

## THE RESILIENCE OF SCIENCE AND TECHNOLOGY SYSTEMS

In countries where science and technology, in spite of the rhetoric and the actions of their rulers and of the laws that their legislators enact, do not constitute a true priority for the State nor are an object of interest and investment for the industry, the weakness of the sector becomes apparent. The absence of a strong and consolidated sector in which political changes and economic crisis do not affect in an important manner the existence and the activity of laboratories and researchers results in an insufficient resilience to properly sustain its stability or its fast recovery.

The measurement of such resilience is rather complex, given that it is not limited to the determination of the elasticity module of a body but it refers to a multi-factorial social situation, where the human factor plays a preponderant role.

The two elements with the biggest weight in debilitating the sector are, on the one hand, the state of the training of the forthcoming generations and, on the other hand, the brain drain from laboratories and academia to enterprises and other institutions or business, particularly to other countries.

The training of high level human resources not only takes a very considerable time to achieve, but also requires of a teaching staff of high quality, familiar with cutting-edge research and its practice, of well endowed laboratories where to carry out practical science, of up-to-date bibliographic resources and of perspectives for a future professional life that do not represent a repellent for a teaching and research career. It requires, finally, of an intellectual climate of openness and of freedom where ideas can flourish without impositions or conditions. It needs the existence of universities with full autonomy.

On the other hand, brain drain, which generally involves the best and the most productive or promising ones, takes

place in an accelerated way when the science and technology sector is weakened beyond a bearable threshold, and faces problems when it recovers and fortifies. Uprooting is always painful for those who leave their land and are forced to adapt themselves to often extraneous environments and to start a new professional trail, but the decision to repatriate implies doubts, mistrustfulness and resentments that are difficult to overcome and, quite often, insurmountable.

In the consolidation or in the destruction and recovery capacity of a system such as that of science and technology, time plays a central part. It is not the same to develop a structure during four, five or even ten years, than to remain in it for decades. The consequences are very different, sometimes for good, rarely, when construction occurs, or for bad, when destruction ensues. Although it is possible to build or, at least, establish the bases for a solid progress in a relatively short time and, certainly, there is no need of much time in order to destroy, we are dealing with a good argument to limit the duration of the terms of rulers and legislators. Above all, because extended periods lead those who are empowered to develop an overbearing need for perpetuation.

The truth is that the social systems, among which is the science and technology system, can be harmed and even destroyed but, also, history shows us that they have the capacity of being reborn, like the mythological bird Phoenix. Like the people, science and technology have a significant level of resilience.

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