

The Era of Scientific Blossom

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The successful establishment of a vibrant and thriving scientific economy in the Western world has prompted a number of developing countries to invest large amounts of seed capital funding into scientific research as a potential new "money-spinner". However, recent and current global financial turmoil has had its toll on some of the investing countries. Akin to most of the other important national sectors, scientific research has suffered significant financial cuts. Indeed, there are rising doubts about the willingness of Western governments to continue to sustain funding due to the financial uncertainties that the world is facing, which raise fears about the feasibility and short term success of such investments.

The recent 'birth' of the Spanish stillborn scientific investment fund has cautiously been perceived by some of the potential investors as an indication that scientific investment is an inevitable failure for the beginners, while at the same time, seen as an excellent opportunity by others. In 2008, the Spanish government promised a new golden age for science by increasing investment in research and development. A couple of years later, the austerity measures taken by the same government in response to the global financial turmoil forced it to cut scientific spending significantly [1]. While a much younger "Euro-zone" country, Croatia, has increased its scientific and research funding. In 2006, for instance, the Croatian government funded the creation of the Croatian Institute of Technology, an institute that facilitates active co-operation and communication between researchers, technology companies, and entrepreneurs who all share a commitment to the development of a technological infrastructure in Croatia, as well as facilitating strong connections to research and development in the Euro-zone [2]. The success of the Croatian scientific investment is evident by its scientific productivity, which has been growing constantly since the year 2000, as measured by the number of journal articles in all scientific disciplines cited in Current Contents/the Web of Science [3].

A remarkable increase in scientific investment has also been seen in Singapore, where the actual amount spent in research and development has grown from S \$6.5 billion (~US \$4.5 billion) in 2005 to S \$13.5 billion (~US \$10 billion) in 2010 [4]. The genuine interest of the Singaporean government in generating a knowledge-based economy has enabled it to become a scientific giant in the region. Some of the early fruits of the investments thus far are the increased number of peer reviewed, publications authored by Singaporean scientists as well as patents awarded, which have both more than doubled between 2007-2009 and 2006-2008, respectively [4].

Intriguingly, a much bolder and vigorous approach to scientific investment is seen by the Saudi government, which was inspired by his majesty King Abdulla's vision of building a scientific and knowledge based economy, which is not only designed to diversify the Kingdom's resources, but also as a way of training of local scientists to pursue research that will contribute to public knowledge. As a result of this, large capital funding has been targeted towards developing the Kingdom's local scientific community and activities. So far, the country has invested in two major scientific sectors, the first is developing scientific infrastructure, such as the newly opened King Abdullah University of Science and Technology (KAUST) at an estimated cost of more than US \$10 billion. Additionally, the Kingdom has established a

number of world class and state of the art advanced research facilities and tertiary academic institutes, which are ready to accommodate first class scientists and facilitate the conduct of cutting-edge research. The advanced technologies place the research infrastructure of the Kingdom as second to none in the region.

The second major investment is in human capital where a number of internationally renowned scientists have been attracted by the commitment of the Saudi government to scientific research, the availability of the advanced research facilities and the generous financial incentives that the Saudi universities and research institutes provide.

While the way in which human capital investment has been procured by two Saudi Universities, namely King Saud University and King Abdul-Aziz University, has been criticized in a recently published article in Science [5], many international scientists view it as an effective strategy to attract eminent scientists whose high level input will significantly improve the country's scientific research capabilities. Prof David Jans, for example, a highly cited researcher in the area of virology, cancer and drug delivery at Monash University (Melbourne, Australia), thinks that "the practice is definitely of value; eminent scientists have a great opportunity to interact with postgraduate students in the Middle East, providing the students with an invaluable intellectual contribution to their work". Thus, this practice of providing financial incentives has been hailed by many as an efficient way for highly successful scientist to "give something back" to the scientific community, and in particular to the development of young researchers in the developing world.

On face value, successfully attracting some of the world's most eminent names in science and medicine is itself a sign of success for the King Saud and King Abdul-Aziz Universities. Other indications of the short term success include the increased number of peer reviewed scientific articles produced by staff at these Universities. Importantly, involving these scientists will provide students and research staff alike, with unique and privileged opportunities of an intellectual input from, and interaction with, Nobel laureates in their scientific career.

An additional benefit has been the significant increase of the two Saudi Universities in the prestigious Shanghai ranking, from initially being very low in the ranking, to becoming amongst the best 200 Universities in the world. "It is an interesting phenomenon of how in

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such a short period of time these two Saudi Universities have broken through the rankings. It is the best illustrative example of capitalism in science” said Dr Anthony Deluca, a senior pharmacologist at the RMIT Drug Discovery Technologies PTY LTD, consultant and a pharmaceutical drug development investment stakeholder. “I would call on other universities around the globe to follow this trend” he added.

The early fruits and obvious signs of success in new scientific investment encourage these countries further to continue their tireless support of further investment, regardless of the current international financial malaise. This demonstrates their willingness and strong commitment to the new emerging ‘knowledge, R&D and scientific’ sector. In conclusion, regardless of time and place, scientific investment is a sound investment that will continue to contribute, not only to the local nation, but to humanity as a whole. As a scientist, I salute and congratulate these governments for their courage and

commitment to scientific prosperity, in a time where scientific budgets are slashed, often as a knee-jerk cost cutting exercise to fund greater defence spending. The prosperity and the competitive scientific spirit that has been generated from such investments has resulted in a new and interesting phenomenon that I would like to coin “the scientific arms race”.

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