

Doing Research in Knowledge-based Societies

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Knowledge is widely regarded as a key ingredient contributing to economic growth and international competitiveness. It is also acknowledged that for this growth to occur, research must be exploited to produce new product and services. The main benefits determined by research exploitation are:

- *competitive advantage;*
- *increase of market share;*
- *higher growth rate.*

These benefits are very important, but if we want to truly contribute to a real and long term progress in our countries it is not just necessary to put a big emphasis on the generation of knowledge but it is essential to focus on the creation of suitable (or good) knowledge. Indeed, there is a wide spectrum of knowledge, scientific, social and cultural, that is essential for the human socio-economical progress.

The two central questions about doing research for favoring human progress and socio-economical benefits are: (1) what is the aim of scientific studies and (2) what makes them different and effective when compared to industrial development. In the past it was acknowledged that research looks for answers to scientific curiosity. The only desire of the “natural philosophers” was to describe nature. Another “unwritten law” was that research must be free because knowledge advancements are produced by curiosity-driven activity. For decades two features upheld the latter belief: (1) the cost of experiments was low and (2) there was a generational time gap between discoveries and their transformation into wealth. Now, on the contrary, experiments are very expensive and discoveries quickly become relevant for economy. Indeed, it is because of the economic relevance that citizens consent to invest tax money for the scientific activity. Some scientists, aware of that, outline the cost-effectiveness of researches. Other claimed paybacks are the “incidents” occurred during studies (like the penicillin discovery). However, the fragility of these arguments shows the importance of redefining the role of research and its relevance in contributing to human progress.

Observe that what really favors progress is not freedom of research but open mindedness, or, better, freedom from research mindsets. It is freedom and responsibility. When mindsets become strong responsibility fades and attitude to face new challenges weakens. Ironically, believing that scientific research is just discovering the unknown is also a mindset that harms scientific activities. The intellectual undertakings essential for the wellness of our people are seen as business and the social responsibilities are supposed to be out of the research domain. When confronted with social requests, some scientists reply that what Universities and research centers produce is enough to benefit industry. This, simply through the application within companies of the latest world state-of-the-art knowledge. But assuming that knowledge is generally and globally valuable means refusing, in essence, any form of feedback from the outside, including the time-relevance of research, and means considering only the consensus of peers.

Research for knowledge-based economy must be strictly related to “knowledge for future wealth (either in material civilization, or in the mental and moral nature of man)” and within a 6-10 years perspective, thus resulting from a realistic and proactive vision of the future world. Accordingly, a key role should be the inception of networks that links scientists at high-education institutions, industries and Government Agencies. Through the network and by proper network initiatives future social necessities (at the global level) are predicted, new technologies identified and the “design of future products (material and intellectual)” started. The network will uphold universities in their knowledge generator role. The links between personnel in firms and University’s researcher must produce the right vision and optimize the use of public funds in the support of advanced research.

In the post-industrial society (or Knowledge Society, as defined by Peter Drucken) knowledge innovation is an essential success factor for high-tech companies. What is new is not change but the rate of change that we are experiencing. Understandings, technologies, customs, values, organizations and people themselves change so fast. High-tech products reach quickly the peak of their own technological and scientific possibilities; competitive products (whose performances often result from disruptive technologies) inevitably surpass them. Moreover, in order to remain on the leading edge of innovation, it is vital to continuously favor new waves of progress capable to sustain a constant generation of “science and technology” life cycles. This cannot be done autonomously by industry; the investments and the creative capabilities required are contrasted by the resources dependence on those entities outside the firm (customers and investors,

primarily) that give it the resources to survive. It is also necessary to co-operate with the industrial trading partners, preferred customers and traditional knowledge suppliers to create knowledge. In addition, the knowledge rooted in the expertise of individuals of the organization must be effectively transferred to new generations through social and technical mechanisms that promote an internal sharing and coding of expertise, while simultaneously forging network partnerships, exchanging and jointly creating new knowledge. Finally, it is necessary to allow at the same time the freedom that favor creativity and an attitude for doing research inspired by needs.

The above is a complex and fragile mechanism that do not forget the unfettered research studies, the ones that are well defined by a reflection of A. Graham Bell: *“Leave the beaten track occasionally, and dive into the woods. You will be certain to find something that you have never seen before.”* That kind of research should be certainly funded, but by specific sources; moreover, it must be mostly intellectual (therefore, at low cost), carried out in Universities (and not in research centers) by real outstanding people. The outcomes must be available to everybody for the progress and wealth of humankind. Low cost is essential because when the research becomes too expensive it must ensure a proper return of investment, otherwise, the taxpayer refuses further support.

The advanced knowledge that the productive world needs must be generated and quickly transferred. Technology transfer must be, essentially, a science and technology thoroughfare that should be free, as much as possible, from bureaucracy and legal impediments. Also, in my opinion, it must be a knowledge diffusion process that moves from the places where the technological culture is produced spreading towards prospective beneficiaries. However, for efficient technology transfer an a priori matching of needs and offers is necessary. For this, we surely need communication channels to spread information about what research laboratories offer, how and for what it can be used and what companies really need. Nevertheless, it is difficult to obtain matching of offers and needs when laboratories and universities do not develop core capabilities useful to allow industry to make better products, but produce something that can be done more economically by industry. Therefore, for concretely benefit the society Universities and research centers should direct their efforts ahead of industrial needs and industries should pursue technical targets that are advanced (and risky) enough to make the contribution of laboratories and universities essential.

What expressed here is a new way of thinking, which probably at the beginning will be opposed by researchers. Present research activity is mainly motivated by the Esteem, Recognition and Self-Actualisation needs of individuals (the highest steps of Maslow's needs hierarchy). Favoring research for knowledge-based economy is not a limit to a genuine research freedom but faces a new challenge: to harmonize the highest needs of individuals and organizations.