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EDITORIAL

Research is a sound investment

Research is difficult, fundamentally characterised by uncertainty of outcome. Evaluating the return on investment (ROI) in research and development (R&D) is notoriously challenging. This is true in any industry, but particularly in those that offer products that are intrinsically intangible, financial services, for example.

> If people tell you they have an accurate and infallible way to measure ROI in R&D at the firm level, the industry level, or the national level, take it with a grain of salt. It is likely that the claimant has an agenda that conflicts with the goal of truly assessing the costs and benefits of R&D. (Hounshell, D, 1998)

Hounshell points out that the ROI challenge is greatest when applied to research that has long-term benefit, the type of benefit that is more likely to be of enduring value rather than risking cannibalisation of recently won innovation.[1]

An assessment by Frontier Economics (2014) in the United Kingdom cites returns based on the most common measurement method, called the production function. This compares the level of investment inputs with an appropriate measure of output or productivity. Frontier Economics summarises the evidence set out in the literature on ROI using the production function as estimating private annual rates of return to R&D investments at a median 30 percent and a mean in the range 20 to 25 percent, stating that no meaningful differences in these returns exist based on whether the analysis considers company-, industry- or country-level data. Social returns take into account the spill-over benefits on other members of society. Frontier Economics cites social returns of between two and three times the corresponding private return.[2]

1 He cites economist Joseph Schumpeter's reference to short-term investment in R&D as the "perennial gale of creative destruction." (Schumpeter, J (1950), *Capitalism, Socialism and Democracy*, first published in 1942 by Harper & Brothers in New York; the quotation is from page 84 of the 1975 edition published by Harper Colophon)

2 The size of this difference between private and social returns on R&D, particularly in industrial innovation, is the main argument for government support for R&D (Hall, 1996).

As difficult as it may be to determine a rate of return on R&D, let alone the associated risk, it is hard to avoid the impression that such a return exists and that certain companies, industries or societies are better than others at making such an investment and reaping the rewards of this strategy. We are generally not surprised at the list of countries that appear high on the list of R&D spenders (see chart on next page). The fruit of this expenditure is frequently evident in our homes or pockets. Much of the improvement in living standards over the last decades and centuries is attributable to a consistent investment in research.

We are also probably not surprised at South Africa's ranking against its more industrialised counterparts. We might reason that the investment that South Africa makes in R&D is appropriate, given its more pressing priorities, though research itself could surely contribute to addressing just these priorities. I am not arguing the point. I am asking a different question: how much is the South African profession intent on investing in the country's future?

Two of the key objectives of the South African Actuarial Society (ASSA) are facilitating the completion of sound research and furthering the public interest. Delivery of the second surely depends, in part, on the success of the first—in part because a number of other preconditions may also have to be met in order for the ASSA voice to become a credible contributor to the public interest.[3] Our stakeholders need sound, practical and insightful research, untainted by vested interests, that contributes meaningfully to the development of rigorous public policy. The models used to manage the impacts of the HIV and AIDS epidemic provide an outstanding example of sound actuarial research meaningfully translated into invaluable and widely used tools. These tools have improved the lives of all South Africans, but particularly those impacted by the epidemic, in a number of ways.

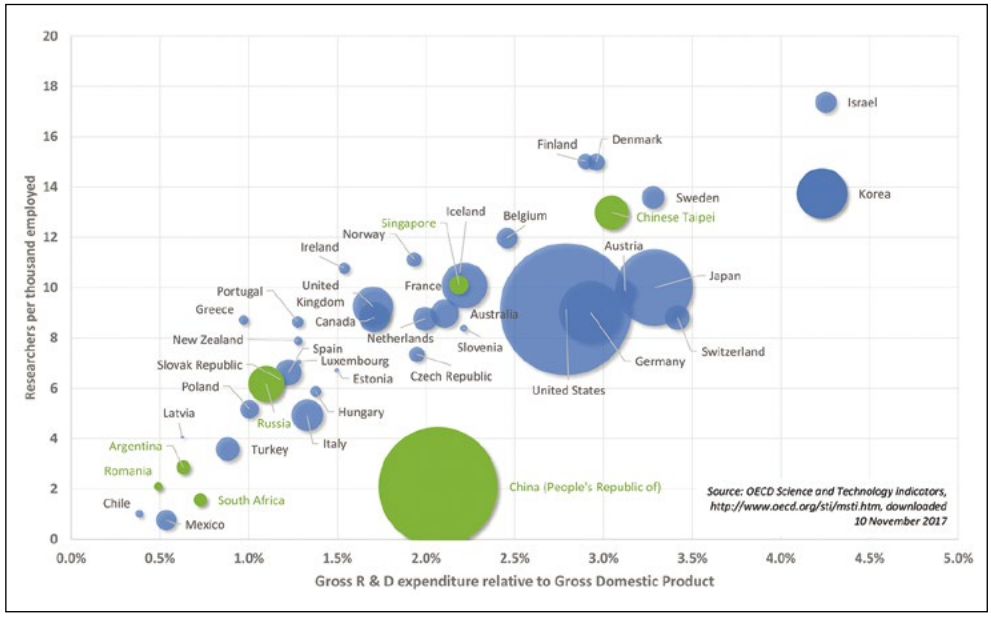
At the 2017 Actuarial Convention a wide variety of subjects were discussed, many of them ably presented by competent practitioners. But only one of these was supported by a written paper.[4] I contrast this with the colloquium of the Life Section of the International Actuarial Association, held the following week in Barcelona, hosted by the Catalan Actuaries Association, a local actuarial chapter with under one hundred members. A scientific committee invited and assessed abstracts months before the colloquium, limiting the number of acceptable submissions to ensure that quality standards were met. Along with three excellent plenary sessions, 30 high-quality papers, not thoughts, ideas or concepts, were presented and discussed in parallel sessions over two days. The inputs were deeply thought-provoking.

It is not clear to me how ASSA is likely to contribute meaningfully to the public interest, more specifically to the development of sound government policy, if it does not put this type of effort into the development of diligent, original and rigorous research.

I would do the subject a disservice if I suggested that the fruits of diligent research were primarily economic. First, the benefits of research are not limited to a return on investments. Research is intrinsically rewarding to the individual or team putting in the effort, but not always in proportion to input. The uncertainty of outcome is exactly what makes research

3 Consistency of professionalism and ethical behaviour may be required, for example.

4 The list of subjects discussed in technical sessions is available at the Convention web site at http://actuarialsocietyconvention.org.za/presentation-summaries-2/.



Gross Expenditure on Research & Development by country
Data includes OECD (blue) and selected Non-OECD (green) countries

fulfilling. Like exercise, reading, learning a language or practising art or a musical instrument, however, the personal and social reward to research frequently comes only after the hard work, and sometimes arduous exploration. The insights provided by a long and careful study of a knotty problem may provide solutions to some of society's deepest problems—and satisfaction may be greatest if they do—but the journey of the study itself provides its own reward.

Second, as noted in the introduction to this article, the social return on research frequently exceeds the economic return. The research objective and the public interest objective need not be separated. Sound research is in the public interest.

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