

Nanotechnology and Development - What's in it for Emerging Countries?

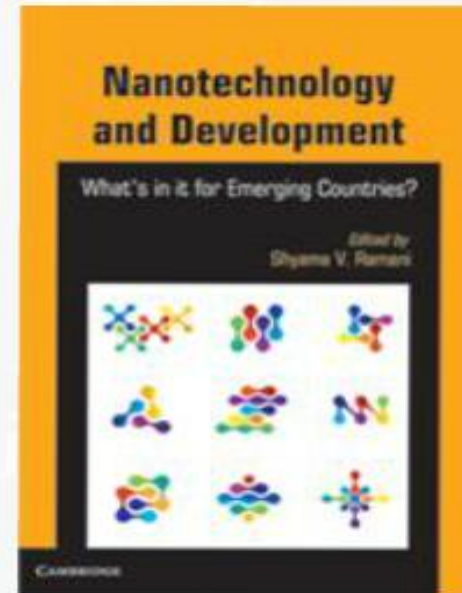
Edited by Shyama V. Ramani



About the Book

This book explores how developed and developing countries are investing to develop capabilities in the emerging nanoscience and nanotechnology fields. It demonstrates that more than just pouring huge amounts of funds into nano and emulating the US policy, developing countries have to work towards leveraging their existing capabilities and resources better and build upon them to strengthen their innovation systems for higher returns.

More investment is not always better. The book covers the US, France, Germany, Korea, India, China, Brazil & Mexico. It reveals how one emerging field is being approached in different ways by different countries as a function of their National System of Innovation.





Roger Coronini

'Research Engineer' of the National Ministry of Education, and attached to the Economics and Firm Strategy Unit of University Pierre Mendès France.

Chapter 1 : On nanoscience, nanotechnology and nanoproducts: Why everyone wants to join this game

"Under such rapidly changing market conditions, the competitive advantages that countries will build will not only depend on how much they invest but how well they leverage existing capabilities to their advantage."

Chapter 8 : 'On India's plunge into Nanotechnology: What are good ways to catch-up?'

"We showed that India like other countries with established scientific capabilities is investing more in nanotechnology than it has in any other platform technology."



Nédson Antônio Campos

Professor in the Department of Industrial and Mechanical Engineering at the Federal University of Viçosa, Brazil.

Chapter 6: Panorama of Nanoscience and Nanotechnology in Brazil

"Scientists were able to introduce the NST in the priority investment portfolio of the Brazilian government, but the lack of arguments in favor of NST- as a differentiated technology - did not ensure exclusivity in relation to other strategic technologies such as biotechnology."



Eduardo Robles Belmont

Full time researcher at the Networks Laboratory of Institute of Research in Applied Mathematics and Systems, National Autonomous University of Mexico, Mexico.

Chapter 7: NST without NII ? The Mexican Case Study

"Even though research in NST had started much earlier in the USA, by investing enormous sums in a national program for NST development, the American initiative fired the gun shot for the start of an international race."

"In Mexico there was no fanfare and no heralding of any expensive nano-only programme! Nevertheless, NST being what it is, scientists in Mexico, could not stand by and watch things happening in other parts of the world, without doing something themselves. "



Jorge Niosi

Professor in the Department of Management and Technology at the 'Université du Québec à Montréal' and Canada Research Chair on the Management of Technology. He is the author, co-author, editor or co-editor of 14 books published in Argentina, Canada, France, the United Kingdom and the United States.

Chapter 9: Nanotech after Biotech in Emerging economies: Déjà vu or a new form of catching up?

"After nearly 30 years of engagement, the diffusion of biotechnology among the emerging countries, including those in the Latin American region remains highly uneven."

"Even if scientific capabilities are built, there is no magic bullet to get the private sector to move, though efficient science-technology-innovation (STI) institutions may be helpful."



Ad Notten

"Information Specialist" and researcher at United Nations University-MERIT and Maastricht University, The Netherlands.

Chapter 4: Co-patenting networks in nanotechnology: A comparison of South Korea and Germany

"Collaboration between economic actors is deemed particularly important for the build-up of capabilities in new science based sectors like nanotechnology. But what kind of collaboration is most effective?"

"In both Korea and Germany governments seem to have clearly realized the importance of the interplay between universities, public research institutions and firms. "



Christopher Newfield

Professor in the English Department at the University of California, Santa Barbara.

Chapter 2: Learning From Solyndra: Changing Paradigms in the US Innovation System

"The 'early-stage public subsidy,' model presides over the U.S. innovation system and its intellectual foundation is sometimes called the linear model—a model that has been much criticized in theory, but remains operative in practice. We propose a general shift from a linear innovation model to our social innovation model, which we call the Social Innovation of Technology (SIT)."

Dominique Vinck



Professor of Science and Technology Studies at Lausanne University. He is also the Director of the Laboratory for Cultures and Digital Humanities (Social Sciences Institute) at Lausanne University.

Chapter 3: How is a regional technology cluster created? Insight from the construction of the nanotech cluster in Grenoble

"The case study clearly confirms that interactions between the state, industry, and academia are necessary for a technology cluster to emerge in an endogenous fashion."

"Collective conversations are necessary for the transformation of expectations into tangible infrastructure."



Nupur Chowdhury

Associate Professor, Centre for Environment and Climate Change,
Jindal Global Law School, O. P.
Jindal Global University.

Chapter 8: On India's plunge into Nanotechnology: What are good ways to catch-up?

"Strategically speaking, the improvement of linkages between the actors involved in public research funding, technology development and technology transfer, and risk regulation is critical to the future success of nanotechnology in India."



Yilin Wu

Assistant Professor of Statistics at School of Statistics and a Research Fellow in National Survey Research Center at Renmin University of China. She is also an Affiliated Researcher at United Nations University-MERIT.

Chapter 5: Sure Bet or Mirage? On the Chinese Trajectory in Nanotechnology

"With university and academic institutions as partners, firms in China can experiment and invest in building their own capabilities to explore the uncertain world of nano-products of the future."



Susan Reid

Professor at Bishop's University in Canada. She is associated to the Canada Research Chair on the Management of Technology.

Chapter 1: On nanoscience, nanotechnology and nanoproductions: Why everyone wants to join this game

" Do you remember the first time you encountered the idea that while the universe could be infinitely large, its' basic building blocks are actually very small? These building blocks, the atoms and molecules comprising all matter, in effect make up the world of nanoscience. As such, the basic fodder for nanotechnology, throughout our world's history, has always been at play. "



Can Huang

Professor, School of
Management, Zhejiang
University

Chapter 5: Sure Bet or Mirage? On the Chinese Trajectory in Nanotechnology

"China has performed well in areas such as strengthening basic research, constructing nanotechnology-related databases, and developing national standards; in establishing national key laboratories and research centers in the field with substantial government investment. However, China has encountered enormous difficulty in commercializing new technology and upgrading traditional industries through nanotechnology."



Daryl Boudreaux

President, Boudreaux &
Associates
Emeritus Chief Scientific
Officer, NanoHoldings
LLC.

Chapter 2: Learning From Solyndra: Changing Paradigms in the US Innovation System

"To convey an idea of how the linear model operates in practice, we summarize the corporate history of our case study, Solyndra."

"Our story illustrates how guarded communications are particularly damaging to the process of knowledge creation, in which disclosure of all core issues, data in all possible detail, and discussion of minute anomalies may be important to forming and testing new approaches."



*Rebeca de Gortari
Rabiela*

Full time researcher at the Institute for Social Research, National Autonomous University of Mexico, Mexico. Editor of book entitled 'Computadoras e Internet en la biblioteca pública mexicana.'

Chapter 7: NST without NII ? The Mexican Case Study

"Three lessons are worth noting from the Mexican experience.

First, people matter.

Second, history matters.

Third, continuity matters and this is the weakest point of the Mexican innovation system. "



Shyama V. Ramani

Professorial Fellow in the United Nations University at Maastricht (NL). Founder “Friend in Need” in India, Editor of this book.

The findings of this book debunk four commonly believed myths.

Myth 1: More investment is always better.

Myth 2: If state funds are invested into science and technology parks – innovations will come to life.

Myth 3: Strong intellectual property rights can ensure catch-up.

Myth 4: Lack of private finance is the main cause of slow catch-up.

It also shows that the real drivers of innovation for economic growth and inclusive development are: **Institutional reform, focussed targets, collectively shared vision, and the presence of techno-entrepreneur leaders.**