

Overcoming the Innovation Paradox and how the IAEA can help

Q&A with the World Bank Chief Economist for Equitable Growth

By Aleksandra Peeva

New technologies have the potential to boost a country's development, but a 2017 World Bank study suggests that many developing countries invest relatively little in realizing that technological potential.

Why?

*To find out, we spoke to William F. Maloney, Chief Economist for Equitable Growth, Finance and Institutions at the World Bank Group and co-author of *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up*. Maloney gave us his take on this innovation paradox and on how the IAEA could help countries maximize their technological potential.*

Q: The results of your recent study show that developing countries are missing out on a huge opportunity by not investing enough in research and development (R&D). Why do you think that is and how can it be changed?

A: A common misperception is that innovation is a flow of great ideas but, in fact, innovation is the accumulation of knowledge. It is also important to mention that it is not just the newest technologies that developing countries can benefit from, but also mature, existing technologies, such as some nuclear techniques, that they can profit from enormously and need to be experimenting with.

But many factors can prevent countries and firms from getting the returns we think they could get when investing in technology. In the innovation paradox study, we present two explanations as to why there is not a greater adoption of technology.

The first is the absence of the complementary production factors necessary for innovation. These factors can include not having access to qualified personnel, necessary machinery, financing, or, one that we especially stress, managerial capabilities. This is critical, since managers who are not capable of organizing



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their plant floor or developing a long-term growth plan are often also incapable of identifying and implementing new technologies or undertaking R&D.

The second is information. People, governments and firms don't know what they don't know. One of the main resources that firms generally don't look for are managerial upgrading programmes, which are when an outside expert analyses a company's performance and suggests an improvement plan. These programmes have been proven to have a large impact on productivity and innovation. One of the reasons for this is that firms often vastly overestimate how well they do in terms of management quality and technological abilities compared to the best firms and therefore don't realize how much they can improve.

Q: Your research shows that governments and the private sector in developing countries need to work in tandem for R&D-focused initiatives to succeed. What role could international organizations such as the World Bank and the IAEA play?

A: The further away one gets from the technological frontier, the more complex the problems become; developing countries often suffer simultaneously from weak educational systems and poorly functioning financial markets and business climates, while also having governments that often do not function very well. This means many developing countries may find themselves in a trap where they don't have the capabilities to fix the things they need to fix in order to adopt technologies and take advantage of them to grow.

We often see people bringing business models from advanced countries to developing countries. However, these business models often don't work because the constraints are different in developing countries, and the models' incentives are designed for a different situation. For instance, an advanced country may have low rates of innovation because of standard problems, such as firms' inability to fully capture the fruits of their innovation effort. So, they focus on patent

systems, public research institutes, tax write-offs or subsidies for R&D. However, developing countries may not have firms capable of carrying out an R&D project or the human capital to undertake it, which means that policies need to focus on these areas first.

International organizations like the World Bank and the IAEA can help strengthen governments, identify key barriers to innovation and adoption of technologies, and assist in creating adequate policies to reduce such problems. Over time, this will lead to more sophisticated innovation structures in developing countries.

Q: The IAEA is not a donor organization; our expertise lies in transferring knowledge and technology to Member States — developing countries in particular — which are crucial for long-term sustainable development. In this context, how could the IAEA best help countries find their way out of the innovation paradox?

A: Technology transfer is a critical ingredient for growth, and facilitating it will require addressing the issues I've talked about: providing information and capacity building. It is never about just providing a machine, but rather ensuring the presence of complementary factors, such as highly trained human capital. The IAEA has the technical know-how and the experts with the right scientific background to help train people to recognize opportunities for transferring technologies and develop the capabilities to transfer these technologies. This is critical for many developing countries with weak human capital, because if there are no capable engineers and scientists to identify where and how a technology can be applied, there won't be an idea transfer, even if the business environment is in reasonable shape.

Building connections with institutions outside the countries can ease the flow of information and increase countries' awareness of existing technologies. This is another critical area in which the IAEA could assist governments.