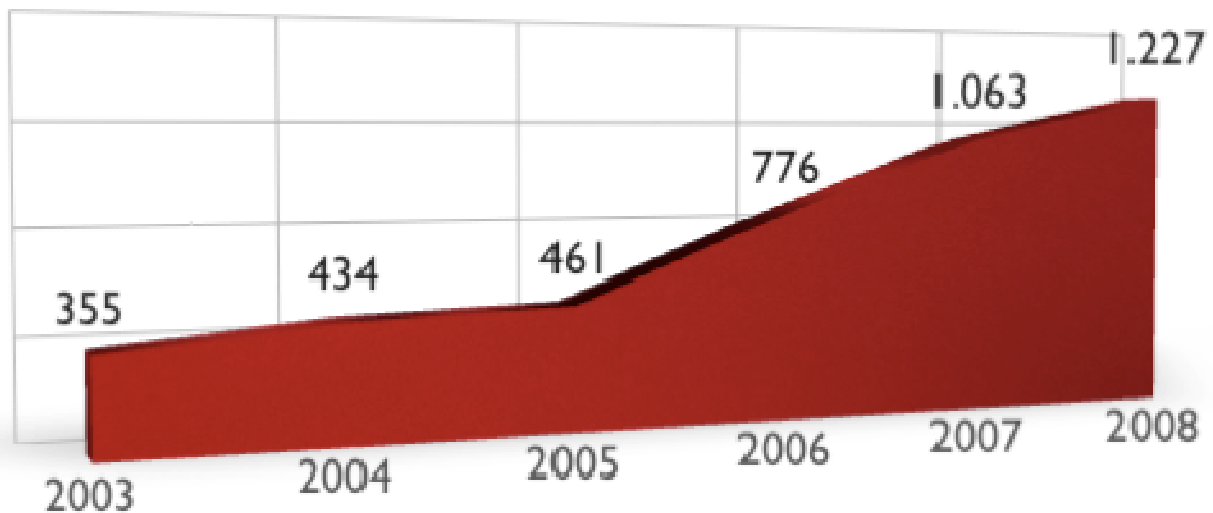
The aim to affirm Portugal as a **networking country in a networking world** implies that the integration and connection potential must be strengthened. Integration and Connection means the capacity to communication in an across border language like English, proficiency in the mother tongue and mathematics and easy access to computers and broad band networks as well as placements and exchanges abroad.

The progress made in this field has resulted in Portugal being considered a global example of good practice. **English is being taught to all first cycle pupils** and the Mathematics and Portuguese results have improved substantially.

Almost one million computers have been distributed in the scope of the *e.Escolas* and *e.Escolinhas* programs to students and teachers from Primary school up and workers in vocational training. An ambitious Education Technological Plan is making the learning environment in our schools a reference for modernity and innovation. Portugal today has one of the highest penetration rates of mobile broad band in the world and is the country with most lap top computers per thousand inhabitants.

None of these implementation figures would be meaningful if they did not represent the turning point in the competitive profile of our country's economy. The **inversion of the technological balance**, which was positive for the first time since records began in 2007 and again in 2008, is a sign of this turning point.

Result of the Technological Balance (€m) and Revenue from Technological Balance (€m)



There are other signs of the turning point such as Portuguese companies' capacity to **disseminate new concepts in the world market** in fields like technologies for education, border control, telemetry, the management of large commercial areas or the internet of things.

Portugal today is a global reference in fields as vital as **next generation networks** and **renewable energies**. As a result, this has attracted various global companies to set up competence centers in Portugal.

Next generation networks
€1000m investment (2009)
25,000 jobs

Pledge in Renewable Energies
€8100m investment by 2012
9700 jobs



The pool of knowledge, technology and innovative capacity in Portugal today is much greater than it was in 2005. This raises the responsibility and the challenge. The Agenda of the Technological Plan is a winning agenda and an agenda that is planned in the future as an inclusive and sustainable **Agenda of the Portuguese society for competitiveness**.

The world has changed and so has the global economy. The crisis demands new answers and new agendas. The variables of competitiveness are even more complex today than in the past because they must incorporate new guarantees of sustainability. **Being competitive is not an end in itself but is a means to promoting inclusion, employment and quality of life.**

The structural nature of the Technological Plan does not dispense with making **significant contributions to facing up to the difficulties of the economic situation**, such as the contraction of the Gross Domestic Product and the negative pressure the crisis has placed on Exports and Employment. The programs for the **upgrading of the school network**, technological modernization of schools, the promotion of **electric mobility**, the **generalization of fiber optic networks**, the creation of **credit lines for SMEs** totaling

more than 3000 million euros and that have been used by 30,000 companies, the **upgrading of health facilities and social protection**, incentives for the production and consumption of **renewable energies** or the boosting of the **social employment market** – these are all examples of the strong response to the economic crisis, crossing the immediate impact with the structural perspective of change.

Credit lines for SMEs

€3700m funding
30,000 operations

Programs to aid employment

€580m in 2009

Upgrading of school network

€2500m
205 schools
6543 jobs



In recent years, Portugal has **worked intensively on technological modernization and the qualification of people, companies and territories**. This hard work has led to remarkable progress in the efficiency and in the integration and simplification of processes in key areas such as administrative modernization, science, education, health, justice, qualifications, competitive networks, security, digital inclusion and support for companies. The sectorial technological plans have become active instruments with great impact on the rationalization and focalization of public policies.

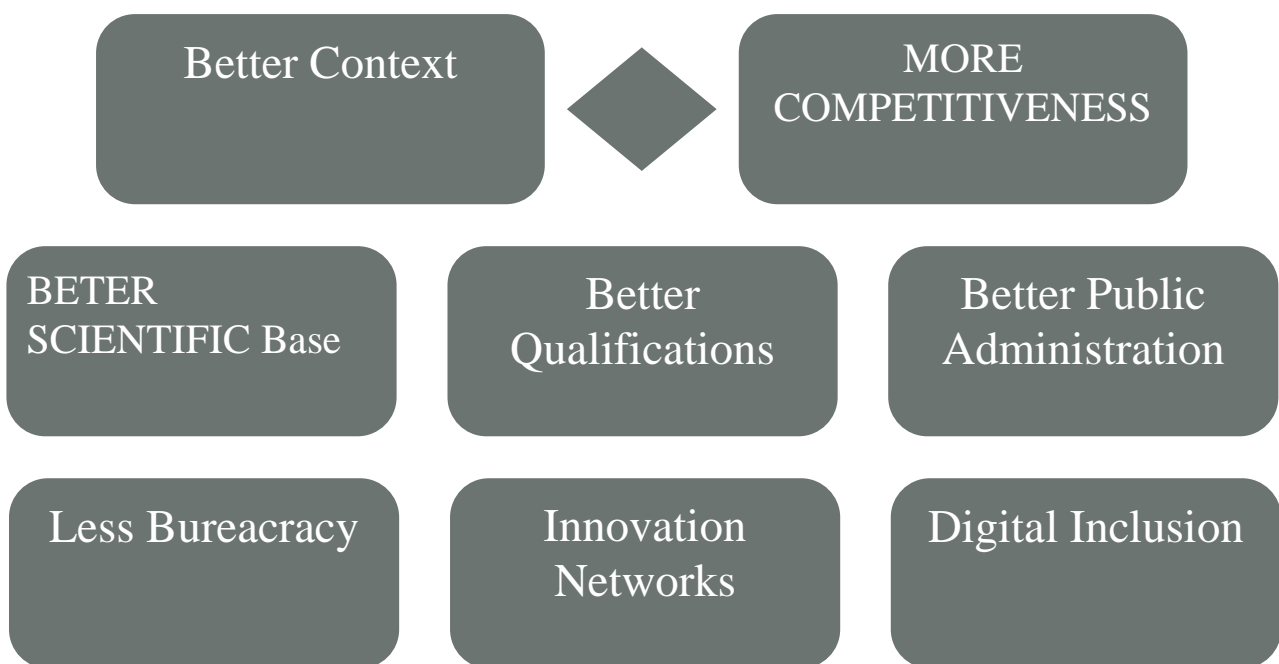
This work must continue and it allows us to aspire to the **fulfillment of an agenda for competitiveness in the new generation**. Portugal is an average sized country, located on the periphery of the European continent but it is one with great centrality from the Euro-Atlantic perspective. This is why we must reinforce our commitment to developing partnerships and promoting knowledge communities from the global perspective and focusing on the development of new products and solutions.

With the Technological Plan – a transversal agenda for growth and competitiveness, Portugal has taken an important step towards integrating public policies and mobilizing private actors. **The path already taken allows us now to go further** and to structure a National Innovation System that is even more articulated and adapted to the challenges of our times.

The **development of competitiveness poles and clusters**, the **international partnerships** and the **fostering of research in consortium** have led the relations between universities and companies to a new level of cooperation. With everyone's

collaboration we will advance even further. Universities and companies must do more than cooperate; they must get increasingly involved in common projects of research, product development and innovation in markets and market loyalty.

The sophistication of online public services for companies has reached 100% in Portugal. The financial system is solid and diversified and the technological and physical infrastructures have attained a high quality standard. Portugal has consolidated its position in the international evaluations for the attractiveness for business; its most vulnerable points remain licensing conditions and rules, the slow-moving justice system and the rules of the labor market. These areas require continued engagement and open dialogue so that solutions of high quality and equity can be implemented.



The decline in the weight of industry and of tradable goods and services in wealth formation is one the greatest weaknesses of the macro-economic model and of the sustainability of the Portuguese economy. It is therefore necessary **to develop and apply measures that favor a new generation of re-industrialization.**

Skills in entrepreneurship, creating sustainable businesses, furthering projects and managing life pathways are essential for the young people of the 21st century. The level of entrepreneurship skills in Portugal is high, but it is important to qualify it and raise its position in the value chain. This means that the pledge in a **reform of the formative model** must be continued, guaranteeing the development of skills for sustainable entrepreneurship in a permanent way and throughout the school trajectory and life long learning.

We are witnessing the development of a **new pattern of network globalization** in which each country or territory disputes non-disposable positions in the value chains. Though every window of opportunity must still be taken advantage of, the Portuguese economy must affirm its leadership in relevant sectors if it is to become more competitive.

It is vital to maintain the strong pledge in creating the right conditions so that Portugal can consolidate its ambition to be a frontrunner in the leadership of sectors like renewable energies, sustainable mobility, forestry, tourism or value added services. With an open and highly interconnected economy, Portugal's macroeconomic balance and potential growth is heavily dependent on its exporting capacity. In addition to continuing the pledge in diversifying markets and raising the value chain, **instruments must be strengthened and integrated that enable the country to become an export platform** of great efficiency and able to penetrate global logistic networks.

Portugal's affirmation as a centrality and an attractive country for people and Business, together with a **strong pledge in the technological leadership** of fields like sustainable mobility and clean energies consolidate a brand image and a consistent practice as a country of reference in innovation and the recovery of high standards of environmental sustainability.

The success of this agenda implies not only a new mindset, that has been part of our cultural model over the centuries, but also a **new attitude**. Portugal is a country of creative and talented people and also a nation in which too many people fail to use this creativity and talent to solve problems or to take advantage of opportunities.

The key to the success of the transforming agenda of the Technological Plan lies in making the Portuguese more consistent and competent entrepreneurs by **placing their talent and creativity at the service of the country's competitiveness**.

Without this there will be no motivation to change. With this, together with the results already achieved, **it makes sense to believe in and renew the ambition**.

Carlos Zorrinho
National Coordinator of the Lisbon Strategy and Technological Plan