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Institute IMDEA Networks: a new way of drawing science and enterprise closer in the field of communication networks

P.M. Romer affirms that know-how of a production function is an irreplaceable factor in current economic development. It is what allows rate of return on investment to grow steadily, and is the defining aspect of an economy's ability to generate technology and consequently increase productivity.

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On the basis of this approach, one of the key issues being posed by current policies is the manner in which public authorities can have a bearing on this new productivity role in order to encourage growth, without forgetting that know-how is not an asset that exists as a result of spontaneous generation and that technology is not neutral – in the sense that this arises as a response to concrete problems, specific of a country or social, economic and cultural environments – it is not directly transferable from one country to another, and therefore maintaining active I+D+i policies is necessary.

An example of this active policy was the IMDEA project, implemented by the Community of Madrid Government in 2006 within the framework of the IV Regional Plan for Scientific Research and Technology Innovation (PRICIT). IMDEA institutes were created under the basis of eight strategic areas for citizens of the Community of Madrid, consisting of water, food, social sciences, energy, materials, nanoscience, networks and software. From the beginning, the general objective consisted of consolidating a science and technology system based on human capital and institutional responsibility, whose final objective meant satisfying social needs by means of promoting R+D+i activities and having these transferred to society. Institute IMDEA Networks – which launched operations at the end of 2007 – initiated activities as an independent research and non-profit entity oriented to building an international team with the purpose of developing leading and innovative technology in all communication network areas.

In order to achieve the founding objectives, IMDEA Networks was created to adapt practices followed in the most prestigious world-wide research centers to the realities of Madrid. As a result of this, it is now able carry out its work as required by society, helping to solve real-world problems and improving social welfare. It is able work in the fields of science and technology

alongside excellent researchers, mostly from overseas, who have been drawn to our scientific and operational approach. Selection of exceptional personnel and an effective transfer model are, therefore, the two basic characteristics represented by our Institute which are attributes distinguishing the model within national scientific-technological standards.

The model applied for selection of research personnel follows standards used by the most prestigious centers in the world: we find the very best in each field, in competitive processes, open and international, and assessed by peers according to strictly scientific criteria. By means of this philosophy, the Institute has launched a number of 'international open calls', assessed by our advisory Scientific Committee, a committee made up of external scientists of the highest world-wide prestige. The selection process, as well as being international, open and competitive, is extremely rigorous.

Our researchers are offered an international and multi-disciplinary working environment of excellence, with thickly woven business cooperation networks, participation of all public Community of Madrid public universities, a global network of external scientific cooperators and flexible research equipment capable of competing and adapting to emerging technological challenges in a global scientific market.

This policy has led to complete success. In little over three years, Institute IMDEA Networks has been successful in creating a top-level body of international researchers: 54 from all over the world, of which 23 are Doctors. In addition to a prominent research background, our scientists also have significant industrial expertise. Indeed, our researchers not only come from eminent international universities, such as Columbia University, Politecnico di Torino, UC Berkeley, EPFL and the Hamilton Institute, but have also been employed by prestigious industrial research laboratories, including NEC, Telefónica, AT&T, Alcatel, Philips, NTT Cocomo and Telecom Italy, and have been granted over 40 patents during the course of their professional careers. Currently, over 35% of these researchers have obtained public or private funding in order to finance their research, which is a further example of their "excellence". To date, they have published 166 books, chapters of books and articles in some of the most significant scientific forums in the world. Our Research Assistants already have 11 theses, including Masters and Doctorates. However, beyond numbers, we care more about the caliber of our impact and how far it reaches. We want to reach out to our society, beyond the scientific community.

The second pillar on which this initiative was founded, and one on which we work every day, is our commitment towards developing an efficient technological transfer model. This commitment has been present from our inception, in the understanding that we are the best qualified organization to understand the needs of society. This transfer model allows us to improve economic competitiveness, company productivity, effectiveness, quality and costs of public services, and is undertaken encouraging growth, registry of patents and other forms of intellectual property, creation of technological based companies, the Institute's participation in activities of scientific dissemination within the company, their cooperation with national and international public and private entities, and participation in national and international scientific-technological networks, etc.

In order to achieve these objectives, and break away from the traditional science and technology transfer-management model, diverse companies from the scientific-technology sector (both national and foreign, and ranging from multinationals to SMEs) have, from the very beginning, participated in the design, objective definitions and monitoring of the Institute's results by means of analyzing our potential. They have become part of our Board and cooperate

directly and indirectly in our research processes, and have signed cooperation agreements or strategic alliances, and now form part of our consortiums and research groups in diverse projects.

Our activity in research projects at regional, national and international level is of key importance for development of our objectives. From its inception, the Institute has worked on 18 projects with public and private funding. These projects bind research and growth and are therefore capable of generating “recordable” results by way of patents, direct contracts and standardization.

Based on the idea that the greater the possibilities of transferring results into production, the more useful science is to a society, Institute IMDEA Networks is also concentrating a major part of its efforts towards forming technologically based companies. For this reason it encourages productive, entrepreneurial and competitive attitudes in its researchers. We want our research to be disruptive and with high social-economic results.

With this policy implying maximum “interlinking” with business networks, our organization is also managing to get closer to the model created by the best research centers in the world in a another way: by complementing received public funding with private funds. In 2010, the percentage of competitive funds obtained from external sources exceeded 30%, over and above the usual in Spanish public research centers.

The Institute also encourages cooperation with international standardization bodies, with the purpose of defining standards in relevant fields for global technological development and, consequently, social welfare. Network standardization is of key importance given the diverse characteristics of productivity and development in the communications market. The final user demands standardized solutions capable of interoperation and integration with equipment from other manufacturers, and therefore, standardizing research results multiplies practical implementation possibilities.

In short, flexibility, agility, responsibility and social relevance, as well as participation and cooperation from all stakeholders, efficiency, accountability, peer assessed results, international quality standards, and opening up to the industry are the defining characteristics of Institute IMDEA Networks, and are the qualities that have contributed most to scientific leadership in the more developed countries. IMDEA Networks and all other Institutes for Advanced Studies in Madrid are helping to generate a body of top-level international researchers in the Community of Madrid, based on three approaches: that science needs, first and foremost, human capital; that human capital needs an appropriate institutional framework in order to efficiently exploit full potential, and that science, first and foremost, should be useful to society and help to resolve the more pressing problems of its community.

Read More:

- [Artículo in BIT online magazine, COIT \(Colegio Oficial de Ingenieros de Telecomunicación\)](#)

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About us

IMDEA Networks Institute, promoted by the Regional Government of Madrid, is a research organization on computer and communication networks whose multinational team is engaged in cutting-edge fundamental science and technology. As a growing, English speaking institute located in Madrid, Spain, IMDEA Networks offers a unique opportunity for pioneering scientists to develop their ideas. IMDEA Networks has established itself internationally at the forefront in the **development of future network principles and technologies**. Our team of highly-reputed researchers is designing and creating today the networks of tomorrow.

Some keywords that define us: 5G, Big Data, blockchains and distributed ledgers, cloud computing, content delivery networks, data analytics, energy-efficient networks, fog and edge computing, indoor positioning, Internet of Things (IoT), machine learning, millimeter-wave communication, mobile computing, network economics, network measurements, network security, networked systems, network protocols and algorithms, network virtualization (software defined networks – SDN and network function virtualization – NFV), privacy, social networks, underwater networks, vehicular networks, wireless networks and more...

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