中国包容性创新
与可持续发展战略

China’s Inclusive Innovation For Sustainable Inclusive Growth

世界银行 著
国家信息中心 著

经济科学出版社
Economic Science Press
中国包容性创新
与可持续发展战略

China’s Inclusive Innovation For Sustainable Inclusive Growth

世界银行 著
国家信息中心 著
图书在版编目（CIP）数据
中国包容性创新与可持续发展战略/世界银行，国家信息中心著.—北京：经济科学出版社，2014.7
ISBN 978-7-5141-4845-9
I. ①中… II. ①世…②国… III. ①发展战略—研究—中国 IV. ①D60
中国版本图书馆CIP数据核字（2014）第163315号

责任编辑：于 源
责任校对：刘 昕
版式设计：齐 杰
责任印制：李 鹏

中国包容性创新与可持续发展战略
        世 界 银 行 著
        国家信息中心
经济科学出版社出版、发行 新华书店经销
社址：北京市海淀区阜成路甲28号 邮编：100142
总编部电话：010-88191217 发行部电话：010-88191522
网址：www.esp.com.cn
电子邮件：esp@esp.com.cn
天猫网店：经济科学出版社旗舰店
网址：http://jjkxcb.tmall.com
北京季蜂印刷有限公司印装
710×1000 16开 19印张 310000字
2014年8月第1版 2014年8月第1次印刷
ISBN 978-7-5141-4845-9 定价：55.00元
（图书出现印装问题，本社负责调换。电话：010-881950）
（版权所有 翻印必究）
Copyright© 2013 by International Bank for Reconstruction and Development / The World Bank

This work was originally published by The World Bank in English as China; Inclusive Innovation for Sustainable Inclusive Growth in 2013. In case of any discrepancies, the original language will govern.

The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

© 2013 年，版权所有
国际复兴开发银行/世界银行
本书原版由世界银行于 2013 年以英文出版，书名为《中国包容性创新与可持续发展战略》。
中文版与英文版在内容上如有任何差异，以英文版为准。
本书所阐述的任何研究成果、诠释和结论未必反映世界银行、其执行董事会及其所代表的政府的观点。
世界银行不保证本书所包含的数据的准确性。本书所附地图的疆界、颜色、名称及其他信息，并不表示世界银行对任何领土的法律地位的判断，也不意味着对这些疆界的认可或接受。
致谢

本项研究是由世界银行和国家信息中心合作完成的。

本报告是在哈米德·阿拉维的领导和指导下完成的。报告
执笔人包括：维诺德·戈尔（高级咨询专家）、拉米什·A·马沙
尔卡（高级顾问）、哈米德·阿拉维（私营部门协调经理）、赵鸾
（私营部门分析师）、张丽艳（咨询专家）、周江华（咨询专家）
和李陶亚（国家信息中心综合部副处长）。瓦伦·席娃·戈尔
（Varun Shiva Goel）（J. D.）为报告做出了重要贡献，拉维·
古帕塔（Ravi Gupta）也协助起草了报告。感谢利恩·格罗斯
（Lynn Gross），迈克尔·菲格罗亚（Michael Figueroa）和叶杉
杉、徐航女士对本报告在后勤、编辑和准备过程中提供的重要
支持。

本报告的部分内容来自拉米什·A·马沙尔卡和维诺德·
戈尔即将出版的《包容性创新：用更少、为更多》一书。

本报告是在 T. 通奇·雅尼克（T. Tunc Uyanik）（世界银
行东亚及太平洋地区金融与私营发展局兼金融系统局长）、
霍默兹·阿格戴伊（Hormoz Aghdaey）（世界银行东亚及太平
洋地区金融与私营发展局副局长）监督下完成的。提供战略
性指导的还包括克劳斯·罗兰德（世界银行中国局局长）、杜
平（国家信息中心常务副主任）和蒲宇飞（国家信息中心综
中国包容性创新与可持续发展战略

合部主任）。报告受益于同行评审的建议，包括阿南德·帕特沃德罕 (Anand Patwardhan) 教授（马里兰大学）、里希凯沙·T·克里希南 (Rishikesha T. Krishnan) 教授（印度管理学院，班加罗尔）、保罗·科雷亚 (Paulo Correa)（FIEEI 首席经济学家），以及在概念形成阶段来自卡尔·达尔曼 (Karl Dalman) 教授 (乔治城大学)、张宇贤 (国家信息中心综合部副主任) 和阿尔弗雷德·沃特金斯 (Alfred Watkins) (咨询专家) 的宝贵意见。

研究团队真诚感谢中国政府机构的合作和支持。此外，许多机构和个人都对本项工作做出了突出贡献。2012 年 5 月在北京举办的区域政策论坛对本报告的初步研究成果进行了介绍 (该论坛是由亚太财经与发展中心和财政部联合主办)。研究团队要感谢李胜女士和她的团队所做的出色组织工作，以及论坛参与者对研究的认真反馈和建议。
ACKNOWLEDGEMENTS

This Study was undertaken as a joint effort between the World Bank and the State Information Center (SIC) of China.

This report was prepared by Dr. Vinod K. Goel (Senior Consultant), Dr. Ramesh A. Mashelkar (Senior Adviser), Hamid Alavi (Coordinator, Private Sector Development, EASFP), Zhao Luan (Private Sector Analyst, EASFP), Zhang Liyan (Consultant) and Zhou Jianghua (Consultant); and Li Taoya (SIC), under the leadership and guidance of Hamid Alavi (Task Team Leader). Varun Shiva Goel (J. D.) contributed significantly to the preparation of this Report, and Ravi Gupta also assisted in the drafting. Lynn Gross, Michael Figueroa, Shanshan Ye and Xu Hang provided invaluable assistance in logistics, editing and preparation of this report.


The study was conducted under the overall supervision from T. Tunc Uyanik (Director, East Asia and Pacific Region, and Financial Systems Global Practice, Financial and Private Sector De-
velopment) and Hormoz Aghdaey (Sector Manager, EASFP). Strategic guidance was also provided by Klaus Rohland (Country Director, China), Du Ping (Executive Vice President, SIC) and Pu Yufei (Director General, SIC). The report benefited from the comments of peer reviewers Prof. Anand Patwardhan (University of Maryland), Prof. Rishikesha T. Krishnan (Indian Institute of Management, Bangalore, India), Paulo Correa (Lead Economist, FIEEI), and at conceptual stage from Prof. Carl Dahlman (Georgetown University), Zhang Yuxian (Deputy Director – General, SIC) and Alfred Watkins (Consultant).

The Team graciously acknowledges excellent cooperation and support from Chinese officials. Many institutions and individuals made valuable contribution to this work. The preliminary findings of this study were presented at the Regional Policy Forum held in Beijing in May 2012 (co-organized by the Asia – Pacific Finance and Development Center, and the Ministry of Finance), for which the team wishes to thank Ms. Li Sheng and her team for the excellent organization and Forum participants for their excellent feedback and suggestions.
序言

中国数十年经济的快速增长，使贫富差距不断拉大。缩小收入差距、共享发展成果、创造和谐社会成为中国政府的重要关切。

当今，全球有26亿人生活在“金字塔底层”（BoP），每天生活费不足2美元，这部分群体占到全球人口的40%。他们身处贫困地区，通常缺少基本生活必需品，例如，清洁的饮用水和卫生设备、住房、高质量的教育、基本医疗、电力、电话、道路和金融服务。此外，他们也无法在令人放心的市场上出售和购买产品与服务，不得不经常购买价高质低的产品和服务——如果还能买到的话。

促进“包容性创新”是世界银行全球减贫和共享繁荣使命的核心，旨在促进广泛和可持续的社会融合，使所有民众参与到经济发展的过程中并受益。世界银行致力于从战略视角，将“包容性创新”理念融入连贯的政策框架和具体行动中，从树立意识开展研究，再将包容性创新应用到全世界。

包容性创新同样与中国政府使命高度相关，并有助于解决日益扩大的贫富差距，这一问题已经引发了广泛关注。但是这一理念对于中国政府和其他利益相关者，无论是从概念角度或是政策角度都是全新的。尽管中国在包容性创新领域已经采取
2 中国包容性创新与可持续发展战略

了重要举措，但仍然缺乏清晰且连贯的战略和实施计划，难以系统性地促进包容性创新的可持续产生和商业化。本报告旨在推广这一理念，树立包容性创新意识，并为包容性创新政策在中国和其他国家的潜在实施和应用设定发展阶段。

世界银行中国局局长
Foreword

As China has rapidly grown in recent decades, so has the gap between rich and poor. Narrowing this gap and to contribute to shared prosperity and creating a harmonious society is a key concern of the Chinese Government.

Today, some 2.6 billion people at the “Bottom of the Pyramid (BoP)” who constitute 40 percent of the world’s population still live on less than US $2 a day. They are stuck in the poverty zone and often lack access to basic necessities of life, such as clean water and sanitation services, housing, quality education, basic health care, electricity, telephones, roads, and financial services. Moreover, they lack access to reliable markets to sell and buy goods and services and are often limited to goods and services that are more expensive and of lower quality—if they are available at all.

Promoting “Inclusive Innovation” is at the core of the World Bank’s mission for poverty alleviation and shared prosperity in the world, as it helps pursue broad and sustainable social inclusion that entails empowering all citizen to participate in, and benefit from, the development process and economic growth. The World
Bank is committed to take a strategic view and to translate the concept of “Inclusive Innovation” into a coherent policy framework and concrete actions, starting with awareness building, to carry out research to operationalize inclusive innovation around the world.

Inclusive innovation is also of high relevance for the Chinese authorities and its importance in addressing increasing disparity between the rich and poor is increasingly recognized. But the concept is still new to the Chinese government and other stakeholders, from both a conceptual and policy perspective. While important efforts are being made in the domain of inclusive innovation, there is no clear and coherent strategy and implementation plan to systematically promote sustainable generation and commercialization of inclusive innovations. This Report, aims to spread the ideas, help build awareness and set the stage for the potential implementation and operationalization of inclusive innovation policy in China and other countries.

World Bank Country Director for China
内容概要

一、促进包容性创新的理由

“金字塔底层”（简称 BoP）人群是世界上最大但最为贫困的社会经济群体。这个群体包含 26 亿人口——其中绝大多数生活在亚洲（有 4.86 亿人生活在中国），其每天生活费不足 2 美元。BoP 人群占到全球总人口的 40% ，但是其每天的生活费仅相当于一杯星巴克咖啡或两袋 M&M 巧克力。这个群体的巨大规模对消除贫困和实现社会和谐构成了巨大挑战。考虑到大多数国家面临的财政约束，社会政策要想实现全国性的覆盖，需要政府采用创新性的手段，确保社会救助项目的高效、创新和可推广，并有持续的财政支持。

过去几十年，中国经济的快速增长极大地减少了贫困人口，但是收入不平等现象加剧。用于衡量收入不平等的基尼（Gini）系数从 1988 年的 38.2 增长到 2007 年的 48.0，城乡家庭收入差距从 1985 年的 1.9：1 增长到 2010 年的 3.2：1。2005 年，中国家庭收入最高的 10% 的人群拥有国民可支配收入的 31.4% ，而收入最低的 10% 的人群只占到 2.4% ，二者相差 13 倍之多。沿海和内陆地区之间的收入差距也在不断扩大。
收入差距只是不平等的一个方面，中国在提供基本产品和服务上也存在着严重的不平等。在中国和世界其他地区，“弱势人群”又被称为“经济上被排除在外”的、“资源匮乏”的人群（比如 BoP 人群的数量更大）。他们无法获得基本的生活必需品，例如清洁的饮用水、污水处理、保障房、食品、基本卫生服务、电力、道路、基础教育和金融服务。中国城乡地区和不同省份之间在医疗、教育、金融、信息技术和医疗产出方面的差异极大。城乡居民在服务获得方面的不平等使得这种差异愈发明显，特别是考虑到绝大部分的金字塔底层人群生活在农村地区。此外，尽管这个群体的整体购买力（全世界每年超过 1 万亿美元）极为可观，但是他们缺少虽然必要但是能够提高自身能力的消费品和现代意义上的市场经济，而这些在其他人看来是理所当然的。

合理的公共政策能够提高服务水平、改善生活质量，并为穷人提供更多的资源——尽管不一定体现在增加收入上。精心设计的包容性增长战略必须解决生活富裕和自我发展的问题。为了更高效地参与经济发展，满足人类权利的基本需求，人们需要获得必需的服务。政策讨论中传递的信息：包容性的增长不仅仅是一种道德上的义务，更是一种明智的经济选择。如果一个经济体中每天有大量人口需要为生存耗费时间和精力，那么将很难释放全部增长潜力。新兴经济体可以继续制定特殊的政策和项目，以直接满足弱势群体的需求，特别是通过政策杠杆，例如税收、转移支付、补贴、福利和应得的权利。但是，一个政策目标（如包容性创新）既可以以支付得起的价格促进基本公共产品和服务的获得，又能提高 BoP 人群的购买力，帮助他们更好地参与经济活动，并通过将低收入者的日常生活水平提高到与富裕人群类似的程度，减少由于收入不平等造成的不公平。

“包容性创新”寻求扩大必需品和服务的供给，以改善生活质量，并通过知识的创造、获取、适应和吸收来实现经济振兴，同时直接满足弱势群体，尤其是金字塔底层人群的需求。“包容性创新”所指的创新是指以支付得起的价格，提供高质量的产品和服务，从而帮助弱势群体创造改善生活质量的机会。包容性创新可以是一种新开发的或新推广的产品和服务，或者是现有技术重组或改进的成果。它们也可以是基于新的研究和先进技术，但是仍然依靠传统的做法和低端技术。此外，与组织创新、工作流程创新、过程
创新、商业模式创新和物流体系创新相比，它们并不一定来自传统科学和技术创新。与充满挑战的市场状况一样，包容性创新并不能充分解释 BoP 产品有限的规模和范围，以及在这方面有限的资源投入。市场失灵无疑是造成这种现象的一个原因，并因此应该引导和明确公共政策的介入。这也说明了政府、公共机构、私营企业、大学、NGO、基金会、金字塔底层人群和个体所发挥的作用，并需要超越当前创新政策和实践中存在的高技术倾向。

“包容性创新战略”是指促进包容性创新产品的可持续生产、传播和吸收的一系列政策，从而将被排斥人群融入一国的创新生态体系。考虑到 BoP 人群的巨大购买力，他们的需求应得到满足，私营企业应和创新生产流程中的其他各方一道提供持续供应。但是，BoP 市场失灵的问题会导致包容性创新产出的严重不足，而旨在促进“前沿创新”的政策又不能很好地解决这些问题。有限的低成本公共干预——基于对包容性创新如何开发、传播和吸收的深刻理解——将创造适当的 BoP 产出。这些政策干预有赖于公私合作以及全球伙伴关系的建立，创造质高价廉的产品和解决方案。

一个协调的包容性战略应能为前沿创新提供补充，即提供最基本的公共服务、提高资源匮乏的穷人的购买力，同时增加 BoP 群体提高收入的机会。尽管多方面的创新活动可以满足穷人的需求，但是其背后还有一个经济意义上更为重要的逻辑：市场失灵所造成的包容性产出下降。尽管包容性创新相继出现在新兴经济体和发达经济体，但仍然是零星的，规模和影响都极为有限。政府可以建立一套自我维持的体系，即鼓励生产更多的包容性创新产品、为物美价廉的产品扩大市场、为 BoP 或资源匮乏的穷人提供更多的资源，使产品更加便宜，供应更加高效，从而被更多的人所享用。

政策支持着重于创造一个支持性的生态体系和相关的基础设施，来促进包容性创新的发展。公共政策可以创造基础性的投资和资金投入，建设功能强大的创新基础设施，并在可持续的基础上增加创新产出。政府的重点应在于促进、支持、激励和利用所有参与方的力量，创造可持续的包容性解决方案，用最少的公共资源产生最大的效益。包容性创新体系应主要依赖于私营部门（包括金融部门）、研究和学术团体、NGO 和全球伙伴关系以及 BoP 人群本身的力量。我们需要在开发创新（本身）的同时向公众传播包容性创新。
需要强调的是，尽管包容性创新是一项非常有用的政策工具，能够促进社会包容性和社会和谐，但是却并非“捷径”。它只是供政策制定者选择的诸多重要备选项之一，应在解决社会包容性与和谐问题的过程中和其他工具一并使用。类似的政策工具还包括：有利的商业环境、实际和信息通信技术的基础设施（特别是在农村）、完善的 FDI 机制、对产权的保护、治理体系、强有力的机构、参与途径、直接补助、教育体系、劳动力流动、竞争性的市场经济环境、鼓励私营部门发展等。例如，对户籍制度的改革将会给中国上亿的农村人口带来巨大的福利改善，这是包括包容性创新在内的任何方式所无法比拟的。对于农村基础设施来说同样如此，例如，通过修路将一个贫困的村庄与主干道相连。

二、中国包容性创新的现状

中国拥有有利的包容性创新发展环境。有利因素包括：①政府致力于创造和谐社会、减少收入差距并改善基本公共服务；②遍布全国的完善的基础设施和信息通信技术（ICT）设施；③发达的创新体系；④快速发展的私营部门，拥有较强的制造业和逆向创新能力；⑤拥有一个拥有巨大潜在购买力的庞大 BoP 市场，能够为私营部门和其他参与者提供参与包容性创新的增长机会。

过去二十年，中国政府一直致力于解决收入差距过大的问题，并采取政策措施减少贫困、促进不发达地区的经济增长。中国政府充分认识到了缩小收入差距的紧迫性，并将建设和谐社会作为“十一五”规划（2006～2010）期间政府的首要任务。2010 年 9 月，时任胡锦涛主席提出了包容性增长战略。即减少贫困、缩小城乡收入差距并为城乡贫困群体和农民工提供基本社会服务。“十二五”规划（2011～2015）将发展理念从“追求经济增长”改为“使发展成果惠及全体人民”。随后，政府扩大了与基本公共服务相关的支出，从 5 070 亿元猛增到 2.6 万亿元。据此，包容性创新与中国密切相关，但是这一概念无论是从理念还是政策角度，对于中国政府而言仍然是全新的。到目前为止，中国一直在强调前沿创新，虽然也开始认识到包容性创新的重要性，特别是对解决不断扩大的贫富差距的作用。
尽管如此，现有的政府项目仍不能充分满足弱势群体的需求，如农民工的服务需求，在服务规模、覆盖面、服务质量和效率方面仍面临严峻挑战。财政和预算约束导致社会服务难以实现普遍性和全国性的覆盖，创新手段匮乏导致服务难以推广且资金难以为继，服务效果和效率欠佳。作为公共服务的主要提供方，政府可以从目标明确的包容性创新战略中获益，因为它可以成为减少财政负担的有力工具，同时提高基本公共服务水平。出台统一且协调一致的包容性创新战略将有助于改善财政资源的有效性，特别是在满足国家需求和建设重点的前提下，在不同部门和目标群体间实现合理分配。这也是追求包容性创新的理由——增加财政支出，促进低成本、高能效解决方案的开发、实施和传播，从而以支付得起的价格向弱势群体提供必要的社会服务。

中国有许多包容性创新计划和项目，但是缺少明确的包容性创新政策和战略。中国缺少高层次的国家级包容性创新机构，无法对包容性创新的实施进行有效牵头、规划、支持和监督。中国有大量的由财政支持的社会项目，但是其当前促进包容性创新体系仍面临巨大的挑战——某些现有项目是临时性的，缺乏协调且效率低下。私营部门作用有限，高校和研究机构对包容性创新关注不足，草根创新仍然是零星的且缺乏支持，而各参与者之间的联系更是脆弱，在某种情况下甚至不存在。这种情况产生了很多疑问：中国政府设立的各类与包容性创新相关的项目是否运转高效；是否具有广泛的影响性，并显著提高了所有参与方的能力和比较优势；是否能够持续性地生产服务于 BoP 人群的产品；是否能对目标人群带来最佳结果并产生最大影响。

三、国际经验

许多国家如巴西、印度、南非、泰国、越南、墨西哥和乌干达，已经启动了促进包容性创新的计划。这些计划在推动各国政府开展包容性创新中发挥了必要的和促进性的作用。总之，这些国家已经成功地开展了包容性创新，采取的手段包括：为研发活动提供资金或协调融资，这些研发项目对于人的全面发展将产生特殊的影响；改善政府作为一个市场参与者在提供公共产品中的作用；在不同领域乃至全球建立伙伴关系；促进 BoP 人群和行业
间的信息交流；建设有助于包容性创新的人才网络；减轻监管负担和加强知识产权保护——促进源代码的开放，所有这些都有助于实现包容性创新的商业化，并在一个由私营部门驱动的市场中持续性地进行生产。

当前包容性创新的主要驱动力来自政府部门、地方政府、科研院所以及更加成熟、专注和协调一致的全国性项目。一些国家具有较强的有利环境、存在大规模的扶贫措施、拥有较好的科技基础设施以及中小企业的健康发展，从而受益于包容性创新的综合性实施。无论是发达国家还是发展中国家的研究机构，都可以成为促进 BoP 创新的源头。人们对科技创新（STI）在发展中国家减少贫困的作用，有了日益清晰的了解和认识。千年发展目标（MDGs）提出的发展重点和令人信服的结果驱动型框架，用于扶持科技创新政策来消除贫困并实现人的全面发展。

对私营部门而言，包容性创新也许将成为未来十年最大的商机。新的模式正在显现，私营企业不仅要实现盈利、造福社会，更要通过造福社会来实现盈利。这就与传统的世界观形成了鲜明对比，过去人们认为满足 BoP 人群的需求主要是通过慈善手段。由于 BoP 市场仍远未得到开发和满足，这也被越来越多地视为具有某种有利可图的潜力。实际上，消费者支出的主要增长预期都将来自新兴市场，其消费能力要远优于发达国家的中等收入阶段落后许多。但是领先企业可以首先开发包容性产品，然后服务于消费曲线上方的新兴中产阶级，乃至发达国家的消费者。这不仅是 BoP 群体，而且是“新的十亿人”市场，BoP 群体中随着收入提高而出现的新消费者将成为包容性创新产品和服务的消费主力。

一些全球性的基金会，例如，比尔和梅琳达·盖茨（Bill & Melinda Gates）基金会、克林顿全球倡议、维康信托基金会等，都参与到与其他伙伴方建立包容性创新的合作中来。他们中每一家基金会支持的领域和采取的方式都不尽相同。这些倡议已经引起了一些最知名的研究机构的关注，包括哈佛、耶鲁、牛津和北大。比尔和梅琳达·盖茨基金会发起的“探索大挑战”项目便是近年最著名的创新活动之一，对包容性创新产生了巨大的推动。从全球来看，成功的包容性创新有赖于各方的合作。

全球包容性创新活动中可以汲取下述经验：

（1）需要强调的是，尽管包容性创新是一项非常有用的政策工具，可
促进社会包容性与和谐，但是却并非“捷径”。它只是政策制定者诸多重要备用选项中的一个，绝不是一个可以解决所有社会问题的灵丹妙药。因此，政府需要考虑采取包括包容性创新在内的所有工具，同时制定战略来解决和社会包容与和谐相关的问题。

（2）考虑到包容性创新的概念仍然较新，截至目前，还不存在最佳实践，也不存在任何一个国家，由于采用了促进包容性创新这一连贯且相互关联的政策，而产生了显著效应。虽然印度在这方面起了个好头，但即便是印度也还在摸索中。因此，我们尚无法清晰地了解到如何从制度上或政策中推动包容性创新。

（3）包容性创新过程必须利用所有的创新性流程：高端技术、低端技术、商业模式、流程效率、支付方式，以及既能服务于发展中国家的 BoP 群体，又能适用于发达国家和发展中国家普通人群的技术。

（4）使包容性创新的想法获得采用并持续地扩大覆盖范围仍然是其面临的一项巨大挑战：这不仅因为富有包容性的创意没有得到充分开发，还因为其远未实现商业化。有无数的发明创造尚处于模型阶段，或者仅在 BoP 层面上获得了有限的成功。

（5）若从整个创新生态系统的角度来看，就能够发现解决办法——将 BoP 人群既作为消费者又作为参与者，这种办法最有可能获得广泛成功。

（6）和前沿性创新一样，成功的包容性创新需要更多的人在经营中遵循“用更少、为更多”的方式。一些业界中的远见卓识者，例如，通用电气的杰弗里·伊梅尔特（Jeffrey Immelt）、塔塔集团的拉坦·塔塔（Ratan Tata），一些研究学者如乔治·怀特赛兹（George Whitesides），以及一些公共研发机构的领导者和政府官员们，都将包容性创新从理念转化为现实。

四、中国促进包容性创新的政策选择

中国可以从促进包容性创新的公共政策中获益匪浅，在实现广覆盖和可持续的基础上减少公共资源的负担。来自中国和全球的经验证明，包容性创新的产出十分依赖于一个充满活力的包容性创新生态系统。有效的政策要能够促进协调，促进建立跨领域、跨机构和跨国界的伙伴关系，促进融资，从
实现 BoP 知识的创造、交流和转移，并促成理念创新的实施和广泛采用。这种政策工具应基于的原则包括：产生更大范围的影响、实现更广范围的覆盖、促进各方更深度的参与。政策框架应包含独立的、经常性的监督和评价机制，旨在实现效率最大化，并使可持续的生产最大限度地减少对政府资源构成的负担。

通过有效的政策工具，协调参与包容性创新的各伙伴方，中国可以采用适合国情的适当工具。政府可以基于自身制度体系、经验和产出设计、采用、试验和调整不同的备选方案。以下是一些公共政策干预工具：

（1）制定统一的国家包容性创新政策和所需的制度体系；
（2）建立监管体系和支持性的公共采购政策；
（3）建立专项资金支持包容性创新发展，包括支持 BoP 解决方案的私营风险资本；
（4）提高所有参与者，特别是私营部门的能力和比较优势；
（5）要求公共研究体系将最优秀的技术和科技力量投向包容性创新；
（6）向“草根”创新者提供专门支持，提高和拓展他们的创新能力；
（7）促进国别间、地区间和全球科技研究机构之间的合作，充分利用全球的人才、技术和资源；
（8）挑战赛和那些提出了具体目标能够改变游戏规则的包容性创新——鼓励承担风险、试错和承认失败；
（9）对政策和项目进行独立的、常规性的监督和评估，从而使其效率和影响最大化，并从中汲取教训。
EXECUTIVE SUMMARY

Rationale for Inclusive Innovation

The “Base of the Pyramid” is the world’s largest but poorest socio-economic group comprising the 2.6 billion people worldwide—a majority of whom live in Asia (486 million in China) – subsisting on less than US $ 2 a day. The BoP members constitute 40 percent of the world’s population, but live on the cost of a Starbucks coffee or two packs of M&M chocolates. The immense size of the BoP poses significant challenges to poverty eradication efforts and social harmony. Given the fiscal constraints prevailing in most countries, social policies can only achieve nation-wide coverage if innovative ways are adopted to ensure that social support programs are efficient, innovative, scalable and financially sustainable.

China’s rapid and consistent economic growth over the past several decades substantially reduced the number of people living in poverty, but sharply increased income inequality. The Gini coefficient of income inequality increased from 38.2 in 1988 to 48.0 in 2007, and urban-rural disparities in household income have grown
from 1.9:1 in 1985 to 3.2:1 in 2010. In 2005, the richest 10 percent of households possessed 31.4 percent of all disposable income – 13 times higher than the 2.4 percent share held by the poorest 10 percent. Disparities between the coastal and the interior regions are also widening.

Income offers just one measure of inequality; China also has high inequality of access to essential goods and services. In China and all over the world, the “disadvantaged,” “economically excluded” or “resource-poor” (a group even larger than the BoP) lack access to the basic necessities of life such as clean water, sanitation services, affordable housing, food, basic health care, electricity, roads, basic education, and financial services. Access to health, education, financial, information technology resources and health outcomes in China vary widely across urban and rural areas and across regions. Significant disparities in access between urban and rural citizens make the nature of the exclusion more visible, particularly when considering that a large majority of BoP members live in rural areas. Moreover, despite their extremely large aggregate purchasing power (well, over a trillion US dollars per year world-wide), this group lacks access to non-essential but empowering consumer products and modern markets that the rest of the world has come to take for granted.

Appropriate public policies can help address improved access to services, improved quality of life, and empowering resource-poor people-without necessarily raising incomes. A well-designed inclusive growth agenda must address both well-being and human empowerment. People need access to essential services in order to achieve the basic level of human empowerment needed to participate in economic development productively. The message dominating policy discussions is: inclusive growth is not just a moral imperative—it is smart economics. An economy in which large numbers of its population devote their time, effort, and energy to the banalities of daily survival will never fire on all cylinders. Emerging economies continue to design special policies and programs that focus directly on the needs of the economically excluded, mostly through standard policy levers like tax and transfer mechanisms, subsidies, welfare and entitlements. But an agenda (such as inclu-
sive innovation) which also facilitates the provision of access to essential goods and services at affordable prices and helps to increase the purchasing power of the BoP will better equip them to participate economically, and will help reduce the injustice of income inequality by making the daily experience of those with lower incomes somewhat more like that of the better ones.

“Inclusive innovation” seeks to expand access to essential goods and services, thereby improving quality of life, and enhancing economic empowerment through knowledge creation, acquisition, adaption, absorption, and deployment efforts targeted directly at the needs of excluded populations, primarily at the Base of the Pyramid (BoP). An “inclusive innovation” is any innovation that helps expand affordable access to quality products and services which help create livelihood opportunities for excluded populations-on a sustainable basis and with significant outreach. Inclusive innovations may be newly-developed or disseminated goods and services, or the result of recombining or adapting existing technologies. They may be based on new research and advanced technologies, but also on traditional ways and low levels of technology. Furthermore, they may not necessarily result from traditional science and technology innovations as much as from organizational, workflow, process, business model, and delivery system innovations. As challenging as market conditions may be, they do not adequately explain the limited scale and scope of pro-BoP products, and the limited commitments of resources devoted to inclusive innovation. Market failures unquestionably form part of the story, and should guide and justify public policy interventions. This suggests key roles for governments, public sector agencies, private firms, universities, NGOs, foundations, BoP, and individuals, and a need to look beyond the high technology orientation of current innovation policies and practices.

Five elements of inclusive innovation-affordable access, high quality, low cost, sustainable business model, and extensive outreach-are fundamental.

An “inclusive innovation strategy” is a set of policies which promote the sustainable production, dissemination and absorption of inclusive innovations by connecting excluded populations to a nation’s innovation ecosystem. Given the BoP’s
immense aggregate purchasing power, their needs can theoretically be satisfied on a sustainable basis by private firms working in conjunction with other actors in the innovation production process. However, failures in BoP markets result in the severe underproduction of goods and services based on inclusive innovations, and policies designed to promote “frontier innovation” do not adequately address those failures. Limited and low-cost public sector interventions-informed by a deep understanding of how inclusive innovations are developed, disseminated, and absorbed-will create a more optimal level of pro – BoP output. These interventions rely on public and private sector initiatives and global partnerships to create high-performance products and solutions that are affordable by resource-poor people.

A coherent inclusive innovation strategy would complement frontier innovation efforts by improving access to essentials and increasing the purchasing power of the resource-poor-while also enhancing income-generating opportunities for BoP members. Though a multi-pronged innovation agenda addresses the needs of the BoP, it also has a more distinctly economic rationale: overcoming market failures which lower the output of inclusive innovations. Inclusive innovations have been developed in both emerging and developed economies, but remain sporadic, operate on a limited scale and have a limited impact. Governments can help create a self-sustainable system that increases the volume of inclusive innovations, expands the market for low-cost and high-performance products, focuses resources and attention on the “resource poor or BoP” market segment, and makes the provision of products cheaper and more efficient, and thus more enjoyable by more and more people.

Public support should focus on the creation of a supportive ecosystem and related infrastructure to promote inclusive innovation. Public policy can enable fundamental investments and resource commitments to create a functioning innovation infrastructure that increases inclusive innovation output on a sustainable basis. The government’s major focus should be to facilitate, support, incentivize and leverage the strengths of all stakeholders in order to create sustainable inclusive solutions with significant outreach at maximum efficiency with the least possible burden on
the public resources. An inclusive innovation system should rely heavily on contributions from the private sector (including the financial sector), the research and academic community, NGOs, and global partnerships-as well as the BoP population itself. We require innovation (itself) in both *doing as well as delivering* inclusive innovation to the masses.

It must be emphasized that while inclusive innovation is a very useful policy instrument to improve social inclusion and harmony, it is not a ‘silver bullet’. It is one important tool in the basket of many options available to policy makers and should be deployed along with other instruments in dealing with the issue of social inclusion and harmony. Such tools include, but not limited to; a supportive business environment, physical and ICT infrastructure (especially rural), sound FDI regime, protection of property rights, governance systems, strong institutions, participatory approach, direct subsidies, sound education system, labor mobility, market based competitive economic environment including encouragement of private sector, etc. For example, reform of the household registration (*hukou*) system holds the potential to unleash enormous welfare improvement for hundreds of millions of the rural poor in China, which cannot be matched by any other means including inclusive innovation. The same goes true for rural infrastructure, such as a paved road connecting a poor village to the main road.

*The Landscape for Inclusive Innovation in China*

China has a strong enabling environment for inclusive innovation. Elements of the environment include; (i) the government’s commitment to create a harmonious society, reduce income disparities and improve access to basic services; (ii) a strong and nation-wide physical and ICT infrastructure; (iii) a well-developed innovation system; (iv) a growing private sector with strong manufacturing and reverse innovation capabilities; and (v) an enormous BoP market with huge potential purchasing power, providing new growth opportunities for the private sector and other actors to engage in inclusive innovation.

Efforts to address disparities in China have been ongoing for over the past two decades, with the government launching several policy initiatives for reducing pov-
erty and bringing economic growth to underdeveloped regions. In recognition of the urgency to address the widening disparities, building a harmonious society has been placed at the top of the government agenda in the 11th Five-Year Plan (2006–2010). In September 2010 President Hu Jintao proposed an inclusive growth strategy aimed at reducing poverty, narrowing the rural and urban income gap and promoting equal access to basic social services for urban and rural poor, as well as for migrant workers. The 12th Five-Year Plan (2011–2015) marks a shift of creed from ‘pursuing economic growth’ to ‘sharing benefits of development by its all people’. Consequently government spending related to broadening access to basic services has dramatically increased from 507 billion RMB to about 2.6 trillion RMB. In this context, inclusive innovation is of high relevance for the Chinese authorities but the concept is new to the Chinese government, from both conceptual and policy perspective. So far, China has emphasized frontier innovation, yet has recognized the importance of inclusive innovation in addressing increasing disparity between the rich and poor.

Current government programs face the daunting challenge of expanding in scope, coverage, quality, and efficiency to sufficiently serve other disadvantaged groups, such as migrant workers. In the coming years, fiscal and budget constraints will be a difficult hurdle to achieving universal and nationwide coverage, absent innovative ways of making social services scalable, financially sustainable, and delivered in effective and efficient manner. As the key provider of public services, the government could directly benefit from pursuing a well-articulated inclusive innovation strategy, for inclusive innovation could be a powerful tool to significantly reduce the burden on the fiscal budget and improve the supply of affordable quality basic goods and services. Pursing an integrated and well-coordinated inclusive innovation strategy is also crucial to allow fiscal resources to be rationally allocated between sectors and target groups, according to national priorities and needs. That is precisely the rationale for pursuing inclusive innovation: leveraging fiscal expenditures to promote the development, deployment and dissemination of affordable high-performance solutions, thus help expanding essential social serv-
ices at an affordable price to excluded populations.

China has many initiatives and programs to promote inclusive innovation and social development, but no explicit inclusive innovation policies and strategies. China has no single high-level national body to champion, formulate, support, and monitor implementation of inclusive innovation initiatives. The country has a large number of public support social programs, but China’s current inclusive innovation system faces significant challenges—most government programs and policies are ad hoc, uncoordinated, and inefficiently operated. Private sector efforts are limited; universities and research institutions remain insufficiently focused on inclusive innovation; grassroots innovation is not well-supported and remains sporadic; international collaboration on innovation is insufficiently oriented toward inclusive innovation; and linkages between various actors are weak and in some cases nonexistent. It is not clear if these numerous government inclusive innovation-related initiatives have a wide outreach, adequately leverage the capabilities and comparative advantages of all stakeholders, sustainably produce pro–BoP products, and deliver the best possible outcomes and impact for the target population with minimal burden on public budgetary resources.

The International Experience

Many governments such as Brazil, India, South Africa, Thailand, Vietnam, Mexico, and Uganda, have initiated programs promoting inclusive innovation. Their efforts demonstrate an essential and facilitative role for national governments in an inclusive innovation agenda. Together, these countries, in total, have catalyzed inclusive innovation by financing or coordinating financing for research and technology development with particularly high impact on human empowerment; leveraged their role as a market participant in the provision of public goods; forged partnerships across sectors and globally; promoted information exchanges between the BoP and industry; strengthened networks of talent that produce inclusive innovations; and eased regulatory burdens while also advancing intellectual property regimes with due attention to open-source alternatives, which allow inclusive innovations to be commercialized and sustainably produced by pri-
vate sector driven markets.

Current international approaches to inclusive innovation range from ad-hoc efforts by individual ministries, sub-national governments, and Research and Technology Institutes (RTIs), to more mature, focused and synchronized national programs. Countries with a strong enabling environment and existing large-scale initiatives aimed at poverty reduction, improving STI infrastructure, and SME development, would benefit from a more comprehensive implementation of inclusive innovation. – RTIs both in developing countries and developed countries-have served as well-springs of pro-BoP innovation. There is an increasing awareness and recognition of the role of science, technology and innovation (STI) in the pursuit of alleviating poverty in developing countries. The Millennium Development Goals (MDGs) have brought focus and a compelling, output-driven framework to policies leveraging STI for poverty eradication and human empowerment.

For the private sector, inclusive innovation is emerging as perhaps the biggest business opportunity of the coming decade. New models are emerging where the private sector is not only ‘doing well and doing good’ but ‘doing well by doing good’. This is in stark contrast to the old worldview in which catering to the needs of the BoP was seen through the prism of philanthropy. That BoP markets remain under-developed and under-satisfied is increasingly seen as evidence of a lucrative potential. Indeed, most of the growth in consumer spending is expected to come from people in emerging markets, who have a much lower spending capacity than traditional middle-class consumers in developed countries, leading firms to first pursue inclusive products and then pivot higher up the curve to serve the emerging middle class-and even consumers in advanced economies. It is not only BoP – but the ‘new billion’ market as new consumers with rising incomes emerging from BoP (with aspirations for high quality products) that will be the consumers of inclusive innovation based products and services.

Global Foundations such as the Bill & Melinda Gates Foundation, the Clinton Global Initiative, the Welcome Trust and others, are involved in funding inclusive innovation partnerships among different players. Each of them support different do-
mains and use different methodologies. These initiatives have drawn interest from the most advanced institutions, from Harvard to Yale to Oxford and Peking University. The ‘grand challenges initiative’ posed by the Bill & Melinda Gates Foundation is one of the most innovative initiatives in recent times, which is giving a much-needed boost to inclusive innovation. Globally, successful inclusive innovations have relied on collaboration between agents.

There are several lessons that can be drawn from global inclusive innovation efforts such as;

- Inclusive innovation is a very useful policy instrument to improve social inclusion and harmony, but it is not a ‘silver bullet’. It is one important tool in the basket of many tools available to policy makers, but it is by no means the solution to all social problems. Therefore, Governments need to consider deployment of all possible tools including inclusive innovation while designing strategies to deal with the issue of social inclusion and harmony.

- Given that the concept of inclusive innovation is relatively new, currently, there are no real best practices, or a country that has demonstrated the significant impact of a set of coherent and inter-linked policies to foster inclusive innovation. India is well head in this regard, but even India’s efforts are work-in-progress. Therefore, we lack clear evidence on how to make inclusive innovation happen from a systemic or policy stand point.

- The inclusive innovation process must harness all innovative processes: high-tech, low-tech, business models, process efficiency, and delivery models; and technologies can have uses not just for the BoP in developing nations but also for regular populations in the developed and developing nations.

- Sustainable adoption and outreach remains a considerable challenge for inclusive innovation efforts: just as inclusive ideas are underdeveloped, they are also under-commercialized. There are numerous inventions either at the prototype stage or with limited commercial success at the BoP level.

- Solutions created with a holistic view of the ecosystem in which the innovation resides-and involve the BoP as both consumer of innovation and a participant
in it—are more likely to be widely adopted.

- Like frontier innovation, successful inclusive innovations have relied on a handful of champions of the ‘More from Less for More’ (MLM) approach to doing business. Visionary industry leaders, such as GE’s Jeffrey Immelt, and Tata Group’s Ratan Tata, individual researchers such as MIT Professor George Whitesides, and leaders of public institutions have brought inclusive innovation from concept to reality.

Policy Options for Promoting Inclusive Innovation in China

China can benefit from a sound public policy for pursuing inclusive innovation on a wide-outreach and sustainable basis with a reduced burden on public resources. Experience in China and globally demonstrates that output of inclusive innovations relies heavily on a vibrant inclusive innovation ecosystem. Policies that harmonize efforts, facilitate partnerships across sectors, institutions, and borders, and coordinate financing can result in a superior generation, exchange and transfer of pro-BOP knowledge, and take innovations from conception to deployment and widespread adoption. The public policy instruments should be based on the principles of achieving wider impact, greater outreach, and deeper involvement of all stakeholders. The policy design should have provisions to encourage businesses to adopt commercially sustainable business models involving inclusive innovation in order to leverage the managerial and organizational efficiency, manufacturing capabilities, market knowledge, technical and industrial expertise and risk-taking capability of the private sector. The policy framework should also include independent and regular monitoring and evaluation mechanisms and aim to achieve maximum efficiency and sustainable production to deliver results while minimizing the burden on public resources.

Through appropriate policy instruments and sound coordination among different agents of the inclusive innovation China could deploy appropriate tools suitable for Chinese conditions. The Government may wish to design, adopt, experiment and adjust various options based on its own institutional systems, experience and outcomes. Potential options for the public policy interventions include the following.
• An integrated national inclusive innovation policy and required institutional systems.

• A facile regulatory system and supportive public procurement policy.

• A dedicated fund to support inclusive innovation including private risk capital for pro – BoP solutions.

• Incentives to leverage strengths and comparative advantages of all stakeholders, especially the private sector.

• Mandates for public research system to channel the very best technical and scientific expertise towards inclusive innovation.

• Dedicated support to grassroots innovators to deepen and expand their innovation capacity.

• Collaboration with national, regional and global STI organizations to leverage global talent, technology and resources.

• Grand Challenge and recognition for game changing inclusive innovations to target specific goals-encouraging risk taking, experimentation and recognizing failures.

• Independent and regular monitoring and assessment of policies and programs to maximize efficiency and impact, and benefit from lessons learned.
# CURRENCY EQUIVALENTS

(Exchange Rate Effective as of April 10, 2013)

Currency Unit = Yuan

US $ 1.00 = 6.25 Yuan

# FISCAL YEAR

January 1 – December 31

# ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AEDC</td>
<td>Alternative Energy Development Corporation (South Africa)</td>
</tr>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
</tr>
<tr>
<td>ARPU</td>
<td>Average Revenue Per User</td>
</tr>
<tr>
<td>BiOS</td>
<td>Biological Innovation for Open Society</td>
</tr>
<tr>
<td>BoP</td>
<td>Base of the Pyramid</td>
</tr>
<tr>
<td>BRICS</td>
<td>Brazil, Russia, India, China and South Africa</td>
</tr>
<tr>
<td>CAS</td>
<td>Chinese Academy of Sciences</td>
</tr>
<tr>
<td>CBRC</td>
<td>China Banking Regulatory Commission</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed – Circuit Television</td>
</tr>
<tr>
<td>CHNS</td>
<td>China Health and Nutrition Survey</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MOF</td>
<td>Ministry of Finance</td>
</tr>
<tr>
<td>MOST</td>
<td>Ministry of Science and Technology</td>
</tr>
<tr>
<td>MLM</td>
<td>More from Less for More (or Many)</td>
</tr>
<tr>
<td>MTB</td>
<td>Mycobacterium Tuberculosis</td>
</tr>
<tr>
<td>NEA</td>
<td>National Energy Administration</td>
</tr>
<tr>
<td>NGOs</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>NInC</td>
<td>National Innovation Council (India)</td>
</tr>
<tr>
<td>NIF</td>
<td>National Innovation Foundation (India)</td>
</tr>
<tr>
<td>NSFC</td>
<td>National Natural Science Foundation Committee</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>CSIR</td>
<td>Council of Scientific and Industrial Research (India)</td>
</tr>
<tr>
<td>FYP</td>
<td>Five-Year Plan</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GRA</td>
<td>Global Research Alliance</td>
</tr>
<tr>
<td>GRL</td>
<td>Global Responsibility License</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
</tr>
<tr>
<td>IFIs</td>
<td>International Financial Institutions</td>
</tr>
<tr>
<td>ICAR</td>
<td>Indian Council of Agricultural Research</td>
</tr>
<tr>
<td>ICMR</td>
<td>Indian Council of Medical Research</td>
</tr>
<tr>
<td>IDEAS</td>
<td>Innovation, Development, Enterprise, Action and Service</td>
</tr>
<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
</tr>
<tr>
<td>INPRA</td>
<td>Information Network Platform for Rural Area</td>
</tr>
<tr>
<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
</tr>
<tr>
<td>OSDD</td>
<td>Open Source Drug Discovery</td>
</tr>
<tr>
<td>PBC</td>
<td>People’s Bank of China</td>
</tr>
<tr>
<td>PCM</td>
<td>Phase Change Material</td>
</tr>
<tr>
<td>PHS</td>
<td>Personal Handset System</td>
</tr>
<tr>
<td>PIPRA</td>
<td>Public Intellectual Property Rights for Agriculture</td>
</tr>
<tr>
<td>P2P</td>
<td>Peer-to-Peer or Person-to-Person</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RMB</td>
<td>Renminbi (China)</td>
</tr>
<tr>
<td>RTIs</td>
<td>Research and Technology Institutes</td>
</tr>
<tr>
<td>SSFC</td>
<td>National Social Science Committee</td>
</tr>
<tr>
<td>SIAT</td>
<td>Shenzhen Institute of Advanced Technology</td>
</tr>
<tr>
<td>S&amp;T</td>
<td>Science and Technology</td>
</tr>
<tr>
<td>SMART</td>
<td>Simple, Maintenance-Friendly, Affordable, Reliable and Timely to Market</td>
</tr>
<tr>
<td>SMEs</td>
<td>Small and Medium Enterprises</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>IP</td>
<td>Intellectual Property</td>
</tr>
<tr>
<td>IPR</td>
<td>Intellectual Property Rights</td>
</tr>
<tr>
<td>IRS</td>
<td>Internal Revenue Service</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MOE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>MEP</td>
<td>Ministry of Environmental Protection</td>
</tr>
<tr>
<td>MIIT</td>
<td>Ministry of Industry and Information Technology</td>
</tr>
</tbody>
</table>
# 目录

<table>
<thead>
<tr>
<th>章节</th>
<th>内容</th>
<th>页码</th>
</tr>
</thead>
<tbody>
<tr>
<td>第一章</td>
<td>包容性创新：概念框架</td>
<td>1</td>
</tr>
<tr>
<td>一</td>
<td>背景：基本服务不平等</td>
<td>1</td>
</tr>
<tr>
<td>二</td>
<td>包容性创新：介绍和基本原则</td>
<td>13</td>
</tr>
<tr>
<td>三</td>
<td>逻辑依据：利用多元创新计划来解决诸多不平等问题</td>
<td>21</td>
</tr>
<tr>
<td>四</td>
<td>政府的作用：建立联盟以克服市场失灵</td>
<td>26</td>
</tr>
<tr>
<td>五</td>
<td>其他机构及作用</td>
<td>34</td>
</tr>
<tr>
<td>第二章</td>
<td>中国包容性创新现状</td>
<td>37</td>
</tr>
<tr>
<td>一</td>
<td>中国包容性创新的发展环境</td>
<td>37</td>
</tr>
<tr>
<td>二</td>
<td>中国包容性创新项目和行动情况</td>
<td>46</td>
</tr>
<tr>
<td>三</td>
<td>促进中国包容性创新的关键和挑战</td>
<td>58</td>
</tr>
<tr>
<td>第三章</td>
<td>包容性创新：国际经验</td>
<td>65</td>
</tr>
<tr>
<td>一</td>
<td>全国性的政府措施</td>
<td>65</td>
</tr>
<tr>
<td>二</td>
<td>研究和技术院所（RTIs）</td>
<td>70</td>
</tr>
<tr>
<td>三</td>
<td>私营企业</td>
<td>75</td>
</tr>
<tr>
<td>四</td>
<td>基金会和国际开发机构</td>
<td>83</td>
</tr>
</tbody>
</table>
二 中国包容性创新与可持续发展战略

五、伙伴关系和合作知识产权 ...................................................... 85
六、全球包容性创新面临的教训与挑战 ........................................... 90

第四章 促进中国包容性创新的政策建议 ........................................... 94

一、公共政策干预的目标 .............................................................. 94
二、公共政策促进包容性创新的要素 .............................................. 97
三、完善设计、监督和评估机制 ..................................................... 107
# TABLE OF CONTENTS

## Chapter 1  Inclusive Innovation: A Conceptual Framework

I. The Context: Inequality of Access to Basic Services ................................. 109

II. Inclusive Innovation: An Introduction and Basic Principles .......................... 125

III. The Rationale: Addressing Multiple Dimensions of Inequality Through a Multi–Pronged Innovation Agenda ......................................................... 136

IV. The Role of the Government: Building Alliances to Overcome Market Failures ............... 142

V. Other Agents and Their Roles ................................................................. 152

## Chapter 2  The Landscape for Inclusive Innovation in China

I. The Enabling Environment to Promote Inclusive Innovation in China ...................... 157

II. The Status of Inclusive Innovation Programs and Initiatives in China .................... 169
III. Key Issues and Challenges in Promoting Inclusive Innovation in China ................................................................. 186

**Chapter 3** Inclusive Innovation: The International Experience ................................................................. 196

I. National Government Initiatives .................................................. 196
II. Research and Technology Institutes (RTIs) ............................ 203
III. Private Sector Firms ................................................................. 210
IV. Foundations and International Development Institutions .............. 221
V. Partnerships and Collaborative IP ............................................. 222
VI. Lessons and Challenges from Global Inclusive Innovation Efforts ... 229

**Chapter 4** Policy Options for Promoting Inclusive Innovation in China ......................................................... 234

I. Key Goals of Public Policy Intervention ...................................... 234
II. Elements of Public Policy to Promote Inclusive Innovation .............. 238
III. Improving Design, Monitoring and Evaluation .............................. 252
图 1 中国城乡收入差距（按年均可支配收入算，
1985～2010 年） ............................................. 3
图 2 中国收入不平等的基尼系数（1988～2007 年） ...... 4
图 3 医疗机构中医疗技术人员比例（2010 年） .......... 8
图 4 婴儿死亡率（2010 年） ................................... 8
图 5 移动电话使用率（2000～2010 年） .................... 10
图 6 互联网使用率（2005～2010 年） ................. 11
图 7 在正规金融机构拥有账户的成年人比例（2010 年）... 11
图 8 拥有金融机构信额度或贷款的企业占比 .......... 12
图 9 包容性创新的特征 ........................................ 16
图 10 包容性创新的方式 ...................................... 18
图 11 包容性创新的动力 ...................................... 30
图 12 功能性投人和创新阶段 ................................. 31
图 13 促进包容性创新的工具 ................................. 34
图 14 金砖国家创新指数的排名 ......................... 44
FIGURES

Figure 1  Rural-urban disparities in annual per capita disposable income in China (1985 ~ 2010) .......................... 112
Figure 2  Gini index of income inequality in China (1988 ~ 2007) ................................................................. 112
Figure 3  Medical technical personnel in health care institutions (2010) .......................................................... 118
Figure 4  Infant Mortality rate (2010) .............................................. 119
Figure 5  Penetration rate of mobile phone (2005 ~ 2010) ...... 121
Figure 6  Penetration rate of internet (2005 ~ 2010) .......... 122
Figure 7  Adult have an account at a formal financial institution (2010) ......................................................... 122
Figure 8  Percentage firms that have a line of credit or a loan from financial institutions ................................. 123
Figure 9  Characteristics of Inclusive Innovations ................. 129
Figure 10 Approaches to Inclusive Innovation ...................... 131
Figure 11 Drivers of an Inclusive Innovation Agenda ........... 147
Figure 12 Functional Inputs and Innovation Stages ............. 150
Figure 13 Instruments to Promote Inclusive Innovation ....... 152
Figure 14 Ranking of BIRCS countries in the innovation index ................................................................. 166
表

表 1  贫困和不平等指标：全球比较 ............................................. 2
表 2  金砖国家城乡差距 .......................................................... 4
表 3  必需品和基本服务的获得情况 ............................................. 6
表 4  城市和农村地区受教育程度（1979 ~ 2006 年） ................. 9
表 5  城乡受教育程度差异（6 岁及以上人口）
    （2009 年） ...................................................................... 9
表 6  电脑、移动电话、固定电话和互联网使用率（每百户家庭，2000 ~ 2010 年） ......................................................... 10
表 7  中央政府社会福利支出 ..................................................... 39
表 8  国家科技计划 ................................................................. 41
表 9  不同领域的研发支出 ....................................................... 42
表 10  中国的研发投入与产出 .................................................... 42
表 11  主要国家的教育、技术和创新指标 ................................. 43
表 12  大中型工业企业的研发支出 ............................................. 45
表 13  政府为弱势群体提供的各类创新推广项目 .................... 48
# TABLES

Table 1  Poverty and Inequality Indicators: A Global Comparison .................................... 110

Table 2  Rural and Urban Disparities in BRICS Countries ............................................... 113

Table 3  Access to Basic Goods and Services ................. 115

Table 4  Education attainment in urban and rural areas, 1979–2006 ......................... 119

Table 5  Rural-urban disparities in educational attainment .............................................. 120

Table 6  Penetration rate of computer, mobile phone, telephone and Internet ................. 120

Table 7  Central government spending related to social welfare budget (RMB billion) ........ 159

Table 8  National S&T programs (million RMB, 2005–2010) ............................................ 163

Table 9  R&D expenditures of different actors (billion RMB, 2005–2010) ......................... 163

Table 10 China’s R&D input and output (2005–2010) ..................................................... 164
Table 11  Key education, technology and innovation indicators in selected countries ................................. 164
Table 12  R&D expenditure of large and medium sized enterprises (billion RMB, 2006 ~ 2010) ................................. 167
Table 13  Various government programs aimed at promoting innovation for the excluded ................................ 171
专栏

专栏 1 包容性创新的主要特征 ................................. 15
专栏 2 包容性创新：用更少，为更多 ............................. 18
专栏 3 前沿创新 vs 包容性创新：需要一种多元化的
创新战略 ................................................................. 22
专栏 4 包容性创新——公共政策选择工具 ......................... 25
专栏 5 中国国家创新体系的主要内容 ............................. 41
专栏 6 中国的星火计划 .................................................. 47
专栏 7 低成本的“海终端”——适合农村诊所 ....................... 51
专栏 8 草根创新者解决穷人的实际问题 ............................. 55
专栏 9 全球研究联盟 .................................................... 71
专栏 10 麻省理工学院 IDEAS 全球挑战赛 ......................... 73
专栏 11 斯坦福大学设计院设计的“拥抱”婴儿
保育箱 ................................................................. 74
专栏 12 通用电气的经济型便携式超声仪 ............................ 77
专栏 13 重组创新 .......................................................... 78
专栏 14 业务流程创新 .................................................... 78
专栏 15 印度的电信行业革命 ........................................... 80
专栏 16 Nayana Hrudayalaya 低成本心脏外科手术 ................ 80
专栏 17 分散的纺织品生产：分形基金会 ............................ 81
2 中国包容性创新与可持续发展战略

专栏 18  包容性创新案例 ................................................................. 85
专栏 19  印度 CSIRO——开发资源药物发现计划 .......................... 89
专栏 20  领导力很重要 ................................................................. 91
专栏 21  促进高校和研究机构参与包容性创新的工具 .................. 102
专栏 22  包容性创新：公共政策和实践的区别 ............................ 106
BOXES

Box 1  Key Features of Inclusive  .............................. 127
Box 2  Inclusive Innovation; More from Less for
        More (MLM)  ................................................ 132
Box 3  Frontier Innovation vs Inclusive Innovation; Need
        for a Multi – Pronged Innovation Strategy  .............. 136
Box 4  Inclusive Innovation – A tool in the public policy
        options basket  ................................................ 140
Box 5  Key Actors of the Chinese National Innovation
        System  .......................................................... 161
Box 6  Spark Program in China  ................................. 170
Box 7  Low – Cost “Marine Terminal” Suitable for
        Village Clinics  ................................................ 177
Box 8  Grassroots Innovators for Addressing the Specific
        Needs of the Poor People  ................................. 183
Box 9  The Global Research Alliance  ......................... 204
Box 10 MIT IDEAS Global Challenge  ......................... 207
Box 11 The “Embrace,” Infant Incubator from the
        Stanford Institute for Design  ............................ 209
Box 12 General Electric’s Value Portable Ultrasound
        Machine  ......................................................... 211
<table>
<thead>
<tr>
<th>Box</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Recombinant Innovation</td>
<td>213</td>
</tr>
<tr>
<td>14</td>
<td>Business Process Innovation; Reconfiguring the Value Chain and Leveraging Local Resources to Build-up Local Capabilities</td>
<td>214</td>
</tr>
<tr>
<td>15</td>
<td>The Telecom Industry Revolution in India</td>
<td>215</td>
</tr>
<tr>
<td>16</td>
<td>Narayana Hrudayalaya Low Cost Heart Surgery</td>
<td>217</td>
</tr>
<tr>
<td>17</td>
<td>Decentralized Textile Manufacturing; The Fractal Foundation</td>
<td>218</td>
</tr>
<tr>
<td>18</td>
<td>Inclusive Innovation Examples</td>
<td>223</td>
</tr>
<tr>
<td>19</td>
<td>CSIR India – Open Source Drug Discovery Program</td>
<td>228</td>
</tr>
<tr>
<td>20</td>
<td>Leadership Matters</td>
<td>231</td>
</tr>
<tr>
<td>21</td>
<td>Instruments to Foster University and RTI Participation in Inclusive Innovation</td>
<td>245</td>
</tr>
<tr>
<td>22</td>
<td>Inclusive Innovation; Public Policy/Practice Differentiator</td>
<td>251</td>
</tr>
</tbody>
</table>
第一章

包容性创新：概念框架

“包容性创新”旨在为弱势群体提供支付得起且高质量的基本产品和服务——特别是那些处在“金字塔底层”的人群。

一、背景：基本服务不平等

“金字塔底层”人群是世界上最大、最贫困的社会经济群体。全球有26亿人处于“金字塔底层”，其中绝大部分生活在亚洲，他们平均每人每天的生活费不足2美元（PPP）。即使在经济快速增长和繁荣的国家，他们的收入仍然意味着巨大的不平等。BoP群体已占到全球人口总数的40%，但其每月生活成本相当于一杯星巴克咖啡或两袋M&M巧克力。BoP的巨大数量对消除贫困和促进社会和谐构成了重大挑战。考虑到大多数国家面临的财政约束，如果能够采用创新的方式确保社会救助项目的有效性、创新性、可推广性和资金上的可持续性，那么社会政策便能实现全国性的覆盖。

① 在文献中指“BoP”（也被称作金字塔底层人群），本报告将沿用这一称谓。
### 表 1

贫困和不平等指标：全球比较

<table>
<thead>
<tr>
<th>指标</th>
<th>中国</th>
<th>巴西</th>
<th>印度</th>
<th>印度尼西亚</th>
<th>日本</th>
<th>墨西哥</th>
<th>俄罗斯</th>
<th>菲律宾</th>
<th>南非</th>
<th>韩国</th>
<th>泰国</th>
<th>土耳其</th>
<th>越南</th>
</tr>
</thead>
<tbody>
<tr>
<td>人口（百万）</td>
<td>1339</td>
<td>190.7</td>
<td>1210</td>
<td>229.9</td>
<td>127.9</td>
<td>107.4</td>
<td>142.9</td>
<td>92.0</td>
<td>49.3</td>
<td>49.0</td>
<td>67.8</td>
<td>73.7</td>
<td>87.3</td>
</tr>
<tr>
<td>人均 GDP（current US $）</td>
<td>4393</td>
<td>10710</td>
<td>1477</td>
<td>3039</td>
<td>43161</td>
<td>9580</td>
<td>10440</td>
<td>2132</td>
<td>7280</td>
<td>20757</td>
<td>4679</td>
<td>9712</td>
<td>1172</td>
</tr>
<tr>
<td>基尼系数</td>
<td>47.0</td>
<td>53.9</td>
<td>36.8</td>
<td>36.76</td>
<td>24.9</td>
<td>51.74</td>
<td>42.3</td>
<td>44.0</td>
<td>57.8</td>
<td>31.6</td>
<td>53.6</td>
<td>39.7</td>
<td>37.6</td>
</tr>
<tr>
<td>收入最高的 20% 的家庭所占比重</td>
<td>47.8</td>
<td>58.1</td>
<td>45.3</td>
<td>44.9</td>
<td>35.7</td>
<td>56.2</td>
<td>48.9</td>
<td>50.4</td>
<td>62.2</td>
<td>39.3</td>
<td>58.6</td>
<td>45.8</td>
<td>45.4</td>
</tr>
<tr>
<td>收入最低的 20% 的家庭所占比重</td>
<td>5.7</td>
<td>3.3</td>
<td>8.1</td>
<td>7.6</td>
<td>10.6</td>
<td>3.9</td>
<td>6.0</td>
<td>5.6</td>
<td>3.5</td>
<td>7.5</td>
<td>3.9</td>
<td>5.6</td>
<td>7.3</td>
</tr>
<tr>
<td>收入最高的 10% 的家庭所占比重</td>
<td>31.4</td>
<td>42.5</td>
<td>31.1</td>
<td>29.9</td>
<td>21.7</td>
<td>41.4</td>
<td>33.5</td>
<td>44.9</td>
<td>22.5</td>
<td>42.6</td>
<td>30.3</td>
<td>30.2</td>
<td></td>
</tr>
<tr>
<td>收入最低的 10% 的家庭所占比重</td>
<td>2.4</td>
<td>1.2</td>
<td>3.6</td>
<td>3.3</td>
<td>4.8</td>
<td>1.4</td>
<td>2.6</td>
<td>2.4</td>
<td>1.5</td>
<td>2.9</td>
<td>1.6</td>
<td>2.1</td>
<td>3.2</td>
</tr>
<tr>
<td>日均收入 2 美元的贫困发生率（PPP）（人口百分比）</td>
<td>36.3</td>
<td>9.9</td>
<td>75.6</td>
<td>50.6</td>
<td>—</td>
<td>8.1</td>
<td>—</td>
<td>45.0</td>
<td>35.7</td>
<td>—</td>
<td>26.5</td>
<td>9.1</td>
<td>38.4</td>
</tr>
<tr>
<td>日均收入 1.25 美元的贫困发生率（PPP）（人口百分比）</td>
<td>15.9</td>
<td>3.8</td>
<td>41.6</td>
<td>18.7</td>
<td>—</td>
<td>3.4</td>
<td>—</td>
<td>22.6</td>
<td>17.4</td>
<td>—</td>
<td>10.8</td>
<td>2.7</td>
<td>13.1</td>
</tr>
<tr>
<td>农村人口（占总人口的比重）</td>
<td>56.0</td>
<td>14.0</td>
<td>70.2</td>
<td>47.4</td>
<td>33.4</td>
<td>22.5</td>
<td>27.2</td>
<td>34.3</td>
<td>38.8</td>
<td>18.3</td>
<td>66.3</td>
<td>30.9</td>
<td>71.7</td>
</tr>
</tbody>
</table>

资料来源：世界发展指标，人类发展报告，世界不平等数据库。
第一章 包容性创新：概念框架

中国在过去几十年实现了经济的快速和可持续增长，大幅减少了贫困人口数量，却导致收入差距急剧拉大。用于衡量收入不平等的基尼系数①从 1988 年的 38.2 增长到 2007 年的 48.0（具体内容如图 1 所示），城乡家庭收入差距从 1985 年的 1.9 比 1，上升到 2010 年的 3.2 比 1（具体内容如图 2 所示）。2005 年，最富有的 10% 家庭收入占到全部可支配收入的 31.4%——是最贫穷的 10% 家庭所占收入比重的 13 倍②。沿海和内陆地区的收入差距在不断扩大。不同地区的基尼系数差距从 1978 年的 0.12 扩大到 2007 年的 0.21③。在 20 世纪 80 年代，中国西部地区的人均产出相当于东部地区的 50% 以上，如今这一比重仅为 41.5%。实际上，以收入不平等指标衡量，中国在全球 144 个经济体中位列第 116 位。④

收入只是衡量不平等的一个方面，中国在提供基本公共产品和服务方面也存在着严重的不平等。在中国乃至全球范围内，无论是“弱势群体”，还是“经济上处于劣势”或称为“资源匮乏的穷人”（这一群体的数量甚至比

![图 1 中国城乡收入差距（按年均可支配收入算，1985~2010 年）](image)

资料来源：《中国统计年鉴》（2011）。

① 基尼系数是用来衡量一个经济体中不同个人或家庭的收入分配或消费支出与完全平均分配之间的差距。基尼系数为零代表平均分配，系数为 100 则被认为是完全不平均。
② 中国的收入不平等在过去二十年持续攀升，但已渐趋缓并有可能下降。
③④ 2011 年世界发展指标。
BoP 还要大)① 都缺少基本的生活必需品，如清洁的饮用水、污水处理、廉租房、食品、基本医疗、电力、道路、基本教育和金融服务（详细情况见表 2）。正是城乡居民（详细情况见表 3）在这些方面的显著差别，使得被排斥的本质更加明显，特别是考虑到占 BoP 群体 90% 的人口生活在农村。此外，尽管他们拥有巨大的购买力（每年全球超过 1 万亿美元），但这个群体难以获得必需品以外的产品，以及有所助力的消费品的机会，同时也难以进入现代化的市场，而这个市场对于其他人来说再自然不过了。

表 2 金砖国家城乡差距

<table>
<thead>
<tr>
<th>指标</th>
<th>巴西</th>
<th>中国</th>
<th>印度</th>
<th>俄罗斯</th>
<th>南非</th>
</tr>
</thead>
<tbody>
<tr>
<td>收入差距②</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>按美元计的人均支出③</td>
<td>4 176</td>
<td>1 592</td>
<td>1 893</td>
<td>616</td>
<td>34</td>
</tr>
</tbody>
</table>

① 经济上的被排斥并不必然导致收入低。其他因素如性别、民族、地理分割、文盲、部落地位等都会产生类似影响。


③ 巴西的数据以 2001 年的收入水平为基准。
<table>
<thead>
<tr>
<th>指标</th>
<th>国家</th>
<th>巴西</th>
<th>中国</th>
<th>印度</th>
<th>俄罗斯</th>
<th>南非</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>城市</td>
<td>农村</td>
<td>城市</td>
<td>农村</td>
<td>城市</td>
<td>农村</td>
</tr>
<tr>
<td>贫困①</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>平均日收入在1.25美元以下的贫困人口占总人口比重（%）</td>
<td>13.0</td>
<td>34.8</td>
<td>2.0</td>
<td>26.0</td>
<td>36.0</td>
<td>44.0</td>
</tr>
<tr>
<td>受教育程度②</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>未受教育（%）</td>
<td>13.0</td>
<td>27.8</td>
<td>5.2</td>
<td>13.8</td>
<td>18.7</td>
<td>37.2</td>
</tr>
<tr>
<td>小学教育（%）</td>
<td>36.9</td>
<td>51.1</td>
<td>58.1</td>
<td>79.2</td>
<td>22.7</td>
<td>29.0</td>
</tr>
<tr>
<td>中学教育（%）</td>
<td>43.4</td>
<td>19.2</td>
<td>36.8</td>
<td>7.1</td>
<td>44.4</td>
<td>40.5</td>
</tr>
<tr>
<td>大学教育（%）</td>
<td>6.7</td>
<td>1.9</td>
<td>14.4</td>
<td>2.1</td>
<td>14.2</td>
<td>—</td>
</tr>
<tr>
<td>医疗服务情况③</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>新生儿死亡率（%）</td>
<td>2.1</td>
<td>2.6</td>
<td>0.5</td>
<td>1.1</td>
<td>3.2</td>
<td>4.9</td>
</tr>
<tr>
<td>婴儿死亡率（%）</td>
<td>4.2</td>
<td>6.5</td>
<td>0.6</td>
<td>1.7</td>
<td>4.9</td>
<td>7.1</td>
</tr>
<tr>
<td>清洁饮用水供应④</td>
<td>99</td>
<td>84</td>
<td>98.2</td>
<td>60.5</td>
<td>96</td>
<td>84</td>
</tr>
<tr>
<td>电力供应⑤</td>
<td>97.8</td>
<td>88</td>
<td>100</td>
<td>99</td>
<td>93.1</td>
<td>52.5</td>
</tr>
<tr>
<td>通信家庭（%）</td>
<td>82.0</td>
<td>59.3</td>
<td>26.7</td>
<td>8.0</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

① 印度始于2005年的数据来自联合国亚洲及太平洋经济社会委员会（ESCAP）的“亚洲城市发展报告”，印度的数据来自世界银行（2009）；俄罗斯的数据来自2006年世界发展指标，以国际贫困线为标准；巴西、俄罗斯和南非的数据来自《金砖国家中的发展、就业和不平等》；综述》，以本国贫困线为准。


④ 巴西、印度、俄罗斯和南非的数据来自世界发展指标（2008），中国的数据来自中国统计年鉴（2009）。

⑤ 巴西、中国、印度、南非的数据始自2008年，来自《发展中国家的能源消费情况》一文，载http://content.undp.org/go/cms-service/stream/assets/\?asset_id=2205320。

### 表 3 必需品和服务的获得情况

<table>
<thead>
<tr>
<th>国家</th>
<th>巴西</th>
<th>中国</th>
<th>印度</th>
<th>日本</th>
<th>墨西哥</th>
<th>俄罗斯</th>
<th>菲律宾</th>
<th>南非</th>
<th>韩国</th>
</tr>
</thead>
<tbody>
<tr>
<td>读写能力（%）</td>
<td>90</td>
<td>94</td>
<td>63</td>
<td>92</td>
<td>—</td>
<td>93</td>
<td>100</td>
<td>94</td>
<td>89</td>
</tr>
<tr>
<td>金融服务（每百人银行账户）</td>
<td>107</td>
<td>—</td>
<td>82</td>
<td>51</td>
<td>717</td>
<td>120</td>
<td>—</td>
<td>57</td>
<td>84</td>
</tr>
<tr>
<td>用水及卫生设施</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>使用经改进的水源——城市地区（%）</td>
<td>99</td>
<td>98</td>
<td>96</td>
<td>89</td>
<td>100</td>
<td>96</td>
<td>98</td>
<td>93</td>
<td>99</td>
</tr>
<tr>
<td>使用经改进的水源——农村地区（%）</td>
<td>84</td>
<td>82</td>
<td>84</td>
<td>71</td>
<td>100</td>
<td>87</td>
<td>89</td>
<td>87</td>
<td>78</td>
</tr>
<tr>
<td>使用良好的卫生设施——城市地区（%）</td>
<td>87</td>
<td>58</td>
<td>54</td>
<td>67</td>
<td>100</td>
<td>90</td>
<td>93</td>
<td>80</td>
<td>84</td>
</tr>
<tr>
<td>使用良好的卫生设施——农村地区（%）</td>
<td>37</td>
<td>52</td>
<td>21</td>
<td>36</td>
<td>100</td>
<td>68</td>
<td>70</td>
<td>69</td>
<td>65</td>
</tr>
<tr>
<td>医疗保健</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>婴儿死亡率（%）</td>
<td>1.7</td>
<td>1.6</td>
<td>5.3</td>
<td>2.7</td>
<td>0.2</td>
<td>1.4</td>
<td>0.9</td>
<td>2.3</td>
<td>4.1</td>
</tr>
<tr>
<td>平均寿命</td>
<td>73</td>
<td>74</td>
<td>64</td>
<td>68</td>
<td>83</td>
<td>76</td>
<td>68</td>
<td>70</td>
<td>54</td>
</tr>
<tr>
<td>牙医数量（每万人）</td>
<td>11.5</td>
<td>0.4</td>
<td>0.7</td>
<td>0.6</td>
<td>7.4</td>
<td>14.2</td>
<td>3.2</td>
<td>—</td>
<td>1.3</td>
</tr>
</tbody>
</table>

注：表中数据来源为世界卫生组织国别数据，扶贫协商小组、世界银行世界发展指标（2011～2012）。
### 续表

<table>
<thead>
<tr>
<th>指标</th>
<th>国家</th>
<th>巴西</th>
<th>中国</th>
<th>印度</th>
<th>印度尼西亚</th>
<th>日本</th>
<th>墨西哥</th>
<th>俄罗斯</th>
<th>菲律宾</th>
<th>南非</th>
<th>韩国</th>
</tr>
</thead>
<tbody>
<tr>
<td>内科医生数量（万人）</td>
<td></td>
<td>17.2</td>
<td>14.2</td>
<td>6</td>
<td>2.9</td>
<td>20.6</td>
<td>—</td>
<td>43.1</td>
<td>11.5</td>
<td>7.7</td>
<td>19.7</td>
</tr>
<tr>
<td>婴幼儿麻疹疫苗接种率（%）</td>
<td></td>
<td>99</td>
<td>94</td>
<td>71</td>
<td>83</td>
<td>94</td>
<td>95</td>
<td>98</td>
<td>88</td>
<td>62</td>
<td>93</td>
</tr>
<tr>
<td>婴幼儿百日咳疫苗接种率（%）</td>
<td></td>
<td>99</td>
<td>97</td>
<td>66</td>
<td>82</td>
<td>98</td>
<td>89</td>
<td>98</td>
<td>87</td>
<td>69</td>
<td>94</td>
</tr>
<tr>
<td>婴幼儿卡介苗接种率（%）</td>
<td></td>
<td>99</td>
<td>97</td>
<td>87</td>
<td>93</td>
<td>—</td>
<td>90</td>
<td>96</td>
<td>90</td>
<td>81</td>
<td>96</td>
</tr>
<tr>
<td>婴幼儿小儿麻疹疫苗接种率（%）</td>
<td></td>
<td>99</td>
<td>99</td>
<td>70</td>
<td>89</td>
<td>99</td>
<td>89</td>
<td>98</td>
<td>86</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>死胎数（每百例新生儿）</td>
<td></td>
<td>1</td>
<td>1</td>
<td>2.2</td>
<td>1.5</td>
<td>0.3</td>
<td>0.5</td>
<td>1</td>
<td>1.6</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>低体重儿（%）</td>
<td></td>
<td>2</td>
<td>5</td>
<td>44</td>
<td>18</td>
<td>—</td>
<td>3</td>
<td>—</td>
<td>21</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>交通运输</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>建成公路（%）</td>
<td></td>
<td>—</td>
<td>54</td>
<td>49</td>
<td>59</td>
<td>80</td>
<td>35</td>
<td>80</td>
<td>10</td>
<td>17</td>
<td>79</td>
</tr>
<tr>
<td>每百平方公里土地公路公里数</td>
<td></td>
<td>21</td>
<td>39</td>
<td>129</td>
<td>23</td>
<td>318</td>
<td>19</td>
<td>6</td>
<td>67</td>
<td>—</td>
<td>105</td>
</tr>
<tr>
<td>通讯</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>电话线路（每百人）</td>
<td></td>
<td>22</td>
<td>22</td>
<td>3</td>
<td>16</td>
<td>32</td>
<td>18</td>
<td>32</td>
<td>7</td>
<td>8</td>
<td>58</td>
</tr>
<tr>
<td>移动电话用户（每百人）</td>
<td></td>
<td>104</td>
<td>64</td>
<td>64</td>
<td>92</td>
<td>95</td>
<td>81</td>
<td>168</td>
<td>86</td>
<td>101</td>
<td>104</td>
</tr>
<tr>
<td>互联网用户（每百人）</td>
<td></td>
<td>41</td>
<td>34</td>
<td>8</td>
<td>9</td>
<td>79</td>
<td>31</td>
<td>43</td>
<td>9</td>
<td>12</td>
<td>83</td>
</tr>
<tr>
<td>能源</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>电力使用情况（%）</td>
<td></td>
<td>98</td>
<td>99</td>
<td>66</td>
<td>65</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>90</td>
<td>75</td>
<td>—</td>
</tr>
</tbody>
</table>


在中国，城乡之间、发达与不发达地区之间的医疗资源和服务差别极大。2010年，城市中每千人拥有7.62名医疗技术人员、2.97名有资质的医生和助理医生、3.09名注册护士；而农村地区每千人只拥有3.04名医疗技术人员、1.32名有资质的医生和助理医生、0.89名注册护士（详细情况如图3所示）。城乡之间的差距还体现在新生儿死亡率、婴儿死亡率、五岁以下儿童死亡率、孕产妇死亡率。例如，城市里的新生儿死亡率为4.1%，而农村地区为10.0%（详细情况如图4所示）。
城乡之间的教育水平也存在巨大差异。尽管城乡之间的教育差距随着小学和初中教育的普及在逐步降低，但是在高中和大学教育方面的差距仍然十分明显。1999～2006年，有84.5%的城市学生能够在初中毕业后进入高中学习，而农村地区仅为25.2%。同样，有58.7%的城市学生在高中毕业后能够进入大学学习，而农村学生中的这一比例仅为24.4%（详细情况见表...
4）。根据2009年全国人口抽样调查的数据显示，在6岁以上的人口中，有20.29%的城市居民拥有大学学历，而乡镇一级只有5.87%，农村地区仅为1.46%（详细情况见表5）。

表4 城市和农村地区受教育程度（1979～2006年）

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>城市</td>
<td>农村</td>
<td>城市</td>
<td>农村</td>
</tr>
<tr>
<td>完成小学教育</td>
<td>96.1</td>
<td>73.6</td>
<td>98.2</td>
<td>75.6</td>
</tr>
<tr>
<td>从小学教育过渡到初中教育</td>
<td>92.4</td>
<td>65.1</td>
<td>94.5</td>
<td>71.1</td>
</tr>
<tr>
<td>从初中教育过渡到高中教育</td>
<td>53.7</td>
<td>13.0</td>
<td>64.6</td>
<td>17.6</td>
</tr>
<tr>
<td>从高中教育过渡到大学教育</td>
<td>22.3</td>
<td>3.7</td>
<td>34.8</td>
<td>11.3</td>
</tr>
</tbody>
</table>

资料来源：中国健康和营养调查（CHNS）数据库。

表5 城乡受教育程度差异（6岁及以上人口）（2009年）

<table>
<thead>
<tr>
<th>受教育程度</th>
<th>城市</th>
<th>乡镇</th>
<th>农村</th>
</tr>
</thead>
<tbody>
<tr>
<td>大学本科或更高教育</td>
<td>20.29</td>
<td>5.87</td>
<td>1.46</td>
</tr>
<tr>
<td>高中</td>
<td>24.17</td>
<td>14.84</td>
<td>8.26</td>
</tr>
<tr>
<td>初中</td>
<td>35.59</td>
<td>44.66</td>
<td>43.44</td>
</tr>
<tr>
<td>小学</td>
<td>16.94</td>
<td>28.39</td>
<td>37.33</td>
</tr>
<tr>
<td>未上过学</td>
<td>3.01</td>
<td>6.24</td>
<td>9.50</td>
</tr>
</tbody>
</table>

资料来源：中国人口和就业统计年鉴（2010）。

在中国，获得信息技术的手段存在巨大差异，且这种差距还在不断扩大。在城市地区，每百户家庭拥有71.16台个人电脑，而农村地区这一数字仅为每百户10.37台。同样，城市地区每百户家庭拥有188.86台手机，农村地区只有136.54台（详细情况见表6）。2005～2010年，互联网在农村的使用率提高到15.9%，而城市地区则为33.1%；在2010年，城市中有一半人口可以连接到互联网，而农村人口中只有18.5%（具体内容如图6所示）。这种数字鸿沟在发达和不发达地区同样存在。2010年，北京和上海的互联网使用率分别为69.4%和64.5%，而贵州和江西的使用率只有19.8%和21.4%。
### 表 6 电脑、移动电话、固定电话和互联网使用率（每百户家庭，2000～2010 年）

<table>
<thead>
<tr>
<th>地区</th>
<th>年份</th>
<th>2000</th>
<th>2005</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>电脑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>农村</td>
<td>9.7</td>
<td>41.52</td>
<td>59.26</td>
<td>65.74</td>
<td>71.16</td>
<td></td>
</tr>
<tr>
<td>城市</td>
<td>0.47</td>
<td>2.10</td>
<td>5.36</td>
<td>7.46</td>
<td>10.37</td>
<td></td>
</tr>
<tr>
<td>移动电话</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>城市</td>
<td>19.50</td>
<td>137.00</td>
<td>172.02</td>
<td>181.04</td>
<td>188.86</td>
<td></td>
</tr>
<tr>
<td>农村</td>
<td>4.32</td>
<td>50.24</td>
<td>96.13</td>
<td>115.24</td>
<td>136.54</td>
<td></td>
</tr>
<tr>
<td>固定电话</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>城市</td>
<td>94.40</td>
<td>82.01</td>
<td>81.86</td>
<td>80.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>农村</td>
<td>26.38</td>
<td>58.37</td>
<td>67.01</td>
<td>62.68</td>
<td>60.76</td>
<td></td>
</tr>
<tr>
<td>互联网</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>城市</td>
<td>16.90</td>
<td>35.20</td>
<td>44.60</td>
<td>50.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>农村</td>
<td>2.60</td>
<td>11.70</td>
<td>15.00</td>
<td>18.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**资料来源：**《中国统计年鉴》(2011)。

### 图 5 移动电话使用率（2000～2010 年）

注：移动电话使用率按照每百户家庭计算。

**资料来源：**《中国统计年鉴》(2011)。
第一章 包容性创新：概念框架 11

图 6 互联网使用率（2005～2010 年）

注：互联网使用率按照互联网用户被调查的比例计算。
资料来源：中国互联网络信息中心关于中国互联网发展情况统计报告。

中国在提供金融服务上也存在巨大差异。在城市地区，82% 的成年人拥有正规金融机构的账户，但在农村地区只有 58%（具体内容如图 7 所示）。与大中型企业相比，小企业从正规渠道获得信贷的机会依然有限（具体内容如图 8 所示）。

图 7 在正规金融机构拥有账户的成年人比例（2010 年）

资料来源：世界银行 Findex 住户调查。
中国城市和农村地区中分别有 58% 的人口和 52% 的人口有机会使用污水处理设施。在饮用清洁水源方面，城乡之间的差距更加明显，城市中有 98% 的人口可以饮用到清洁的水源，而农村中这一比例只有 60%。①

为了更高效地参与经济发展，满足人类权利的基本需求，人们需要获得必需的服务。获得基本服务的一些指标可以帮助了解 BoP 人群和“资源匮乏的穷人”的生存状况，仅从收入无法获得这些群体的更多信息。但是，获得服务的指标也是衡量人类能力的一种参照。那些无法获得服务的人只为生存而奋斗，无力承担任何风险；他们在面临生活中不可控的变化时毫无抵抗力，无法创造和抓住任何经济机会；同时由于远离市场，也无法向他们出售或提供知识，或者从他们那里获得和总结知识。其结果是，BoP 群体不仅被排除在经济增长的收益之外，同时也被剥夺了对经济增长有所贡献的机会。

精心设计的包容性增长战略既要提高人们的福祉也要实现人类的权利。在政策讨论中传递的信息意义丰富：即包容性增长不仅在道义上是必需的，从经济角度来说也是明智的。感知上的不公正会滋生社会动荡（正如最近中东和泰国的局势，以及在世界各地出现的小规模的骚乱事件），而随后经

① 世界发展指标（2011）。
第一章 包容性创新：概念框架

经济上的不稳定则是难以避免的。由阶级主导的政治通常会故意采用减少财富的政策，或未能及早调整政策抓住经济增长机遇，而这些机遇来自外国直接投资、贸易和新技术。不公平现象对以出口导向型增长为主、内需消费增长为辅的经济带来了挑战，因为国内市场要满足社会各阶层的需求。最重要的是，在一个经济体中，如果大量人口每天花费时间、精力和能量为日常生计而奔波，那么这个社会永远不可能全速前进。这将浪费其最宝贵的资源——人力资源，将本应转化为人口红利的资源变成人口税。

有效的政策可以解决服务供给的问题，提高生活质量并为穷人提供资源——但不一定会提高他们的收入。新兴经济体已经出台特殊的政策和项目，直接满足经济上处于劣势的人群的需求，因为他们不能简单地等待“水涨船高”，即通过一些标准性的政策杠杆如税收、转移支付制度、补贴、福利和权利以及旨在提高竞争力的标准化经济发展实践来专门解决收入不平等问题。毫无疑问，这些措施都非常重要。但是，如果一项政策能够以支付得起的价格提供基本物品和服务，同时又能增加 BoP 的购买力，那么将帮助 BoP 以更经济的方式融入市场，减少由于收入不平等造成的不公正现象，提高 BoP 群体的生产力，从而得以增加他们的收入和提高生活水平。

二、包容性创新：介绍和基本原则

“包容性创新”寻求扩大必需品和服务的供给，以改善生活质量，并通过知识的创造、获取、适应和吸收来实现经济发展，从而直接满足弱势群体，尤其是金字塔底层人群的需求。一个简单的事实就是，真正的包容性增

长应该仅仅通过参与便能够实现：BoP 必须成为消费者，成为世界上顶尖公司直接服务的对象，享受世界上最好的技术，创新者的想法能够转化为全球畅销的产品，而无论工人还是企业家都能更加便捷地获得基本物品、服务、技能、技术和信息。“包容性创新”的概念包括两个关键的方面，并应经受各种分析和政策设计：首先，一项创新要具备真正的包容性（即定义什么是“包容性创新”）；其次，一项“包容性创新战略”要有合理的目标、内容和逻辑，这也是政府、企业、高校、NGO 和类似非营利机构采取行动的基础。

“包容性创新”是指一项创新性活动，能够以支付得起的价格、提供高质量的产品和服务，从而为弱势群体创造生计机会——在可持续的基础上产生重大的影响。专栏1中列举了对这个概念的定义及解释，阐明了具有何种特征才能够使创新真正具备包容性，并有可能产生广泛的社会影响。这种创新可以通过各种形式的创新流程得以实现。实际上，能够产生包容性创新的最重要的方法在于其异质性。包容性创新可以是一种新开发的或新传播的产品和服务，也可以是将现有技术重组或改造后的成果。它们可以基于新的研究和先进科技，也可以植根于传统的经营方式和低端技术。此外，它们不必源自传统科技，也不用像组织创新、工序创新、流程创新、商业模式和配送系统创新那样依赖于传统技术。不同的组织可以在其中发挥作用，例如，政府、公共部门、私营企业、高校、NGO、基金会甚至是个人（包括BoP成员等）。这些机构或个人拥有不同的专业技能、不同层次的复杂性和正直性、不同的客户、捐赠者和消费基础。总之，需要跳出当前创新政策和实践中的高科技倾向。

需要强调的是，尽管包容性创新是一项非常有用的政策工具，用于促进社会包容性与和谐，但是却并非“捷径”。它只是供政策制定者选择的诸多重要备选项中的一个，应在解决社会包容与和谐问题的过程中与其他工具一道使用。因此，政府需要考虑包括包容性创新在内的所有能采用的工具，同时制定能够处理社会包容与和谐的战略。类似的工具还包括：有利的商业环境、实体和 ICT 基础设施（特别是农村的）、完善的 FDI 机制、对产权的保护、治理体系、强有力的机构、参与途径、直接补助、教育体系、劳动力流动、竞争性的市场经济环境、鼓励私营部门发展等。
专栏1

包容性创新的主要特征

包容性创新是指能够为弱势人群提供支付得起的质廉价优的产品和服务的任何创新，特别是在长期可持续发展的基础上和更大的影响范围内，为金字塔底层人群创造提高生活水平的机会。

包容性创新有五个主要特征：

（1）可获得性——主要针对目标消费者在经济金字塔中的位置，产品类型和可能创造的价值和机会。但是对于全世界26亿日均收入不到2美元的人口来说，包容性产品的价格绝不仅仅“足够低”，而是必须以“极低”的价格才能扩大其覆盖面。因此，“极低成本”的支付得起的门槛意味着需要大幅削减成本才能在创新过程中发挥巨大作用，实现真正的包容性。这些听起来有些不切实际，但实际上已经有许多国家的产品做到了这一点。

（2）可持续生产。从长期来看，包容性创新必须通过遵循市场原则来实现，因为私营部门只有依靠市场，而不是依赖于非持续性的政府补贴或采购。这一特征的重要性显而易见：更高的产出、更加充分的竞争（例如，由市场参与者引发的竞争，而不是通过政治力量从中斡旋）、对纳税人来说更加低廉的成本，以及最重要的一点——市场的约束力量，从而确保包容性产品能够为消费者提供更大的价值，代表一项有价值的社会事业。值得注意的是，长期可持续生产原则并不是要否定——而是要突出政府在建立和维持包容性创新生态体系中的重要作用，这一功能完善的体系能够在适当的社会层面产生出包容性创新。政府的作用，市场失灵这些会导包容性创新生产不足并招致公共干预的现象将在本章第四节，即第24至26段中进行讨论。

（3）高质量的产品和服务有助于创造改善生活水平的机会。一个真正的包容性创新不仅是发达国家产品和技术的模仿版，便宜但质量差，向穷人进行倾销——换句话说，就是利用现有技术“向少数人提供更少的功能”。包容性产品必须实现“向少数人提供更多的功能”，这就要通过创新来克服成本约束，帮助BoP以更便宜的价格享受到更高质量的基本服务。这意味着要利用尖端的科技，或真正创新性的非技术创新，去进行发明、设计、生产和销售，实现较高的性价比，创造出真正支付得起的产品。“改善生活水平的机会”是指这些包容性产品要满足用户的最基本生活需求，并对生活质量产生根本性的、改善性的影响，而这种影响要通过增加收入才能实现，但却是不现实的——在各种限制因素下很难真正实现。包容性产品主要是为资源匮乏的穷人创造经济机会，即利用创新的目的——如扩大改善性产品和服务的覆盖，而非通过创新的手段——如在
创新过程更多地参与获利。重要的是，这一逻辑可以为传统的创新方式带来回报——为提高生活质量带来突破性的改进，并增强竞争力。

（4）服务于弱势群体，特别是金字塔底层人群。这些日均收入不到 2 美元的 26 亿人口，应成为包容性创新的主要受益者。他们无法分享经济增长带来的收益，因为他们通常只能参与非正规、效益低下且相对封闭的影子经济。他们遭遇社会排斥有很多原因，其中至少有一条是因为和经济上更有保障的生活质量之间的本质差异，特别是许多国家新崛起的中产阶级，他们刚刚开始获得自身认知。与其他扶持 BoP 的政策相比，包容性创新能够缓解由于经济和社会排斥导致的这些原因。

（5）广泛的影响力。真正的包容性只有在包容性创新的收益大规模推广时才能得以显现，例如，使相当大一部分人口受益。不同产品的目标人群各不相同，有的只有几万人，有的则能惠及上百万（例如，为早产儿设计的低成本保育箱）。但是，包容性创新只有进行广泛推广，才能赢得公众支持。而不能仅仅停留在“好的创意”上，或少量的小众消费者。

尽管包容性创新是一项非常有用的政策工具，用于促进社会包容性与和谐，但是却并非“捷径”。它只是供政策制定者选择的诸多重要备选项中的一个，应在解决社会包容与和谐问题的过程中与其他工具一道使用。具体内容如图9所示。

资料来源：拉米什·马沙尔卡和维诺德·戈尔（Ramishi Masharka & Vinod Gore），《包容性创新：用更少、为更多》（即将出版）。

图9 包容性的特征
一些包容性创新源自前沿技术和重大的新技术突破。一种全新的用于治疗新生儿黄疸病的光照疗法，其成本只有西方设备的二十五分之一，能够帮助医院每年治疗 2 000 万黄疸病儿。一种叫作 Chotukool 的低成本（69 美元）冰箱，利用高端绝缘技术，能够在没有电力的条件下保持数小时的冷藏，而消耗的电量只有普通电冰箱的一半，从而大大延长了食物和医疗产品（如疫苗和药品）的保存期。另一个案例是售价仅 39 美元的 Aakash 笔记本电脑，这款由私营企业和公共研发机构共同开发的产品，有可能产生突破性效应。这款低成本的、兼具计算和上网功能的设备，拥有强大的功能，能够对印度的农村教育产生革命性影响。尽管这些创新尚未得到广泛传播，但是它们显示出了广阔的前景——包容性创新政策需要解决的正是这种“好看不实用”的问题。

另一些包容性创新则利用相对初级的或现有技术，尽管这些技术本身无法产生强有力的影响。例如，低成本（100 美元）的 KickStart MoneyMaker 灌溉泵可以用脚驱动，帮助非洲贫困的农民从靠天吃饭变为灌溉农业，而无需购买价格更高、功能更强的水泵。Freeplay 生命线广播同样采用现有技术，适用于南非农村艰苦和闭塞的环境。这款外表坚固、拥有 AM/FM/SW1/SW2 调频的收音机，使用简单、易于接收，依靠太阳能储能电池运转，可以为成千上万的非洲农民提供各类信息，包括医疗、安全、教育、农业生产和防灾减灾等。麻省理工学院发展实验室开发的 Bici – Lavadora, 是一种便携的脚踏式洗衣机，预计售价为 127 美元，能够极大地提高妇女洗衣服的效率。这一创新将一种在世界其他地方被视为理所当然的产品，以较低的成本生产出来，且完全不依靠电力（如果产品模型能够成功投产的话）。也许令人印象最为深刻的“低技术”包容性创新产品来自医疗领域：斋普内足（28 美元）现已销售到 18 个国家，而斋普尔膝盖则对现有的低成本假肢设计进行了改造，采用了新材料和经过检测的性能改进，既提高了性能，又能将成本保持在极低水平。

包容性创新同样依赖于工序、物流和商业流程的创新（不局限于科技创新），以降低成本、扩大覆盖面。例如，印度的阿拉文眼科保健医院以超低的价格（30 美元）开展白内障手术。在提高手术医生（支付高薪）利用效率的同时，其手术质量可以达到国际水平。这里的医生并不负责整个手
术，而只负责其中一部分（具体内容如图 10 所示）。同样的工序创新还用于低成本的心脏手术中（成本约为 3 000 美元），由印度班加罗尔 Narayana Hrudayalaya 医院提供的这种手术，其成功率不低于发达国家的医院。

![图 10 包容性创新的方式](image)

其他的包容性产品使用创新性的物流体系，得以克服现有体系的一些障碍，以前正是这些障碍影响了对弱势群体的服务。例如，新疫苗不再需要放在冰箱里储存，或者只需单独一支试剂，而为早产儿生产的 Embrace 孵化箱（成本仅 25 美元）则完全不需要电力。所有涉及的案例都只是包容性创新中的一簇（一些仍处在开发阶段，而另一些则成功投产）。对这些包容性创新产品的详细介绍主要集中在第 3 章，专栏 2 中描绘了一些包容性创新的潜在领域。

专栏 2

包容性创新：用更少，为更多

创新能够解决以下多少个问题？

（1）我们能否将每支二十美元的乙肝疫苗降至 0.5 美元？

（2）我们能否把一辆舒适、安全又省油的车的价格，从 2 万美元降到不足 2 000 美元？
第一章 包容性创新：概念框架

（3）我们能否将假肢的价格，从 1 万美元降到不到 30 美元？
（4）我们能否将一台高质量的白内障手术的价格，从 3000 美元降到不足 30 美元？
（5）我们能否将治疗前列腺的药物价格从 1 万美金降到不到 170 美元？
（6）我们能否生产出售价仅 39 美元的笔记本电脑？

毫无疑问，针对上述问题已经出现了质优价廉的解决方案。持续地付出和适当的政策可以在下述领域增加包容性产品、扩大覆盖面，为资源匮乏的人群提高生活质量：

（1）获得便携的技术类产品——电脑、移动电话、互联网；
（2）获得教育服务——获得信息、远程访问教室和实验室、远程学习、在线教育、访问虚拟实验室、书籍和期刊，与国内外其他机构开展合作，以更低的成本、更快的速度获得教育接入；
（3）获得金融服务——金融包容性、网上银行、账单支付、微小金融服务、ATM机、保险和投资产品；
（4）获得医疗服务——低成本诊断、治疗和疫苗、病人信息、医生出诊、疾病信息、儿童和孕妇护理；
（5）获得农业服务——农作物类型和价格、市场动态、天气预报、化肥和农药、农田和牲畜保险；
（6）城市管理——小城镇、获得互联网和教育服务、犯罪和交通管理、减少污染；
（7）利用广播电视（或卫星电视）播放节目，如教育类、农业类、娱乐类，提供有关法律、应急和灾害信息；
（8）气候变化——能效、可再生能源、太阳能灯、太阳能灶、离网发电；
（9）应急和灾害管理——预报海啸、飓风、洪水、风暴、避难，向受害者提供应应急救助；
（10）获得政务服务——了解政策、法律、法规，了解土地、财产和出生记录、公共服务的对象等。

资料来源：拉米什·马沙尔卡和维诺德·戈尔，《包容性创新：用更少、为更多》(即将出版)。

除了上述提到的创新性方法，破坏性的“思维”，如节俭创新和逆向创新，都引发了商业圈的快速关注。“节俭创新”是指“为了应对有限的资源，无论是资金上的，还是技术上的或制度上的，都可以将这些桎梏转化为
优势”。① 一些大公司已经成功推行了这种创新，既有发达国家的企业如通用电气，也有新兴经济体如塔塔汽车，以及一些创业企业，都生产出了包容性产品。同样，“节俭科学”是指科技创新较少来自好奇心的驱动，更多的来自解决“紧迫的问题”，而这些解决办法需要相关的科技知识。此类创新也已经提上了全球主要机构的研究日程。② “逆向创新”可以使中国和印度，发挥劳动力的低成本和“节俭”思维优势，实现性价比上的巨大变化。③ 这些创新方式的实现原则包括：第一，通过寻找高成本、传统的创新流程之外的其他方式，可以使企业从中受益；第二，可以使企业克服各种限制因素造成的障碍，而不是选择降低产品质量或调整目标市场来规避这些挑战；第三，是关于思维方式的重要性：完成这些任务需要采取一种节俭且灵活的态度，而包容性创新成果有赖于高效的商业模式，需要对组织的原则深刻理解。这些原则可以为创新型企业提供极有价值的建议，但是，却不足以解决国家创新体系的失败之处——即无论是在数量上还是影响上都难以使BoP创新获得发展，而这正是包容性创新战略的目标。

“包容性创新战略”是一套能够促进包容性创新可持续生产、传播和吸收的政策，可以将弱势群体与整个国家的包容性生态体系相连接。考虑到BoP的巨大购买力，他们需求理应得到满足，并且由私营企业与其他机构共同致力于创新的生产流程，从而持续性地供应。但是，BoP市场的失败会导致包容性创新产品严重产出不足，而旨在促进“前沿创新”的政策并不能解决这些市场失灵的问题。如此一来，BoP群体仍然被隔绝于典型的创新体系之外，因为这一体系主要是用于实现“前沿创新”。有限的和低成本的公共干预——基于对包容性创新演化、传播和吸收的深刻洞察之上——将能促进更有利于BoP群体的适当产出。这些干预有赖于公共部门和私营部门的行动，以及全球性的合作伙伴关系，这种合作能够创造出高质量的产品和

① 克里斯丁·邦德和伊恩·索恩托（Kirsten Bound & Ian Thornton et al.）：《我们勤俭的未来：从印度创新体系中获得的经验》，英国国家艺术基金会（Nesta），2012年；纳维·拉德夫、杰蒂普·普拉杰、西蒙内·阿乌哈（Navi Radjou, Jaideep Prabhu & Simone Ahuja）：《Jugaad 创新》（Jugaad 是北印度语，指聪明的即兴创作）。

② 乔治·怀特赛茨：《勤俭之路》，载《2012年的全球》，《经济学家》特刊，http://gmx-group.harvard.edu/pubs/pdf/1136.pdf。

③ 维贾伊·戈文达拉扬和克里斯·坦博勒：《逆向创新》。
第一章 包容性创新：概念框架

解决方案，同时又能为资源上匮乏的群体所接受和承担。

发展中经济体虽拥有强大的创新能力，但是落后的农业经济仍依赖于农业和其他尚未得到充分开发的生产力，因此，包容性创新战略应建立一个全国性的创新体系，并遵循以下目标：

（1）促进能够普及最基本公共服务的创新，例如，清洁的饮用水、污水处理、教育、医疗、食品、电力、电话和金融服务——使其能够以更为合理的方式进行生产；

（2）促进知识的创造、传播、吸收和实施，以持续不断地扩大 BoP 创新的受益者；

（3）为“草根”创新者提供机会，帮助他们将创意推向市场（并有机会从中获利），使得人人可进行创新；

（4）提高农业、工业（特别是中小企业）、非正规行业和农民的竞争力。

包容性创新战略的目标不只是简单地将不同产品推向市场，而是要在资源获取方面处于劣势的个人和国家创新生态体系之间建立一种持久的联系，克服 BoP 市场失灵的现象，并使创新体系获得其他可为其服务的创新。第三节和第四节将介绍包容性创新战略的逻辑依据，包括理由、特色、适当的政府干预。第五节明确指出，一项战略的实施不能完全依赖于政府，企业、研究和技术机构、国际金融机构、全球伙伴关系和基金会都应参与其中。

三、逻辑依据：利用多元创新计划来解决诸多不平等问题

直到最近，有关创新政策的讨论主要还是集中在，如何加快技术追赶、鼓励在技术前沿领域开展创新，从而增强国家的竞争力。但是，目前的创新战略却很少涉及普通民众的生活，特别是那些生活在农村地区的穷人和弱势
群体。由于新兴经济体中长期存在不平等和多样性问题，因此，“包容性创新”战略应成为“精英创新”的补充，共存于一个多角度和相互支撑的包容性框架里，使创新成为社会平等和减贫的重要驱动力，从而有助于提高生产率、增强竞争力。

专栏3

前沿创新 vs 包容性创新：需要一种多元化的创新战略

<table>
<thead>
<tr>
<th>因素</th>
<th>创新类型</th>
<th>前沿创新</th>
<th>包容性创新</th>
</tr>
</thead>
<tbody>
<tr>
<td>驱动力</td>
<td>由好奇心促使的科学研究</td>
<td>开展应用型和成本节约型科技研究</td>
<td></td>
</tr>
<tr>
<td>受驱动</td>
<td>复杂研究能力，受到决策者和 STI 社团的欢迎</td>
<td>创新型企业家面临资源稀缺的挑战</td>
<td></td>
</tr>
<tr>
<td>市场</td>
<td>通过既定路径，完成从创意到产品再到市场</td>
<td>新开发、尚未形成市场的</td>
<td></td>
</tr>
<tr>
<td>利润</td>
<td>较高的研发投入和持久的溢出（高回报）</td>
<td>附加值较低的产品</td>
<td></td>
</tr>
<tr>
<td>目标</td>
<td>提高生产力、促进经济增长</td>
<td>提高人们的生活水平（获取、生产率和购买力），改善生计、促进社会和谐</td>
<td></td>
</tr>
</tbody>
</table>

一个协调的包容性战略应能为前沿创新提供补充，即提供最基本的公共服务、增强资源匮乏的穷人的购买力，同时提高生产力、增加 BoP 群体提高收入的机会。

（1）提高必需品和服务的覆盖范围。

促进包容性创新有助于实现政府普遍服务的目标，在一个高效和可持续的基础上提供高质量的基本服务。每个国家都应该扩大基本产品和服务的覆盖面，从它们最有价值的资产——“人口”中获得巨大的回报。“人口红利”是许多新兴经济体获得长久成功的关键因素，可以通过相关改革，使适龄工作的人口能够充分发挥经济上的生产力。实际上，在一些地区，BoP 群体或经济上被排斥的群体中有相当高比重的年轻人，从理论上讲，有利的人口结构（如适龄工作人口与年轻人口和老年人口之比）与经济增长是负相关的。

包容性创新项目有助于提高人口能力，因此能够帮助更多的人参与到经济发展中来。一些医疗领域的创新能够大幅降低治疗成本（如治疗黄疸病、
假肢，外科手术消毒，白内障手术）和预防性服务的成本（如疫苗，免疫，
诊断，清洁的饮用水），从而使数以百万计的人口加入到劳动力中，并发
挥更大的作用。同样，价格极低的预制板房屋和家用建筑知识的普及，可以
使那些难以抵御自然灾害乃至日常气候变化的房屋，变得更加便宜，更加牢
固。农村地区金融中介领域的突破，扩大了信贷覆盖范围，而手机，无线电
和识字工具（如电脑上装载的识字系统，功能强大，仅 15 亿美元的投资就
可以把东南亚地区的识字率提高到 OECD 国家水平），能够帮助人们获得技
能，信息和进入市场的机会。

包容性创新能够加速千年发展目标的实现，加速低成本医疗产品的开发、
实施和传播，帮助农村地区资源匮乏的人群获得便宜的医疗产品。例如，如
果 25 美元的无电力 Embrace 婴儿保育箱能够进入市场，并得以在更贫困、更
偏远的地区应用的话，就能够显著降低五岁以下儿童和婴儿的死亡率。

此外，政府应将大量的财政资源投向那些为弱势群体提供社会服务的项
目，并日益扩大此类项目的范围，覆盖面和质量，同时囊括更多的社会组
织。但是，考虑到 BoP 人口的巨大基数和财政资源限制，那些旨在实现高质
量的普遍性和全国性覆盖的社会政策，需要有效的创新方式，从而确保这些项目
在规模和经济上的可持续性。而这正是开展包容性创新的目的，政府对包容性
创新的支持能够产生乘数效应，覆盖到那些直接购买和投资所不能及的地方。

（2）增强购买力和参与经济发展的能力。

一方面，收入不平等问题，即便能够有所改善，也仍有可能成为哪怕最
成功的（平等的）增长奇迹所要面临的持续困扰。因此，任何包容性增
长战略都必须直接改善低收入人群的生活质量。政策制定者理应关注 BoP
群体的购买力，因为他们要面对不断上涨的商品和食品价格波动以及通货膨
胀。但是，解决这些问题的政策干预机会有限，这既有外生原因，也源自高
增长和开放市场带来的巨额反补贴收益。

另一方面，包容性创新项目可以令人信服地扩大收入微薄群体支付得起
的产品范围，而无需改变或影响促进经济增长的政策。但当前私营部门远未

---

1 埃德温·利姆，伊恩·波特，鲍姆·罗姆和迈克尔·斯彭斯编著：《中国经济中长期发展和
转型——国际视角的思考和建议》。
实现成本集约，而公共领域又不太可能考虑财政资源约束——虽然无须总是如此。利用现代科技指向特定目标，在生产时考虑到 BoP 的利益，这就已经服务了全球数以百万计的人口。这些项目为传统创新带来了回报——能够在提高生活质量方面实现突破性的提高——近年来，创新在发展中的作用主要是增强国家竞争力和创造高收入的就业机会。简单来讲，BoP 群体也必然有一条平行发展之路，即较少地依赖于财富的再分配，更多地依赖于产品和服务种类及覆盖面的扩大，因为从传统意义上来说，产品和服务是用衡量购买力的。例如，生活质量的改善可以体现在一台支付得起的非电力洗衣机、一台低成本的冰箱、虽非必需但是可以与改善身体状况的“现代医药”相关的医疗保健。同样，笔记本电脑、电话和收音机可以提高娱乐享受，帮助弱势群体建立自我认知，而这种认知是通过参与更大范围的国民文化实现的，此前提他们则很难接触到。价格极低的污水处理产品可以使人们在艰苦环境下的生活相对容易些（并减少疾病的传播）。这些产品不仅可以使生活变得更加舒适，更有助于增强人们的能力和自信。他们可以把富余出来的时间用于参加经济活动、开办企业，也可以提高劳动生产率、改善健康状况。同时，当前高收入和低收入人群之间的鲜明差异也可以通过扩大产品的覆盖面而变得更加清晰，因为这些产品可以提高尊严、实现自我价值并得到社会的认同。

（3）减少收入不平等。

以上提到的都是包容性创新主要关注的领域，为以减少收入不平等为目标的包容性增长政策提供补充。但是，包容性创新项目同样可以为 BoP 群体提供创造收入的机会——无论是包容性创新的生产者还是消费者。只要政策适当，经需求驱动的创新和 BoP 生活中本就存在的创造力体现在市场上，为“草根”创新者带来收益（同样为社会带来收益）。与此同时，知识（和经改良的产品）向资源匮乏者的扩散有助于提高生产力以及 BoP 企业的收入。这些企业通常都是小型的，非正规的且生产力低下。例如，之前讨论过的 MoneyMaker 灌溉泵，它能够为低收入农民每年增加 1000 美元的收入，帮助近 50 万人脱贫。

在一些国家，包容性创新能够产生宏观经济上有重要意义的行业，推动经济发展。例如，药用和芳香植物的种植为阿富汗人提供了另一条有利可图的生计之道。通过成千上万的小规模加工和销售作坊，使得这一行业具备了
第一章 包容性创新：概念框架

高附加值潜力，同时还能提高妇女的参与度、增加出口、用本土的草药替代昂贵的进口药。

一些包容性创新还能提高生产率，解决收入流动性陷入停滞的问题。这个问题一直困扰着快速增长的新兴经济体。实际上，中国近年来正日益陷入低收入困局。①造成这个问题的原因有很多，但是持续的生产率下降证明，如何向资源匮乏的人群介绍和传播有用的知识，仍然是影响经济增长的主要障碍之一。

专栏 4

包容性创新——公共政策选择工具

世界上约 40% 的人口（BoP）每天生活费不足 2 美元。这一群体应该和其他 60% 的人口一样获得高质量的生活，因为所有的生活都同等重要。为了应对这一挑战，即使存在着收入不平等问题，政府也应当为 BoP 提供基本生活服务（教育、医疗、食品、饮用水、污水处理等）。

所有政府都希望快速并同时实现以下三个目标：第一，提供必要的服务；第二，提高购买力；第三，缩小收入差距。但是，现实总是并非如我们所愿。

即使在今天，每晚仍然有上亿人饿着肚子睡觉。为什么还有这种情况出现？诺贝尔奖得主阿玛蒂亚·森（Amartya Sen）对孟加拉国饥饿的研究发现（《贫困与食物：论权利与剥夺》，阿玛蒂亚·森著，牛津出版社），饥饿的发生并非是由于粮食短缺，而是由于人们没有钱或没有手段去购买。世界各国政府出台的政策都是要增加穷人的支付手段——通过补贴、权利、现金转移支付等。这些标准的政策工具确实能够发挥作用。但是我们要越过“手段”去关注“目的”，也就是生活的质量。此外，我们不仅需要实现“增长”，而且要实现“包容性增长”——甚至是“快速的包容性增长”。

包容性创新可以作为一种手段，为弱势人群提供支付得起的优质价优的产品和服务，特别是在可持续发展的基础上，和更大的影响范围内，为金字塔底层人群创造提高生活水平的机会。

从某种意义上讲，“包容性创新”不仅有益于贫困人群，更能惠及整个世界。一只乙肝疫苗的价格为现在的二十分之一，一台高质量的白内障手术价格为现在的百分之二，一台心脏手术的价格是现在的五分之一，这些看似不可能的事都通过包容性创新

① 尼尼·福尔、约翰·彭卡沃：《中国收入流动性演变》：1991～2002》，2010 年版。
得以实现。在所有案例中，这些高质量的疫苗或手术并不逊色于（甚至优于）发达国家的同类产品或服务。这就不仅是“便宜”，而且是“质优价廉”的产品和服务。我们能够想象到这种“质优价廉”的医疗服务所能产生的影响吗？这不仅能够惠及穷人，同样也能惠及富裕国家，因为这些国家预算中的一大笔支出，要用在日益高涨的医疗成本上。

为了实现“包容性创新”的真正目标，我们要突破国家范畴，在全球层面上“协调”各方行动。这涉及各国政府、NGO、私营部门、研究团体、国际开发机构等。除了技术创新，还要充分利用商业模式创新、流程创新、市场创新和组织创新。

这正是将政府目前采用的、为经济上处于弱势地位的人群服务的政策与“包容性创新”的结合，这种合力将创造一个新的世界，使全球70亿人的面孔上展现欢颜，从而早日使我们的梦想得以成真。

四、政府的作用：建立联盟以克服市场失灵

尽管多方面的创新活动可以满足 BoP 的需求，但是其背后还有一个经济意义上更为重要的逻辑：克服市场失灵所造成的包容性产出下降。充满挑战性的市场环境并不足以说明 BoP 产品狭小的范围和规模，以及包容性创新获得的有限资源。市场失灵毫无疑问是原因之一，因此需要有效的公共政策干预。

（1）有待完善的金融市场。无论是何种创新型融资，风险始终贯穿始终。在包容性创新中，风险会更高甚至更难量化（例如，充满不确定性），这是因为其中蕴含的性价比会剧烈波动，以及一旦产品获得开发，在销售和物流阶段（包括消费者融资）中的风险。

① “用更少、为更多”战略——即利用更少的资源，获得更高的产出和更好的质量，从而使更多的人受益——通常要求对现有商业模式、组织结构和产品的开发、制造和销售流程进行彻底改造。仅靠对现有经营模式进行小修小补，很难为 BoP 提供服务——或者完全错失目标，抑或终端产品价高质低。为了克服创造力和投资的惰性，只有接受不确定性、勇于承担风险、进行更多的尝试，从而决定哪种 BoP 商业模式能够发挥作用。

例如，低成本的投入并不能解释印度电信是如何以比美国低数倍的成本提供移动电话服务的。但是，印度电信在网点采取了高容量、低成本策略。这一战略在决定何时“做或买”时与西方电信公司有本质不同，西方企业会将风险分散于参与移动服务的各方。印度公司的做法使得服务提供商，将每增加一名入网用户的成本降到极低，从而使手机成为扶贫和帮助 BoP 的一项极为强大的工具，特别适用于印度的农村地区。
在风险融资中，并非所有净现值为正的项目都能获得融资。金融家们通常会避免投资此类项目，即便按风险（如果已知的话）折算的回报率较高。这个问题有时则非常突出，特别是当抵押物（或其他合理的资产）即使它们并不能为一笔贷款提供正式担保）灭失，虽然抵押物的缺失令复原的机会很小。但是，对于很多创新型项目，尽管预期值为正，却无法提供任何抵押物。此外，一些抵押物的替代品，例如声誉、法律执行力和所能看到观察到的行为，对很多包容性创新而言也难以提供。

（2）分散化的社会和投资风险取向。一个与此相关的问题是对于风险善好的错位：即使抵押物（或适当的抵押替代品）存在，许多金融家仍然不会冒险去投资此类项目。在成功率极低的情况下即使预期值是正的也枉然。将风险分散于不同投资者的机制虽有助于缓解问题，但是却不能从根本上消除风险，并且由于高额的代理和监督成本导致效率低下。最后结果是：能产生巨大社会利益并有机会获得成功的项目被放弃——即使投资者能够完全从中获利。

（3）创新中存在的外部性问题。当然，在许多创新中，投资所能获得的收益有可能会完全转化为失败，对包容性创新而言同样如此。能够产生公共物品，也就是说，创新能够创造知识，而知识具有非竞争性和非排他性。知识产权保护可以部分解决创新者从知识中获取利益的问题，但并非全部。但是，在许多情况下，知识产权保护在全球很多地区并没有得到充分落实。因此，对很多创新活动而言，仍存在资源配置不合理的现象。

（4）包容性创新的外部性问题。除了知识以外，一些成功的包容性创新还能产生其他收益，却未能被创造者充分利用。创新可以通过扩大基本必需品的覆盖范围、提高资源匮乏人群的生产力和降低准入门槛来促进经济的发展。此外，创新带来的收益还体现在增强社会包容性、提高国民福祉、满足人们生活在一个更加平等的社会的愿望。同时，还能减少社会不稳定带来的破坏性风险、增加提高社会福祉的政策被采用的机会（或防止以不公平为名，出台减少社会财富的政策）。许多包容性创新都遵循“用更少、为更多”的原则提供产品，从而在环境保护和经济繁荣中寻求平衡：成本的大幅下降通常包含着资源和能源消耗量的大幅减少。值得注意的是，BoP 特别是农村中的 BoP，极易受到气候和环境因素的不利影响。
（5）BoP 市场孤立：信息不对称和创新体系的失败。当前 BoP 市场仍然规模较小、服务不健全且以非正规经济为主，生产率较低且效率低下。因此，贫困人群能接触到的通常都是质量低下且价格昂贵的商品和服务——如果这些商品和服务存在的话。尽管 BoP 市场购买力大（规模在 1 万亿美元左右），却仍然被高端企业所忽视，因为这些企业仍关注于传统产品、服务、商业模式和生产销售流程，价格虽低，质量和服务水平却大打折扣。大部分企业还不能成功找到一条创新之路，创造和销售物美价廉的产品，特别是 BoP 群体所能够负担的产品，因此，这些企业也就无法满足 BoP 市场的需求，也无法从中获利。具体内容包含以下两个方面。

①信息不对称。BoP 市场仍然处于未开发阶段，且难以渗透到传统市场。教育程度、语言、地理分隔（及其他障碍）将许多 BoP 与市场分隔开来，同时市场所需的信息（和实物）交换也成为一种负担。同样，对高端企业来说也很难“抓住”市场机遇：尽管出于好意，但那些负责或参与产品开发和市场营销的人却很难认同、理解并为那些与他们毫无关联的人服务。信息流通不畅也反映在消费者不愿和无法接受新产品，以及企业对贫困人群实际需求、环境和传统的忽视。

因此，信息不对称并不会导致道德风险和逆向选择等问题引发的扼杀市场行为的投机取巧。但是，创新者（行业、研究机构、国内外）和 BoP 群体之间的信息交流仍然具有挑战性，没有市场愿意首先去尝试。知识的创造者很难理解 BoP 群体的需求，以致无力为其提供服务，或开发能被他们接

① 例如，最近一些大型企业开发的非常知名的 BoP 产品，却并未获得想象中的成功。这主要是因为缺乏对目标消费者群体需求和习惯的基本了解。塔塔集团生产的 Nano 汽车，原被宣传为“人民的汽车”，使民众以较为合理的价格拥有一辆汽车，却不想成为有钱人追求时髦而购进的第二辆轿车，无法到达其目标消费者。原被设定的消费者不愿再去展示厅参观，也不再信任这款看上去极为“精致”的汽车，更不用说获得银行贷款了（许多潜在买家并没有固定工资）。“一娃一电脑”活动面临同样的问题：电脑的基本设计和软件都很难满足当地的需求、文化乃至预期，甚至有言论批评这些企业将数以亿计的 BoP 群体当作一个毫无个性的群体。

虽然许多批评声音认为问题主要在于营销的失败，例如，雄心勃勃提出的 2 000 美元一辆汽车或 100 美元一台电脑，这种宣传无疑大大提高了人们的预期，但实际上又无法做到。实际上，问题的根源非常简单：生产者与消费者之间在消费习惯、传统和生活环境方面糟糕的信息沟通。希望创造新的产品以满足 BoP 的需求，这种精神是值得赞赏的：即便有些产品未能到达目标客户，但却激发了对服务 BoP 市场的重新思考和变革。促进和推动这样的信息交流有助于减少未来的失败，并确认创新——对新意的尝试开发——能够真正地从生产者转移到消费者手中（同时要解决消费、物流、营销和融资的问题，还要考虑到产品设计标准和开发问题)。
受的产品。同样，BoP 群体虽然拥有传统知识和需求驱动的创造力，但是却
难以将这些宝贵的财富转化为市场化的产。由于信息交换不畅导致的失败
可以通过其他方式弥补，例如，促进国家创新体系惠及 BoP 群体，将他们
既当场消费者又当作知识创造者。

②系统失控。一个好的创新体系能够产生激励、提高能力、建立实验平
台、引导研究、促进信息交换、明确需求（并减少不确定性）、使创新活动
合法化等。网络化对于创新过程的各阶段都是必不可少的。以早期融资为例，
天使投资者形成的网络能够进行有效组合（同时分散风险），为风险投
资提供资金，也能更好地将技术和人才进行匹配，实现技能、所有权和控制
的融合。但是，目前即使是发展完善的创新体系也仍未能囊括包容性创
新。与前沿创新和追赶创新类似，包容性创新仍然依赖于较强的信息网络、
融资、技术甚至社会关系，需要了解、激励和引导创新流程，将创意转为
市场化的产。因此，推动国家创新体系向包容性创新的调整，应该增加包
容性创新的产出和质量，使其达到一国原始创新能力（例如，利用人力资
本、现有的非包容性研发基础设施等）。

为了将包容性创新纳入国家创新体系并克服市场失灵，政府可以促进和
加强以市场为导向的联盟，创造创新性的产品以满足不同寻常的市场需求，
做到四个“可”：可负担、可到达、可获得和可接受。尽管包容性创新相继
出现在新兴经济体和发达经济体，但仍然是零星的，规模有限、影响有限。由
于缺乏系统的 BoP 支持政策，最活跃的参与者要数慈善家，而非受利
益驱动的商人，但实际上有许产品都是有利可图的。政府可以建立一套自
我维持的体系，即鼓励产生更多的包容性创新，为物美价廉的产品扩大市
场，为 BoP 或资源匮乏的穷人提供更多的资源，使产品更加便宜、供应更
加高效，从而被更多的人所享用。

① 天使投资者比其他人更成功的原因是他们能降低代理机构成本，具有并购技巧、所有权和
控制力。的确，粗略的调查显示，在美国，支持科技企业的投资者中，密切合作的天使投资与只是
用天使投资进行风险投资相比，前者的成功率是后者的 7 倍。
30 中国包容性创新与可持续发展战略

图 11 包容性创新的动力

因此，公共支持应侧重于创造一个支持性的生态系统和相关基础设施，以促进包容性创新的发展。图 12 列出了创新过程中的系统功能。但在许多国家，融资、知识产权保护、技能、知识和技术转移，这些能够加强创新链并为创意思想产品转化扫清障碍的手段，通常都不是现成的，特别是对包容性创新而言。例如，连接高校研究（已经产生了许多包容性创新成果）和市场的生态体系比较脆弱，并且在新兴经济体中难以渗透到 BoP 市场。影响包容性创新的障碍同样也影响了知识扩散和新产品的推广。此外，一项包容
性创新政策必须促进新的包容性创新，同时还应将“实验室”中的产品和那些在数量、规模和影响上默默无闻的“草根”产品加以推广，并对穷人天生的创造力进行鼓励和成功推广。具体内容如图 12 所示。

图 12 功能性投入和创新阶段

公共政策的作用。增加竞争是驱动创新最为有效的手段，但是政策措施和创新支持机制同样能发挥重要作用。公共政策可以带来投资和资源投入，建设功能强大的创新基础设施，能够在可持续的基础上增加创新产出。因此，创新政策的主要目标应该是创造一个创新生态体系，以应对 21 世纪的挑战，并侧重于促进包容性增长。这一生态系统要能够促进 BoP 创新（包括“草根”创新）的产生、采用、传播和推广，并采取激励、价值评估、
有效商业化、使用、融资和有利于 BoP 的知识产权保护等手段。为了服务 BoP 市场需要结成利益同盟，因此这些政策必须建立创新型的公私伙伴和全球伙伴关系，以增强同盟中各方力量，在更大规模和可持续的基础上开发、生产和销售包容性产品。政府的重点应在于促进、支持、激励和利用所有参与方的力量，创造可持续的包容性解决方案，用最少的公共资源产生最大的效益。

“包容性创新”这一术语通常有不同的理解：①更加便宜的产品和服务，并提供给穷人，这一类解释还包含了除降低成本以外的创新，例如提高质量或增加透明度（如公共服务）；②创新的资源来自非正规行业，还包括“草根”创新；③能够提高 BoP 生产力的创新，或者提高他们增加收入的能力。尽管 BoP 代表了一个重要且未被涉足的市场机遇，但是从公共政策的角度出发，包容性创新的重点应在于创造收入和提高生产率，从而帮助 BoP 人群提高生产力，扩大就业范围，改善生活水平。

包容性创新的另一个重要方面，是有助于创造（或保存）无论是本地的还是全球性的公共产品。例如，BoP 通常要依赖于环境和生态系统的资源。能够维持或增强非市场性服务的创新将对 BoP 产生特别重要的作用，特别是对农村贫困人口而言，因为他们对当地环境和生态资源的依赖要远高于城市的中产阶级。支持创新的经济理由在于，为地方（和全球）创造公共产品是极为必要的。贫穷的家庭消费也更低，这既是因为缺乏购买力，也是由于缺少获得产品和服务的途径。对可获得性和支付得起的政策干预不尽相同，例如，后者可能需要直接的收入补贴，而前者则需要创造市场和制度变革。

特别需要提出的是，政府政策要能发挥以下功效，以解决包容性创新生态体系中存在的问题。

①协调和提供融资，特别是早期融资和产品扩大规模阶段的融资。包容性创新中存在一些对项目本身产生威胁的风险，要使之其他更大一些，创新的过程也更长一些，这主要源自销售的挑战、新颖性和 BoP 群体对产品的接受度。因此，与典型的高技术创新路线不同，公共政策对融资的支持就需要在稍晚的阶段出现。实际上，有几个案例开发出了前景广阔的包容性产品，成本极低却功能强大，但是却一直未能投入市场提供给穷人。取而代之
的是，这些产品仍然停留在概念阶段，或者作为一种生活方式供更为富裕的消费者享用。

②需求方的支持。作为必需品和服务的传统提供者——社会福利项目和公共物品——政府在创新生态体系中具有独特优势，可以与其他各方开展合作，以降低成本、提高质量、扩大包括公共服务在内的必需品覆盖范围。因此，他们应考虑减少对一些领域创新的直接干预，例如，供水、污水处理、发电和送电、交通等。相反，可以利用一些手段，例如，挑战赛、资助研究、采购担保等，政府可以向创新者提供需求方面的支持，减少项目的风险和不确定性。

③引导公共研究机构（和使用公共资源的非公共机构）研究包容性创新。许多国家资助或直接参与具有国家战略意义的研究，这些研究通过国家研发实验室和与高校建立的伙伴关系得以完成。一些民生项目可以直接产生可行的包容性创新产品，同时提高这些机构在包容性创新领域的研究能力，加强行业和 BoP 人群之间的联系，促进包容性技术的转移。同样，由公共资金建立的“包容性创新学院”——一个积累和传播 BoP 信息的智库，可以针对 BoP 人群的需求、提供潜在的解决方案、设计和提供 BoP 产品——从而利用一国的学术资源，用于与包容性创新相关的众多学科。

④促进“草根”创新。“草根”创新者在促进包容性创新中能够发挥重要作用。他们试图解决一些地方性问题或对特定的资源约束做出反应。政府可以考虑建立一个中央级的机构负责推广 BoP 草根创新者的成果（例如，印度的国家创新基金会）；对提交的创新申请进行意见征集、记录和分类；获得技术专家的支持，推动有前景的创意进行转化，至少也要形成完整的概念；促进专利授予和许可，并妥善安排意向方的技术转移。

⑤配套网络和促进不同领域的合作。从长远看，促进包容性创新的网络应该是自发形成的。但是政府可以利用其制度化的联系建立一个包容性的创新生态体系（或对现有包容性体系进行重组，囊括前沿创新和包容性创新）。例如，政府可以创立一个高级别的机构，如包容性创新委员会，作为与各部门、企业、实验室和高校协商的实体。政府还可以促进集群的发展——作为另一种促进创新的手段——利用土地使用政策、创建包容性创新的园区和集群。同样，政府可以支持建立包容性创新门户，精简流程，帮助感兴趣的企
业获得公共支持，并有机会参与相关的私营活动。

<table>
<thead>
<tr>
<th>促进包容性创新的工具</th>
<th>促进包容性创新的工具</th>
</tr>
</thead>
<tbody>
<tr>
<td>公共政策</td>
<td>包容性创新委员会</td>
</tr>
<tr>
<td>包容性创新学院</td>
<td>包容性创新基金会</td>
</tr>
<tr>
<td>包容性创新中心</td>
<td>包容性创新集群</td>
</tr>
<tr>
<td>创新门户</td>
<td></td>
</tr>
</tbody>
</table>

图 13 促进包容性创新的工具

五、其他机构及作用

制定一个国家包容性创新日程需要各方的参与和贡献。设计完善的公共政策可以创造出一个有利的支撑环境，激励和帮助各方参与者尽全力参与到包容性创新中。但是一个包容性创新体系的成功更在于私营部门（包括金融服务）、研究和学术界、NGO、全球合作伙伴以及 BoP 人群自身的重要参与。

私营部门。大型企业可以利用他们雄厚的技术、组织和营销能力，为 BoP 群体创造和提供产品，并将利润作为回报。① 他们同样可以受益于与企业和研发机构的合作。例如，低成本的外科手术、手机服务、农业设备、汽车和电子设备，在这些领域许多企业都已成功地开发出惠及 BoP 的产品。除了标准的研发外，这些企业开始打破那些“百炼成金”的商业模式，对组织结构进行变革，创造并拥有了新的能力。这些案例说明，众多企业同样可以建立一个清晰的愿景、设定“略高”的目标、利用企业家的创造力克服困难、关注人本身而非短期内增加股东价值（相信利润会如期而至）。②

小型企业和新成立企业同样可以作为包容性创新的供应商和用户，并作为中介促进大企业和 BoP 沟通的桥梁。其中一些企业利用现有技术和产品服务于 BoP 市场后，已经获得了成功。小企业通常是非正规的且生产力低下，因此可能会采用包容性创新成果来增加收入，同时可以降低 BoP 消费者的成本。本地的小企业还拥有巨大的信息优势，可以促进产品、技能和信

① C. K. 普拉哈拉德：《穷人的商机》，2004 年。
② C. K. 普拉哈拉德和 R. A. 马沙尔卡：《哈佛商业周刊》，2010 年 8 月。
息向资源匮乏的人群流动。例如，印度最大的私营银行 ICIC 便充分发挥了这种优势，利用当地的分支进行贷款评估和监督，同时将风险转移到更大范围的金融体系中，从而扩大了在落后地区的信贷和金融服务覆盖面。

大学和研发社团。在发展中国家，学术和研发机构肩负着特殊的责任，去支持包容性增长和促进社会公平。政府对这些机构的支持有着明确的目的，即他们所开展的活动和项目能够惠及整个社会。这些机构拥有的知识赋予了他们较强的研究能力，因此必须为 BoP 人群提供解决方案，即通过“高端”创新来促进经济增长、提高竞争力。实际上，与前沿创新类似，高校同样可以从包容性创新中获得资金支持。研究机构还应认识到，包容性创新可以发挥传统创新所没有的教育功效，提供丰富的教育体验、融合多领域的学习、让更多的学生进入到产品设计和开发中。

全球合作伙伴关系。国际组织和外国政府可以提供资金、技术支持、技术转移，帮助创造、获取、改造、生产和传播包容性创新。这些机构还可以提高发展中国家的创新能力，例如，开展合作和联合安排，提高地方开发和实施包容性创新的能力。国际金融机构（IFIs）如世界银行应该做出表率，促进包容性创新在发展中国家的展开，并和其他金融机构如亚洲开发银行、非洲开发银行、农发基金、美洲开发银行等进行合作。这些机构还可以发挥合力，发动国际金融机构、捐赠者、慈善家、耐心资本、企业和 NGO 的力量，并建立战略伙伴关系。IFIs 还可以促进和利用研发团体之间的全球伙伴关系——既包括发达国家，也包括发展中国家。全球研究联盟（GRA）便是一个极好的例子，即在不同国家的公共研发机构中建立伙伴关系，这个联盟涉及印度、南非、澳大利亚、德国、芬兰和美国，现已成为世界银行在越南和其他国家开展的包容性创新项目的知识合作方。

重要的是，发达国家应该认识到他们同样能从包容性创新中分一杯羹。虽然包容性创新关注于满足穷人需求，但同样可以满足贫穷国家富裕人群的需求以及发达国家的人群。例如，28 美元的贾普尔足或者 25 美元的 Embrace 婴儿保育箱同样能够在 OECD 国家找到需求，对于这些创新产品而言，不存在穷富之分。这些创新的特征在于：①成本极低；②创造或发明时考虑到 BoP 的需求；③其性能大致相当于或高于价格更高的同类产品，而这些产品最开始是为富裕消费者设计和发明的。包容性创新最成功的领域莫过于
医疗卫生领域：发达国家的弱势群体同样缺少医疗服务，而不断高涨的医疗成本已经成为美国当前面临的最主要的财政挑战。国际贸易和竞争力框架对于促进包容性创新意义显著。例如，传统意义上的技术转移是指发达国家的成熟技术被转移到发展中国家。包容性创新则在很多情况下意味着，首次进入市场的技术将出现在发展中国家。

NGO 组织。NGO 促进包容性创新的方式包括：募集和监管资金，明确 BoP 的需求和习惯，对创新进行分析评估，已决定是否适合或对 BoP 群体（信息交换功能）会带来何种影响，并开展项目协调。许多 NGO 社团规模都较小，但如果定位准确，其影响力同样可以很大。NGO 可以发挥宣传作用，将合适的信息传递给不同层级的政策制定者。

“被排斥者”、“资源匮乏的穷人”和“BoP”。被排斥者和弱势群体应该发挥比包容性创新产品使用者更大的作用。他们必须在适当的时机或和其他合作方工作之机阐述自己的需求和问题，确保制定的解决方案能够满足他们的需求，符合其文化传统。他们必须加大知识和技能的扩散（从 BoP 到企业，反之亦然），因此，必须加强同企业、NGO 和研究机构的接触。此外，许多 BoP 成员本身就是创新者。他们的“草根”创举必须走向商业化，才能最大限度地扩大影响（还可以增加收入，并为日后的创新提供激励）。
第二章

中国包容性创新现状

一、中国包容性创新的发展环境

中国拥有有利的包容性创新发展环境。有利因素包括：（1）政府致力于构建和谐社会、减少收入差距并改善基本公共服务，为包容性创新提供了激励和充实的财政资源；（2）遍布全国的完善的基础设施和信息通信技术（ICT）设施，使私营部门和其他参与者能够在不发达地区实现包容性创新；（3）发达的创新体系，能够提供包容性创新所需的知识基础、人力资本和研发能力；（4）快速增长的私营部门，拥有较强的制造业和逆向创新能力，能够开发、生产和为 BoP 消费者提供物美价廉的产品；（5）一个拥有巨大潜在购买力的庞大 BoP 市场，能够为私营部门和其他参与者提供参与包容性创新的增长机会。

1. 政府致力于解决收入差距

20 世纪 80 年代以来，中国政府一直致力于解决收入差距过大的问题，并采取政策和行动减少贫困，促进不发达地区的经济增长。1986 年，

中国政府充分认识到了解决收入差距的紧迫性，并将和谐社会建设作为“十一五”规划（2006～2010）期间政府的首要任务。2010 年 9 月，胡锦涛主席提出了包容性增长战略，旨在减少贫困、缩小城乡收入差距并为城乡扶贫群体和农民工提供基本社会服务。“十二五”规划（2011～2015）将发展理念从“追求经济增长”改为“使发展成果惠及全体人民”，这反映在不同领域采取的一些重大行动，例如，社会保障、教育、医疗、交通基础设施、公共卫生和农业等。

随后，与扩大基本公共服务相关的政府支出急剧增加。从 2005 年到 2012 年，中央政府预算内支出中涉及民生的领域有农业、社会保障、教育、医疗和保障房建设，支出从 5070 亿元增加到约 2.6 万亿元。2012 年，政府社会福利支出在全部预算内支出中所占比例超过 40%，而 2005 年这一比例只有 25%。中国政府在减贫和促进公共服务均等化方面取得了重大进展。④ 详细内容见表 7。

① 部分原因是认识到贫困分散性的本质，实际上，许多穷人并不住在贫困县，贫困县中也有许多人并不穷困。

② 《从贫困地区到贫困人群：中国扶贫议程的演进——中国贫困和不平等问题评估》，世界银行报告，2008 年。

③ 如果想深入了解中国的西部大开发计划，可参见 Goodman，D. S. G. （Ed.）著：《中国“开发西部”运动——从全国、省和地方的角度》，载于《中国季刊》特别报道，2004 年。

④ 从 1981 年到 2008 年，人均收入在 1.25 美元以下的人口比重从 84% 下降到 13.1%，有超过 6 亿人摆脱了贫困。农村新型合作医疗保险的覆盖面积从 2005 年的 21.7% 增长到 2011 年的 95.0%。2006 年开始实施的农村义务教育，于 2008 年实现了全覆盖。在实施全国污水处理项目后，农村中能够获得清洁饮用水的人口比重从 2005 年的 56.6% 增长到 2010 年的 84.7%。
表 7  
中央政府社会福利支出

<table>
<thead>
<tr>
<th>项目</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>中央政府社会福利支出总额（亿元）</td>
<td>5 070</td>
<td>6 080</td>
<td>8 360</td>
<td>10 780</td>
<td>14 250</td>
<td>16 300</td>
<td>20 810</td>
<td>25 970</td>
</tr>
<tr>
<td>医疗（亿元）</td>
<td>83</td>
<td>138</td>
<td>664</td>
<td>832</td>
<td>1 181</td>
<td>1 389</td>
<td>1 728</td>
<td>2 035</td>
</tr>
<tr>
<td>教育（亿元）</td>
<td>384</td>
<td>536</td>
<td>1 076</td>
<td>1 562</td>
<td>1 981</td>
<td>2 160</td>
<td>2 964</td>
<td>3 781</td>
</tr>
<tr>
<td>社会保障和就业（亿元）</td>
<td>1 624</td>
<td>2 010</td>
<td>2 303</td>
<td>2 762</td>
<td>3 351</td>
<td>3 582</td>
<td>4 414</td>
<td>5 751</td>
</tr>
<tr>
<td>保障房建设（亿元）</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>493</td>
<td>993</td>
<td>1 293</td>
<td>2 118</td>
</tr>
<tr>
<td>农业和对农民的补贴（亿元）</td>
<td>2 975</td>
<td>3 397</td>
<td>4 318</td>
<td>5 625</td>
<td>7 253</td>
<td>8 183</td>
<td>10 409</td>
<td>12 287</td>
</tr>
<tr>
<td>中央政府预算内支出总额（亿元）</td>
<td>20 250</td>
<td>23 480</td>
<td>26 870</td>
<td>35 430</td>
<td>43 860</td>
<td>46 660</td>
<td>54 360</td>
<td>64 120</td>
</tr>
<tr>
<td>政府社会福利支出占全部支出的比重（%）</td>
<td>25.0</td>
<td>25.9</td>
<td>31.1</td>
<td>30.4</td>
<td>32.5</td>
<td>34.9</td>
<td>38.3</td>
<td>40.5</td>
</tr>
</tbody>
</table>

资料来源：http://www.gov.cn/2008lh/content_913007.htm，各类中央政府预算报告。

尽管如此，现有的政府项目仍不能充分满足弱势群体如农民工的需求，在服务规模、覆盖面、服务质量和效率上面临严峻挑战。① 财政和预算约束导致社会服务难以实现普遍性和全国性的覆盖，创新手段匮乏导致服务难以推广且资金上难以维持，服务效果和效率欠佳。这也正是追求包容性创新的理由——增加财政支出，促进对低成本、高效能解决方案的开发、实施和传播，从而以支付得起的价格向弱势群体提供必要的社会服务。

2. 完善的基础设施和 ICT 设施

中国拥有覆盖全国的基础设施和 ICT 设施，可以促进 BoP 的商业开发，特别是在不发达地区。基础设施匮乏是阻碍企业进入 BoP 市场的重要因素：

---

① 埃德温·利姆、伊恩·波特、鲍罗·罗和迈克尔·斯彭斯编著：《中国经济中长期发展和转型——国际视角的考察和建议》。
为 BoP 群体铺设基础设施①是一项耗费大量资源和管理成本的工作，很少有企业家愿意耗费资源来完成当地的基础设施建设。在中国，各级政府所修建的基础设施已经为 BoP 商业开发创造了条件。例如，截至 2009 年，② 中国有 61.3% 的村庄通水泥路，有 97.4% 的农村家庭通电。普及 ICT 基础设施方面也取得了重大进展。绝大部分村庄能够接收广播、电视、电话、移动网络和互联网。③ 除了硬件基础设施，政府机构和其他各方还建立了各类农村信息服务站，为农民提供各种综合性的、低成本的信息服务。④ 这些基础设施的存在促进了以 ICT 为基础的包容性创新产品和服务的广泛使用。例如，农民可以通过地方政府开通的农村信息热线和平台，仅凭一个电话或手机上网就可以获得农业、市场和技术领域的相关信息，从而提高了农村生产力、增加了农民收入。

3. 发达的国家创新体系

中国以前所未有的规模和超常的速度进行科技开发，为发展包容性创新提供了巨大潜力并奠定了良好基础。中国的国家创新体系已具备开展包容性创新的基本要素，包括强大的公共机构、大学、研究机构、企业和融资机制（见专栏 5）。如果转向包容性创新的话，现有的创新体系同样可以用于满足弱势群体的需求、解决他们的问题。例如，中国科学院的两家研究机构——深圳先进技术研究院和理化技术研究所，均已开展了对农村低成本医疗技术的研究。这些研究得益于中国创新体系拥有的大量智力资本，可以被用于解决弱势群体面临的技术问题。

① 菲拉·哈拉德和哈特（2002）。
② 农村家庭固定观察点调查（2000 ~ 2009 年）。
③ 广播电视的覆盖率从 1998 年的 88.3% 上升到 2009 年的 89%。超过 20 户的通电村庄在 2010 年前已经全部接入广播和电视。拥有电话的行政村比重从 2004 年的 89.2% 上升到 2010 年的 100%。到 2009 年，能够接入互联网的乡镇比重扩大到 99.3%，在行政村中的比重达到 91.5%。资料来源：农村家庭固定观察点，2000 ~ 2009 年。
④ 例如，在工信部和科技部的支持下，截至 2011 年，已经在县村两级分别建设了 11 724 个和 107 695 个信息服务站。通过与地方政府合作，中国移动和中国电信分别建立了 11.8 万个和 18 万个信息服务站。目前，每个县和行政村都拥有信息服务站。
专栏5

中国国家创新体系的主要内容

中国政府为创新创造了良好环境，并为一些领域的研究提供了稳定的资源。中央政府制定了一些科研规划，支持最重要的基础研究（详细内容见表8）。国家自然科学基金会是政府促进各领域基础研究的重要机构。企业可以以研发支出的1.5倍进行税收抵扣。

中国的高等教育规模在过去十年快速扩张，高等教育机构从1995年的1054家增长到2010年的2358家。其中，700家高等教育机构拥有研发能力，一些高校如清华大学作为研究型高校，在国际上享有盛誉。与其他国家的同类机构相比，中国的大学有两个显著的特征：一个是理工科学生数量多，从而为相关研究活动奠定了基础；另一个是以应用研究为主。在过去十年，中国的高校已经成为最重要的知识来源和产学研合作的关键力量。

公共研究机构在支持基础性和战略研究中发挥了关键作用，特别是自然科学领域和高新技术研究领域。中国科学院作为中国最富盛名的研究机构，是自然科学领域的国家级研究机构。中国农业科学院同样拥有广泛的研发机构网络。

企业同样也是重要的研发活动参与者，有超过70%的研发活动发生在企业（其中有17%在外资企业），比1990年的40%大幅增加。同一时期，公共研究机构在研发活动中所占的比重也从一半减少到不足1/4（详细内容见表9）。

资料来源：《OECD中国创新政策研究报告》（2007年）

表8

<table>
<thead>
<tr>
<th>项目</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>973 基础研究</td>
<td>983</td>
<td>1354</td>
<td>1645</td>
<td>1900</td>
<td>2600</td>
<td>4000</td>
</tr>
<tr>
<td>关键技术研发项目</td>
<td>1624</td>
<td>2888</td>
<td>5423</td>
<td>5066</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>火炬计划</td>
<td>70</td>
<td>108</td>
<td>139</td>
<td>152</td>
<td>228</td>
<td>220</td>
</tr>
<tr>
<td>星火计划（1988 服务于农村中小企业）</td>
<td>117</td>
<td>102</td>
<td>150</td>
<td>200</td>
<td>219</td>
<td>200</td>
</tr>
</tbody>
</table>

资料来源：《中国科技统计年鉴》（2011）。

① 总部设在北京的中国科学院（简称中科院），在全国各地设有分支机构，共有12家分院、117个研究所、100个国家实验室和国家工程研究中心、1000余个国家试点，研究人员总数超过5万人。这些中科院的分支机构和办公室分藏在国内20个省、直辖市。中科院已经投资建设或创建了430个科技型企业，分布于11个行业，包括上市的八家企业。
表 9
不同领域的研发支出
单位：亿元

<table>
<thead>
<tr>
<th>行业</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>研发机构</td>
<td>513</td>
<td>567</td>
<td>688</td>
<td>811</td>
<td>996</td>
<td>1 186</td>
</tr>
<tr>
<td>高校</td>
<td>242</td>
<td>277</td>
<td>315</td>
<td>390</td>
<td>468</td>
<td>597</td>
</tr>
<tr>
<td>企业</td>
<td>1 630</td>
<td>2 135</td>
<td>2 682</td>
<td>3 382</td>
<td>4 249</td>
<td>5 185</td>
</tr>
<tr>
<td>大中型企业</td>
<td>1 250</td>
<td>1 630</td>
<td>2 112</td>
<td>2 681</td>
<td>3 210</td>
<td>4 015</td>
</tr>
</tbody>
</table>

资料来源：《中国科技统计年鉴》（2011年）。

作为科技大国，中国的研发支出自2005年保持了20%以上的增长速度，2010年达到1 120亿美元。研发支出占GDP的比重在十年间翻了一番，2010年达到1.76%（详细情况见表10）。中国的研究人员数量位居世界第二，仅次于美国。全国218个国家重点实验室覆盖了全部基础科学领域。国家创新体系的持续进步使创新成果层出不穷。例如，中国的科技论文发表数量位居全球第二，居民专利申请数量全球第一（详细情况见表11）。

表 10
中国的研发投入与产出

<table>
<thead>
<tr>
<th>指标</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>研发支出（亿美元）</td>
<td>387</td>
<td>475</td>
<td>585</td>
<td>730</td>
<td>918</td>
<td>1 117</td>
</tr>
<tr>
<td>研发支出占GDP的比重（%）</td>
<td>1.32</td>
<td>1.39</td>
<td>1.4</td>
<td>1.47</td>
<td>1.7</td>
<td>1.76</td>
</tr>
<tr>
<td>研发增长速度（%）</td>
<td>24.6</td>
<td>22.6</td>
<td>23.5</td>
<td>24.4</td>
<td>25.7</td>
<td>21.7</td>
</tr>
<tr>
<td>全职研发人员</td>
<td>136 500</td>
<td>150 200</td>
<td>173 600</td>
<td>196 500</td>
<td>229 100</td>
<td>255 400</td>
</tr>
<tr>
<td>博士生毕业人数</td>
<td>27 680</td>
<td>36 250</td>
<td>41 460</td>
<td>43 760</td>
<td>48 660</td>
<td>48 990</td>
</tr>
<tr>
<td>受理的国内专利申请</td>
<td>38 320</td>
<td>47 030</td>
<td>58 650</td>
<td>71 710</td>
<td>87 760</td>
<td>110 940</td>
</tr>
<tr>
<td>国内授权专利</td>
<td>17 160</td>
<td>22 390</td>
<td>30 160</td>
<td>35 240</td>
<td>50 180</td>
<td>74 060</td>
</tr>
<tr>
<td>申请国际专利</td>
<td>17 330</td>
<td>21 050</td>
<td>24 520</td>
<td>28 980</td>
<td>31 460</td>
<td>39 120</td>
</tr>
<tr>
<td>授予的国际专利</td>
<td>5 330</td>
<td>5 780</td>
<td>6 790</td>
<td>9 370</td>
<td>12 840</td>
<td>13 510</td>
</tr>
<tr>
<td>SCI收录的中国科技人员发表的论文数</td>
<td>63 150</td>
<td>71 180</td>
<td>79 670</td>
<td>95 510</td>
<td>108 810</td>
<td></td>
</tr>
</tbody>
</table>

资料来源：《中国科技统计年鉴》（2006～2011）；《世界知识产权指标报告》（2006～2011）。

---

### 表 11  
主要国家的教育、技术和创新指标

<table>
<thead>
<tr>
<th>指标</th>
<th>国家</th>
<th>印度</th>
<th>中国</th>
<th>韩国</th>
<th>巴西</th>
<th>俄罗斯</th>
<th>美国</th>
<th>日本</th>
<th>南非</th>
</tr>
</thead>
<tbody>
<tr>
<td>居民专利申请数（2010）（个）</td>
<td></td>
<td>7.26</td>
<td>293.07</td>
<td>131.81</td>
<td>2.71</td>
<td>28.72</td>
<td>241.98</td>
<td>290.08</td>
<td>0.82</td>
</tr>
<tr>
<td>科技文章发表数（2009）（篇）</td>
<td></td>
<td>19.92</td>
<td>74.02</td>
<td>22.27</td>
<td>12.31</td>
<td>14.02</td>
<td>208.60</td>
<td>49.63</td>
<td>2.86</td>
</tr>
<tr>
<td>教育经常性开支占比（2009）（%）</td>
<td></td>
<td>3.07</td>
<td>1.8</td>
<td>3.94</td>
<td>4.82</td>
<td>3.54</td>
<td>4.79</td>
<td>3.19</td>
<td>5.43</td>
</tr>
<tr>
<td>中学生与教师数量比</td>
<td></td>
<td>32.70</td>
<td>15.46</td>
<td>17.98</td>
<td>17.14</td>
<td>8.47</td>
<td>13.76</td>
<td>11.97</td>
<td>25.05</td>
</tr>
<tr>
<td>高等教育入学率（2009）（%）</td>
<td></td>
<td>16.23</td>
<td>25.95</td>
<td>—</td>
<td>36.07</td>
<td>75.89</td>
<td>94.81</td>
<td>59.02</td>
<td>—</td>
</tr>
<tr>
<td>每百万人中研究人员数量（2008）</td>
<td></td>
<td>137</td>
<td>1071</td>
<td>6286</td>
<td>1100</td>
<td>2581</td>
<td>4663</td>
<td>7038</td>
<td>821</td>
</tr>
<tr>
<td>研发总支出占 GDP 百分比（2009）</td>
<td></td>
<td>0.76</td>
<td>1.70</td>
<td>3.36</td>
<td>1.08</td>
<td>1.25</td>
<td>2.79</td>
<td>3.45</td>
<td>0.93</td>
</tr>
<tr>
<td>科研机构质量（1 = 非常差，7 = 在本领域国际范围内最佳）</td>
<td></td>
<td>4.51</td>
<td>4.31</td>
<td>4.82</td>
<td>4.14</td>
<td>3.84</td>
<td>5.83</td>
<td>5.54</td>
<td>4.67</td>
</tr>
<tr>
<td>大学/产业合作研究（2011）（1 = 没有合作；7 = 广泛合作）</td>
<td></td>
<td>3.82</td>
<td>4.53</td>
<td>4.66</td>
<td>4.20</td>
<td>3.49</td>
<td>5.71</td>
<td>5.06</td>
<td>4.62</td>
</tr>
<tr>
<td>2011 年风险资本交易数量/每兆单位，以购买力平价计算 GDP</td>
<td></td>
<td>51</td>
<td>32.3</td>
<td>45.6</td>
<td>10.0</td>
<td>7.2</td>
<td>243.3</td>
<td>6.4</td>
<td>16.2</td>
</tr>
<tr>
<td>2010 年国内居民专利申请数/每十亿单位，以购买力平价计算 GDP</td>
<td></td>
<td>1.99</td>
<td>28.96</td>
<td>89.90</td>
<td>1.24</td>
<td>13.01</td>
<td>16.66</td>
<td>67.1</td>
<td>1.56</td>
</tr>
<tr>
<td>2009 年科技文章数/每十亿单位，以购买力平价计算 GDP</td>
<td></td>
<td>5.47</td>
<td>8.16</td>
<td>16.31</td>
<td>6.14</td>
<td>6.61</td>
<td>14.97</td>
<td>12.1</td>
<td>5.67</td>
</tr>
<tr>
<td>国内商标注册数/每十亿单位，以购买力平价计算 GDP</td>
<td></td>
<td>—</td>
<td>119.71</td>
<td>32.95</td>
<td>21.93</td>
<td>28.81</td>
<td>11.25</td>
<td>—</td>
<td>65.53</td>
</tr>
<tr>
<td>2010 年高科技净出口占净出口总量份额（%）</td>
<td></td>
<td>4.84</td>
<td>30.06</td>
<td>24.04</td>
<td>3.57</td>
<td>1.35</td>
<td>14.76</td>
<td>16.2</td>
<td>2.16</td>
</tr>
</tbody>
</table>

资料来源：全球创新指数（2012），2012 年世界发展指标。
中国的科技能力领先于金砖国家，并正在快速追赶 OECD 国家。借助综合性的国家创新体系，中国在创新指数排行榜上位列第 29 名，在一些关键性的创新指标上位居金砖国家之首（详细情况见图 14）。实际上，中国动用了大量科技人力资源，用于提升经济发展的技术水平，并成为全球人才争夺中的关键力量（详细情况见表 12）。此外，一些科技发展的配套机构，如咨询公司、信息服务公司和风险资本等也都蓬勃发展。除了基础研究，中国的工业研发力量也在加强，以研发投入衡量，新兴经济体中领先的 15 家公司中有 5 家来自中国。①

**图 14 金砖国家创新指数的排名**

资料来源：全球竞争力报告（2011～2012），世界经济论坛。

4. 快速发展的私营部门拥有较强的制造业能力

中国的私营部门不断融入国家创新体系，为包容性创新的商业活动提供了坚实基础。官方数据指出，私营科技企业的数量②从 1986 年的 7 000 家增至 2006 年的 15 万家。在大中型工业企业中，私营企业的研发支出在 2006 年仅有 105 亿元，只占到国有企业的 63%，但到了 2010 年便达到 413 亿元，

① 监测工业研究：《2014 欧盟工业研究计分牌欧盟委员会（2011）和 OECD 科学、技术和产业展望》。
② 纳入官方统计的科技型私营企业主要指，经营范围为技术收购、技术转移和产业化，开展研发支出，拥有研发人员的企业，并应拥有某些科技产出和成果，如专利和新产品。
超过了 2010 年国有企业的支出额（详细情况见表 6）。此外，中国大中型私营
工业企业在国内申请的发明专利数量从 2006 年的 1885 项猛增到 2010 年的 8659 项。① 中国许多私营企业的科技实力正在快速提高，其中一些正在
接近国际技术前沿，例如，ICT 行业的华为和中兴，太阳能行业的尚德和工
程行业的大连机床集团。

<table>
<thead>
<tr>
<th>表 12</th>
<th>大中型工业企业的研发支出</th>
<th>单位：亿元</th>
</tr>
</thead>
<tbody>
<tr>
<td>企业类型</td>
<td>年份</td>
<td>2006</td>
</tr>
<tr>
<td>国有企业</td>
<td></td>
<td>165</td>
</tr>
<tr>
<td>私营企业</td>
<td></td>
<td>105</td>
</tr>
<tr>
<td>外资企业</td>
<td></td>
<td>444</td>
</tr>
</tbody>
</table>

资料来源：《中国统计年鉴》（2011）。

中国拥有强大的制造业能力和充足的低成本、高素质劳动力，具备生产
物美价廉产品的突出实力。低成本制造能力和研发实力的结合，为包容性创
新提供了可能。包容性创新需要突破大规模生产所需的复杂机器、密集自动
化、大量资本支出，以及机械性地将这些因素进行重新组合，才能满足 BoP
的需求和当地的资源特点。越来越多的私营公司正在瞄准和成功进入 BoP
市场以服务这些客户。那些与 BoP 联系紧密的企业在理解 BoP 群体需求、
发现商业机会方面拥有天然的优势。金融领域的宜信公司、家用电器行业的
海尔公司和能源领域的清华阳光公司，都是这方面的成功案例。许多地方企
业利用成功的创新型商业模式，来充分发掘低成本制造能力的优势，而不是
机械地依赖于提供低成本解决方案。例如，比亚迪汽车公司突破了电池生产
中的自动化模式，通过采取半自动半人工的方式，大幅降低了电池价格，从
而为那些需要电池作为关键原件的产品提供了低成本解决方案。

5. 庞大的 BoP 市场拥有不断增长的购买力

中国庞大的 BoP 市场拥有巨大的潜在购买力。按每天 1.25 美元（2005

① 《中国统计年鉴》（2011）。
年购买力平价指数）计算，2005 年中国生活在贫困线以下的人口有 1.73 亿；如果按 2 美元（2005 年购买力平价指数）计算，BoP 人群的数量为 3.94 亿。无论按照哪种标准，中国目前拥有世界上第二大的 BoP 人口，仅次于印度，占到全球 BoP 人口总量的 13%。① 中国的 BoP 主要集中在农村地区。② 此外，2.5 亿的农民工群体也属于重要的弱势群体。尽管大量的农民工迁移并定居在城市，但是却无法享受当地居民（受户口制度所限）所能享受的几乎所有非收入性福利，包括房屋的质量和成本、受教育机会、社会救助机会等。

随着消费的增加，中国的 BoP 市场正在快速增长，显示出包容性创新的巨大潜力。从 2005 年至 2010 年，低收入农村居民的消费支出从 1 548 元增加到 2 535 元。随着收入的增加，食品支出所占的份额在下降，用于交通、通信、家庭装备和医疗服务的支出在快速增长。巨大的 BoP 市场为私营部门提供了新的增长机会，通过参与包容性创新来扩大规模、降低成本和提高产品质量。BoP 市场还可以加深对需要解决的问题和需求的理解。当企业尝试进入这一市场，关注 BoP 消费者的兴趣和需求时，便能够促进竞争、增强竞争力，并在巨大利润的支撑下实现行业的快速增长。

二、中国包容性创新项目和行动情况

1. 政府项目和行动

中国政府已经采取了大量举措，向农村引进和推广创新。一个突出的例子便是始于 1986 年的星火计划。该计划旨在传播先进技术和应用技术，促

① 这不包括那些收入相对较高的弱势群体，他们同样缺少生活的基本必需品，例如，清洁饮用水和污水处理服务、廉租房、高质量的教育、医疗和现代金融服务。

② 根据世界银行的最新评估报告（世界银行：《从贫困地区到贫困人口：中国扶贫议程的进展（2009 年）》），按照世界银行贫困线——以 2003 年农村（城市）价格计算，人均年收入 1 124 元的标准——有 93.3% 的 BoP 人群生活在农村地区，5.9% 是连续六个月以上生活在城市的农民工，0.8% 是城市居民。
进农业和农村地区的发展（详细情况见专栏6）。在过去五年，中央政府平均每年向星火计划拨款1.5亿元（约合2370万美元）。在20世纪90年代后期，用于传播实用技术的医疗类项目和行动也进入农村医院和诊所。由于城乡在信息技术领域存在巨大差距，在21世纪初，政府开展了各类远程教育和远程医疗项目，向农村提供先进的医疗和教育资源。

专栏6

中国的星火计划

1986年，中国科技部启动了星火计划，并很快推广到中国每一个省。其名称源自一句中国格言“星星之火、可以燎原”，意思是科技之火将遍布中国的广大农村地区。计划的主要目标是向农村地区传播和推广技术和知识，从而促进当地农业和其他行业的发展，使农村的家家户户从中受益。

星火计划的发展分为三个阶段。1994年以前，星火计划主要通过资金拨付支持乡镇企业，为农民提供技术培训，利用研究机构的专业技能来解决当地面临的技术难题。1994年后出现了一些较大的变化，支持星火计划的资金从政府机构转向银行贷款和参与者自筹，扶持方向也转为支持私营企业和农村企业。同样，当地政府在项目的选择、实施和支持力度上都发挥了重要作用。最近几年，星火计划的范围更加综合。一些新推出的项目获得了星火计划的资助，包括促进农村信息化发展的项目、农村科技特派员项目、为农民提供技术培训、支持农村技术园区和农村产业集群的建设、向穷人传播技术等。

在“十一五”规划期间（2006～2010年），星火计划包含了5.7万个项目，总投资达到1940亿元。在20世纪80年代末、90年代初，该项目在政府研发支出中占到相当高的比例，但是近年来，中央政府只为其中一些重大项目提供了少量资金支持（平均每个项目1.5亿元），这些重大项目由地方农业厅和科技厅推荐，并经科技部批准。尽管地方政府能够提供一些配套资金，但是这些项目的资金主要来自银行和私营企业。

资料来源：马克·杜茨主编：《释放印度的创新潜力：实现可持续性和包容性增长》（第四章），世界银行，2007年。部分资料来自对科技部中国农村技术开发中心的访谈。

随着建设和谐社会成为中国政府的首要任务，更多的工作被用于推广与弱势群体相关的创新活动。“十一五”规划期间，大量领域开展了各类针对弱势人群的项目，包括污水处理、医疗、教育、交通、能源和生态环境
（详细情况见表 13）。加强科技惠民成为国家“十二五”科技发展规划的一大特点。其中一些优先发展领域与包容性创新密切相关，例如，加强农业技术的推广和传播、开发全国卫生信息技术系统等。

表 13  政府为弱势群体提供的各类创新推广项目

<table>
<thead>
<tr>
<th>领域</th>
<th>牵头单位</th>
<th>启动时间</th>
<th>项目内容</th>
<th>措施</th>
</tr>
</thead>
<tbody>
<tr>
<td>医疗</td>
<td>科技部、卫生部</td>
<td>2008</td>
<td>组织跨区域的远程医疗服务；治疗帕金森症的深层脑部刺激疗法；多层面螺旋 CT；自生化分析仪；电生理抗体成像术</td>
<td></td>
</tr>
<tr>
<td>污水处理，生态环境</td>
<td>科技部、环保部</td>
<td>2006</td>
<td>饮用水净化技术；大气污染控制技术；废旧电器的回收</td>
<td>汽车尾气净化器</td>
</tr>
<tr>
<td>教育</td>
<td>科技部、教育部</td>
<td>2006</td>
<td>国家数字教育资源公共服务平台；课程项目；国家终身学习平台</td>
<td>建立服务于终身学习社会的公共教育平台</td>
</tr>
<tr>
<td>能源</td>
<td>财政部、科技部、能源局</td>
<td>2009</td>
<td>金太阳工程——在不通电的偏远地区安装光伏发电</td>
<td></td>
</tr>
<tr>
<td>农业</td>
<td>科技部、农业部</td>
<td>2009</td>
<td>派遣科技特派员帮助农民创业；“十一五”期间共增产 4800 万吨粮食</td>
<td>17 余万科技特派员被派往全国各地</td>
</tr>
<tr>
<td>农业</td>
<td>科技部</td>
<td>2006</td>
<td>国家粮食丰产科技项目；“十一五”期间共增产 4800 万吨粮食</td>
<td>“十一五”期间共增产 4800 万吨粮食</td>
</tr>
<tr>
<td>信息通讯技术</td>
<td>科技部、工信部</td>
<td>2010</td>
<td>在山东和湖南开展的农村信息化工程；建立了省级 ICT 综合农村服务平台</td>
<td></td>
</tr>
</tbody>
</table>

资料来源：科技部关于民生科技的新闻发布会。

政府利用公共资金支持服务与弱势群体的创新，包括为基础研究提供资金，为创新商业化和扩散提供资金支持。例如，2010 年，政府为深圳先进技术研究院的生物、医疗和健康工程部门提供了至少 2 亿元资金（作为主要资金来源），支持其开展低成本医疗服务研究。同时，政府也在逐步转型，从单一的费用提供者转向吸引私人投资参与某些领域的开发。例如，2010 年，农业产业投资基金从中央政府获得了 4.39 亿元投资，从地方政府获得了 8900 万元的配套资金，并成功地从银行和私营企业吸引资金 28.36 亿元。

政府同时利用财政政策激励私营部门进入 BoP 市场。例如，2007 年实
施的家电下乡政策。这一政策为农村居民购买电视、冰箱、手机和其他家用电器提供 13% 的补贴。中央政府提供了全部补贴资金的 80%，省级政府承担了其余补贴。2010 年，农村地区卖出了 7 718 万各类补贴家电产品，销售额达到 1 732.3 亿元。冰箱和电视占到全部销售额的 61%。① 在这一补贴政策推动下，一些具有包容性创新特征的产品如低成本太阳能热水器，得以进入农村市场，供 BoP 人群使用。2010 年，太阳能行业集中了 3 000 家公司，员工总数达到 300 万，太阳能电热产品的营业额约 6 亿元。

中国政府还利用与地方企业（主要是国有企业）的合作来实施包容性创新项目。农村信息化网络平台项目就是政企合作的一个成功范例。该项目由工信部和农业部于 2004 年联合启动，目的是为农民提供信息技术服务。两大部门与中国移动建立了合作伙伴关系，双方根据各自职能和资源优势，划定任务和责任范围，从而为合作建立了清晰架构。截至 2008 年年底，该平台覆盖了 97.35% 的农村地区，用户超过 4 036 万。虽然项目前期投资高达 195 亿元，但自 2009 年起便实现盈利。②

政府也发挥协调作用，促进企业和高校实验室之间的合作。一个典型的例子是由科技部和农业部启动的农村科技特派员项目。在该项目中，政府鼓励专家、教授、研究者和博士前往农村，实现其创新产品的产业化，并建立农村科技园。通过这种方式，由政府组织的科技特派员成为研究机构和企业之间的中介，密切了产学研合作。农村科技特派员项目发源于 1998 年的福建南平市，并于 21 世纪初快速传遍全国。到 2011 年年底，全国共有 17 万名科技特派员，5 000 万农户因此受益。③

政府支持技术园区和商业孵化器开展创新产业化活动。各类的农村科技园区被用于促进农村创新的产业化和商业化。它们是农业科技、技术成果转化和现代农业生产集中创造和展示的场所。这些园区结合技术与资本，通过吸引领先的农业企业，组织农户参与高附加值的生产，来提高农业生产率。


② Genia Kostka 和周江华：《进军中国的低收入市场：多方伙伴关系的成功要素》，载《工作论文》2012 年。

③ 中国农村技术开发中心主任贾敬敦所做报告，http://www.most.gov.cn/ztl/qgkjtpygz/kjt-pxdsal/200911/t20091102_73947.htm。
例如，2009 年，天津郊区建立了一家农业技术园，启动资本为 1.5 亿元，
主要来自科技园所在村庄的房地产收入。该园区建立的平台用于吸引农业领先
企业，并组织农民种植高附加值的蘑菇。园区提供土地和厂房，企业利用
现代技术来实现农业创新的产业化和商业化。

此外，一些政府采购措施支持了包容性创新发展。在过去几年，中国政府
采购的规模和范围迅速扩大。因此，一些与包容性创新有关的产品被列
入政府采购计划。例如，在山西省、湖北省和深圳市，由深圳先进技术研究
院发明并被用于乡村诊所的多功能诊断床，被列入社区医疗服务设备的政府
采购名单。“初次购买”计划确保了大宗采购，使得私营部门生产包容性创
新产品更具吸引力。2009 年 4 月，常熟市政府与江苏龙芯梦兰技术公司签
署协议，购买 1 万台低成本的龙芯电脑，用于中小学的数字教室。随后，
在科技部的资金支持下，财政部、农业部和江苏省政府计划投资 3.5 亿元，
购买 15 万台龙芯电脑，用于当地农村学校的多媒体教育。

2. 高校和研究机构的活动

在中国，研究机构和高校在支持包容性创新发展中发挥了重要作用。作
为重要的研发执行机构和知识存储库，研发机构拥有的强大研究能力使其能
够提供包容性创新所需的技术。例如，成立于 2009 年的清华绿色跨境研究
中心联合美国康奈尔大学，参与国际 BoP 网络以促进中国 BoP 的研究。中
国科学院将低成本医疗系统作为其“创新 2020”计划中的战略要素。中科院
下属的 30 余家研究机构参加了医疗设备和健康服务研究，特别是深圳先进
技术研究院、苏州生物医学工程技术研究所、上海高等研究院，成为研究
低成本医疗服务的主力军（详细情况见专栏 7）。在采用由深圳先进院自主
开发的医疗芯片后，农村诊所安装的诊断和监测设备价格显著下降。例如，
一台多功能诊断床的价格为 3.5 万元（约合 5000 美元），而大医院的进口

---

① 政府采购现已覆盖种子和农业机械、基本药物和疫苗、教科书和云计算。

② 龙芯电脑最初是由中科院计算技术研究所开发的，因其低成本和低耗电量被誉为“穷人的
CPU”。2006 年，这款低成本的电脑售价仅 1599 元（约合 250 美元），12 英寸的笔记本电脑售价为
2000 元，采用了低成本的龙芯-2E CPU。
诊疗设备价格通常高达百万元人民币。但是，该项目的主要参与者都是国有企业，私营部门的参与必将大大降低其未来研发费用。

与此同时，高校和研究机构同样能够受益于包容性创新。例如，深圳先进技术研究院申请的专利数量占到低成本医疗设备专利的 80%，并成为该行业的重要领导者。参与包容性创新为深圳先进技术研究院带来了良好声誉。国家自然科学基金 (NSFC) 于 2009 年启动了与包容性创新相关的项目，教育部、国家社会科学基金同样自 2009 年起对此类项目给予资助。此外，包容性创新能够提供各类教育经验。例如，宜信公司入选 2009～2010 年中国 MBA 企业案例大赛。

此外，中国已经拥有庞大的农村公共研究体系，包括 1 237 家农业研发机构和 888 家农业大学或技术学院。农业研究体系覆盖广泛，如开发新的农作物品种，提高小农户的产量。例如，已经培育出的超级杂交稻和矮秆小麦。高产育种已经获得成功并被农民广泛使用。采用先进技术同样可以提高生产效率。例如，基于组织培养的抗病土豆，在山东省的种植面积已经达到 5 万公顷，其产量提高了 30%～40%。

专栏 7

低成本的“海终端”——适合农村诊所

由深圳先进技术研究院开发的“海终端”主要由两部分构成：一是便携式出诊包，二是多功能检查床。

便携式出诊包。便携式出诊包又被称为多参数体验包，适用于人口分散的农村和牧区。它可以集成 7 导心电图、11 项尿常规、自动血压和无创血氧、还能监测人体的呼吸、体温和脉搏；出诊包还配有蓝牙功能模块，可供村民在出诊归来后将体验信息无线回传到多功能检查床上。

适合农村卫生室的多功能健康检查床。该设备适用于人口较为集中的农村，包括多功能健康检查床、多参数健康检查仪、全科诊断系统及相关医疗软件系统，集合了基础检查功能，包括血液分析、尿液分析、十二导心电图、无创血压、血氧、监护、全科系统（视力、色盲、内科、外科、眼底镜、耳镜）等检查功能，结合了医生工作站软件
系统并采用电子健康档案建立及管理系统。整套设备能够基本满足农民所需要的基础医疗检查，有效解决了目前农村基础设备严重缺乏的问题，而价格则只需3.5万元，农民每次体检的费用只需30元左右，并能够在10分钟内完成十多个体检项目。目前，这张床已销往吉林、山东、四川、江苏、广东、上海等20多个省市，同时已被列入陕西省、湖北省、深圳市等社区卫生服务建设设备采购目录。

新疆低成本健康医疗服务系统应用示范项目。新疆地处中国西北边陲，2 100 多万人口中有1 200 多万居住在农村，其中大部分为少民群体，就医环境极为简陋。中科学院新疆分院针对这一现状，与深圳先进技术研究院、新疆西北信信息公司合作，在已有新疆低成本健康“三基”医疗网底工程基础上，建立能够为基层医疗机构提供标准化、低成本、易使用、易维护的整合低成本健康基层医疗服务体系。项目将在新疆50 家以上社区基层医疗机构、10家以上乡医疗机构建立应用示范，进而向全疆进行大范围推广应用。该项目包括了基层健康数据采集、基层健康信息云服务、健康数据集中存储和统计分析等若干部分，构成医疗健康领域的“物联网”，在传统医疗服务信息系统的基础上，进一步将智能感知、智能数据获取、数据存储等纳入医疗健康领域。项目将研究所科技成果与地方社会经济发展的迫切需求紧密联系，基于已有科技成果转化产品化研发、转化，为地方社会经济发展服务。

手机诊断。与传统的医疗技术相比，手机医疗设备具有很多优势，例如，可移动性、无线连接、互联网服务、多媒体、数据储存、数据管理和计算、传感器技术，以及良好的用户体验，因此表达了新兴生物医学工程技术的未来。由中科院理化技术研究所和清华大学联合成立的医疗技术团队，获得了大量实验室发现，并可以进行商业化操作。例如，手机可以被用于对病人的长期观察，这对于需要密切观察的疾病来说非常重要。由于缺少合适的设备，长期以来对打鼾难以治疗。现在，只要病患在身体上连接一个声音传感器，就能记录打鼾的强度和时间，并将这些数据通过手机实时或按计划进行传送。对于药物类药物，可以把传感器放到鞋上，记录人体运动时的强度和频率，甚至能够重现一个人一整天的活动。

资料来源：《低成本医疗离我们还有多远》，见《南方日报》2011 年3月23日。

高校和研究机构的另一个重要作用便是与企业合作，促进包容性技术的推广。这种合作的形式包括通过联合研究或技术许可而形成的衍生企业和产学研技术联盟。前者代表为清华阳光能源开发公司，作为清华大学的衍生企业，向农村地区推广该校的太阳能热利用技术。后者的典型例子是深圳先进技术研究院和深圳中科强华科技公司。作为重要的研发执行机构和知识存
储库，研究院所拥有的强大研究实力使其能够提供包容性创新所需的技术。但是，这些做法仍是个例，尚未充分挖掘其潜力。如果将前沿科技与弱势群体的特殊需求相结合，并寻求私营部门的更广泛参与，那么这些研究机构便能够创造出更多的包容性创新解决方案。

3. 私营部门的行动

尽管面临诸多挑战，例如，缺少市场信息、知识和技能匮乏、基础设施不够完善、融资服务狭窄等，但许多企业仍在推动中国的包容性创新发展。通过与包容性创新企业和专家的座谈，可以发现这些中国的包容性创新解决方案形式多样、不拘一格。一些企业向弱势群体提供医疗、电力和信贷服务，还有一些企业为 Bop 群体提供支付得起的创新产品，如手机、太阳能热水器，以提高弱势群体的生活水平。形式包括：（1）利用技术创新提供支付得起、可接受的产品；（2）重组价值链，利用当地资源提高地方能力；（3）用创新性的方式来克服基础设施和其他瓶颈；（4）利用其他机构的能力和资源，共同创造包容性创新解决方案。

利用技术创新来提供支付得起并被接受的产品。中国企业为 Bop 市场设计新的产品，而不仅仅是提供与发达经济体的成熟市场相同的产品。他们利用先进技术，创造出包容性的商业模式，在成功地进行产品改造的同时大幅降低成本。例如，联发科公司生产出无线通信领域的系统芯片，这种芯片显著降低了生产的技术门槛并大幅降低了成本。这一创新使得手机的价格可以低至 20 美元，从而使手机在中国和其他发展中国家成为 Bop 群体支付得起的产品。联发科也因此成为继高通公司之后，在手机芯片领域的全球第二大半导体厂商。许多地方企业都生产电动自行车。在这一领域，电池被用作替代摩托车的传统引擎，但在设计上更加简单，价格低廉，从而成为许多 Bop 群体的选择。海尔公司发明了价格低廉的洗衣机，主要满足农村用户的需求，包括增加一些额外的功能，如用洗衣机洗蔬菜和应对不利的基础设施条件（电压不稳）。特变电工公司开发了一种小型的光伏发电设备，白天安装在骆驼身上，利用骆驼搬运货物的同时用来发电和储能。存储后的太阳能可以在晚上为家用电器发电。此外，另一家叫作天合太阳能的江苏公司也开发出了类似产品。风电行业也存在类似
的商业模式，例如，金风科技能够为农民提供小型的离网风力发电机。反过来，
对能源的利用可以使生产方式更加高效，增强了利用其他产品和服务的能力，
从而为创造更多的包容性商业模式提供了可能。

重组价值链，并利用当地资源来提高地方发展能力。例如，中国的太阳能
热水器公司改变了传统的农村超市销售模式，深深植根于当地网络，获得
一手信息，从而使经营更加高效，并在消费者中建立信任。电热水器在中国
农村市场的广泛传播便是其中的一个典型案例。南京九康生物科技发展公司
利用嫁接技术，培育了一种新型的栋树，能够生长在高海拔地区，种植面积
可覆盖近半个中国。公司采用“企业+农户”的方式，向当地农民提供外包。
舜华鸭业发展有限公司则采用“企业+协会+农户”的模式，租用湖泊
或水库开展鸭子养殖。

利用创新性的方式克服基础设施和其他瓶颈。全景赛斯公司利用基于云
计算的网络培训模式，帮助农村地区建立低成本的网络培训系统，为弱势群
体提供教育和培训。海尔公司开发的宽电压带家用电器，解决了农村电网电
压不稳的问题。生产太阳能热水器的皇明太阳能公司，在全国范围内提供太
阳能的相关培训，扩大潜在需求和提高品牌知名度，增强了对品牌的信任
度。宜信公司作为一家金融服务公司，通过互联网提供个人对个人的微小金
融服务，并引进孟加拉乡村银行的微小信贷模式，即通过网络平台连接 BoP
和城市中的资金。该公司还与地方扶贫机构合作，向其信贷客户提供金融扶
贫服务，或向其小企业客户提供记账乃至企业管理服务。

利用其他机构的能力和资源，共同创造包容性创新解决方案。为了解决
与 BoP 和其他弱势群体做生意所面临的挑战，不同机构之间正在建立合作者
伙伴关系，开发产品、服务和配送机制。这种非传统意义上的伙伴关系变得尤
为重要，特别是对于成本共担、分享能力和知识、填补现有体系的空缺。一
些公司擅长包容性创新的设计和执行，而另一些企业则擅长整合流程。例如,
GE 公司和地方政府合作，推出了“健康创想”（Health Imagination）战略”①。
GE 公司联合地方供应链，为农村医院提供支付得起的定制化服务，而地方政府

① GE 公司于 2009 年提出了“健康创想”计划，旨在开发创新型技术，满足新兴经济体不断
增长的医疗需求。该计划将在 6 年时间内投资 3 亿美元，开发 100 款价格低廉的医疗设备，50 款多
功能、用户友好界面，能够将成本降低 15%，并在全球范围内推广。
则帮助推广 GE 产品，并对乡村医生如何使用 GE 的产品进行培训。与 GE 类似的还有西门子的“SMART”战略。① 深圳中科强华科技有限公司和深圳先进技术研究院则是另一类模式。中科强华（属于国企）成立于 2008 年，主要生产和营销由深圳先进技术研究院研发的低成本医疗设备。深圳先进技术研究院负责基础研究和部分应用研究，而强华主要负责流程创新和商业化。在商业化方面，强华还与中科院的其他机构和地方政府一道，推广该产品在农村诊所的应用。

4. 草根创新

在中国，有无数的创新源自草根阶层。例如，穷人创造的和为穷人创造的产品，其领域覆盖广泛，涉及农业、医疗、能源、交通、家庭设施和公共安全。草根创新者都来自非正规部门，包括农民、学生、技工、艺术家、退休工人或企业家。与正规部门的创新类似，草根创新还包括技术创新和组织创新。② 许多草根创新者致力于解决穷人的特殊需求，而这些需求通常被正规部门所忽略（详细情况见专栏 8）。在绝大多数情况下，草根创新者并不具备商业头脑。他们出于各种目的开展创新，有的纯粹出于兴趣，有的是为了改善生产条件，有的是为了帮助他人，有的则是废品利用。大量的草根创新者存在于公共领域，个人或机构都可以免费使用其产品。

专栏 8

草根创新者解决穷人的实际问题

警报器。2001 年，天津市北辰区大张庄镇的赵同乡（音）和几个电工，生产了一种警报器。市场上的警报器价格高，村里的领导希望他们帮忙制造。他们发明了一款成本仅 100 元的简易警报器，比市场上的同类产品要便宜很多。当地政府在大张庄镇组织了现场会，推广这项创新，有 20 多个村镇采用了这款产品。

① 西门子公司于 2006 年启动了“SMART”战略，即“简单易用、维护方便、价格适当、可靠耐用、及时上市”，从而为农村地区提供低成本的医疗解决方案。
② 对中国的草根创新，可详见蜜蜂通讯（Honey Bee Newsletter）：《中国创造：中国创新案例精选》(2009～2011 年)。
洋葱授粉。过度使用农药和杀虫剂导致许多蜜蜂死亡，农民只得依靠手工授粉。一种中国产的洋葱能够发出洋葱和大蒜的味道，开花时间需持续一个月。因此，人工授粉的时间会更长，需要的工作量更大。天津的农民开发了一种技术，在洋葱地里堆放腐烂的物质，用于吸引苍蝇——类似蜜蜂授粉。这一创新效率高且成本为零。

播种机。1988 年，河南滑县的一名农村高中学生吕胜庆发明了一种播种机，用于拖拉机播种。当时，农村广泛使用小型拖拉机，但是中国农民使用了 2000 多年的传统播种方法，却不能用于拖拉机。吕胜庆发现他的父母手工播种十分辛苦，并由此驱使他发明了这一机器。

资料来源：天津财经大学创新与创业研究中心。

许多草根创新都属于增量创新，即基于对现有产品的改造。创新者利用现有技术，因地制宜地解决特殊问题。一些当代创新的产生属于不同的个人或团体就同一问题找到不同的解决办法。其中的每一个创新也许都是次优的。但是，当将这些创新汇总起来就会发现，其中一些会相互作用，并由此可能会产生全新的构想。例如，黄土高原上的雨水收集系统，

便基于对传统雨水收集系统的改造和开发。许多发明者利用某一领域中公知的概念或特征，去解决另一个毫不相关的新领域中的问题。这种方式在很多情况下都被证明是有效的，特别是解决顽固性难题或面临的现有问题。例如，草根创新者围绕自行车的一些发明：如用于播种、除草、锄地、扫化肥的犁；从井里汲水的劳动设备；人工驱动的自行车可以将动能转化为电能；自行车呼吸机（一项非常令人吃惊的创新，成功地挽救了河南省安阳市一个 15 岁女孩的生命）。

此外，还有合作性的草根创新，即许多人一起解决自身或他人的问题。例如，中国独一无二的农民研究会，就是旨在促进这种合作性质的创新。一些草根创新者对以前的研究活动进行补充并有所贡献。一个叫郭玉富的农民发明了一种不对行玉米收获机，可以根据不同的玉米行距进行收割，并得以在中国很多省份应用。

冬季（大棚）生产技术产生于 20 世纪 80 年代早

① 吴斌：《中国农村的可持续发展：农民创新和边远地区的自我组织》，劳动利奇出版社 2003年版，143～148 页。

② 过去，玉米收割机只能用于收割固定行距的玉米。
期，是由两名来自辽宁省的农民发明的。这种无须加热即可生产温室黄瓜的
大棚在中国得以普遍推广。山西省一个叫王衡的农民，发明了一种增强型防
水剂，可以在 6 秒的时间内阻挡住 660 立方米/秒的流量，从而成为地下防
水项目的一个重大突破。而他的产品也在中国乃至其他国家得以采用，如日
本、孟加拉国、韩国和摩洛哥。

政府在促进和推广草根创新中发挥了重要作用。例如，农业部和科技部
各自创立了技术创新项目。草根创新者所在的机构，如合作社、研究会、研
究机构、企业和其他机构都可以以个人名义或与正规部门一道进行联合申
请。当郭玉富和王衡成立公司进行业务扩展时，他们申请了政府科技扶持项
目的资金，并成功获得了几轮融资，用于创新升级和推广。许多草根创新产
品的扩散同样得益于正式的技术扩散渠道，如温室大棚技术，主要得益于公
共农业技术推广体系。一些政府项目业已制度化。例如，一年一度的国家科
技进步奖自 2004 年起为基层创新者设立了奖项。由中国科教联合地方政府
举办的全国发明展览会已经成为一项年度性展览。此外，政府还为创新者设
置了其他层级的奖项。

一些支持草根创新的政府类项目，提供创新专利，支持草根创新者参与
展览和评奖，成为草根创新者与政府、企业或潜在投资者的桥梁。媒体在草
根创新的扩散中能够发挥重要作用。例如，中央电视台一档名为“致富经”
的节目，就着重介绍农村企业家的成功经验，使得许多农村创新得以成功推
广。一些国内的研究机构和国外同行也致力于共同促进包容性创新。例如，
天津财经大学和印度可持续技术与机构研究与创建协会（SRISTI），建立和
开发了制度性机制，共同寻找、记录和推广草根创新者，从而有助于加强政
府和其他各方开发草根创新者的能力。该项合作已经创立了一个网上草根创
新者孵化平台，记录了 3 000 余个草根创新案例和 100 段草根创新者视频。①
此外，天津财经大学的学生还帮助草根创新者向政府和其他相关机构进行申
请。②

② 例如，2010 年，一个学生团队帮助一位名叫王金庭（音）的下岗职工发明了一种新的绘画
技术，在沙画中加入了珍珠，实现利润近 8 万元。他们还帮助他获得了地方政府的资助，将他的
工作室变成了一个正规的企业，雇员超过 30 人。
三、促进中国包容性创新的关键和挑战

1. 制度性和政策性框架

中国有许多包容性创新计划和项目，但是缺少明确的包容性创新政策和战略。中国政府在促进包容性增长上的目标十分明确，但是仍缺少对包容性创新的统一举措。尽管各类相关主体提出了许多此类计划，但由于缺乏明确的目标、目的和战略，即如何在全国推动和实施包容性创新，因此，各方的行动仍处于各自为战状态。许多部委、机构和地方政府都做出了积极努力，创造和传播服务于弱势群体的创新，从而间接推动了包容性创新的发展。然而，很少有项目能够囊括包容性创新所要求的全部要素——明确的目标受益人、高质量、支付得起、广覆盖和商业可持续性。一些政府出台的政策有效支撑和促进了包容性创新的发展，但是，从整体来看，缺少专项资金、财政刺激措施、政府采购和其他支持性工具，使得包容性创新缺少有针对性的激励，从而无法发挥其全部潜力。而私营部门和其他各方的有限参与，同样增加了政府推动包容性创新的负担。创新（本身）要求的是“开展并向社会传递”包容性创新。

尽管一些计划包括合作与协调，但有相当一部分仍处于分散、无组织的状态，导致在政府机构中出现大量的职能重叠和空白现象。例如，农业创新一直是政府战略的重点，由农业部科技司和科技部农业司牵头，多家部门协同推进。此外，一些同等重要的领域尚未得到完全重视，例如，提供清洁水、能源、教育、医疗服务。包容性创新要求相关政府机构之间建立协调机制，但是当前的政府结构缺少一种有效的协调机制和高层的协调机构。

此外，国家之间的科技研究机构和扶贫机构之间也有一些合作，但是从总体来看，科技政策与扶贫政策仍然是相互分离的。中国缺少高层次的国家级包容性创新机构，无法对包容性创新的实施实现有效牵头、规划、支持和监督。尽管存在着一些机制，例如，国家扶贫开发领导小组办公室负责牵头
制定扶贫纲要，包括科技部在内的各部委参与；但是，扶贫办并不具备科技扶贫能力，无法解决农民面临的问题，也难以和负责科技创新的部门建立密切合作。由于缺少清晰和统一的包容性创新战略，导致财政资金无法到位。作为公共服务的主要提供方，政府可以从目标明确的包容性创新战略中受益，因为它可以成为减少财政负担的有力工具，同时提高基本公共服务水平。出台统一且协调一致的包容性创新战略将有助于改善财政资源的有效性，特别是在满足国家需求和重点目标的前提下，在不同部门和目标群体间实现合理分配。

2. 政府驱动的政策和项目效果

政府项目和政策的执行主要采取自上而下的方式，其他各方参与有限，特别是私营部门在规划和设计阶段极少参与。随着建设和谐社会成为中国政府的首要日程，一些原则和标准，包括目标受益人、商品和服务的质量和支付得起性已经日益成为政策制定者在项目设计时考虑的重点。一些项目和行动在影响范围和规模上产生了立竿见影的效果，并对促进包容性增长做出了重要贡献。但是，包容性创新的重点领域和实施方式通常都是由政府决定的，缺少对 BoP 实际需求的深刻理解，其商业模式也缺乏可行性。这些因素都会产生问题，如一个地方政府计划向农民提供支付得起的电脑，但是设计时并没有认识到农民并不愿意使用电脑，一方面是因为许多软件程序与这种电脑上安装的 Linux 操作系统不兼容，另一方面在于电脑上安装的许多农业和远程教育软件并不能真正满足农民的需求。

此外，政府倾向于直接提供产品和服务，而不是创造有利的环境，激发私营部门和其他参与者的兴趣。当前许多政府类项目严重依赖于政府资金和财政补贴，如大量的农业和农村 ICT 项目。此外，私营部门的参与进展缓慢，公共领域仍然在此类项目的设计和实施阶段发挥了重要作用。这种方式无法使政府从与私营部门所掌握的资源中受益，这样既难以吸收私营部门的

① 例如，在星火计划中，有超过 4 000 万家庭接受了培训；在科技特派员项目中，有 17 万科技特派员遍布全国，使得逾 5 000 万农村家庭从中获益。
管理和技术经验，也难以获得资金、提高效率和风险承担能力。这并非是长
久之计，并有可能成为政府的沉重负担。一旦经济增速放缓导致财政收入下
降，政府对现有项目的投入便难以为继。因此，在提高公共资源的使用效率
上下功夫，推动包容性创新仍有可为。

最后但同样重要的是，对公共项目的监督和评估仍有待加强。特别是对
于政府主导性项目，仍然缺少系统且独立的监督和对成果及其影响的评价。
官方的口径倾向于强调投入——如投入了多少、支付了多少补贴——而不是
强调实际结果和产出。此外，许多项目中的目标受益人定义模糊，而福利的
提高并不在监督和评估范围之内。在补贴的发放过程中，决策者对于要支持
的项目缺少清晰的成本收益分析。

3. 私营部门行动的覆盖面和可持续性

与政府主导的自上而下模式不同，中国私营部门的包容性创新通常效率
更高、效果更好。这些项目主要受经济利益驱动，私营企业可从中合理利用
资源。然而，许多私营部门开展的包容性创新项目在范围上覆盖有限，并缺
少推广潜力。尽管一些包容性创新产品已经成功打入了某些领域，但是私营
部门的包容性解决方案覆盖面仍然较低。许多创新产品难以推广。这主要是
受企业资源限制，一些地区的因素也影响到了商业模式的有效性。例如，
宜信公司提供的 P2P（个人对个人）微小信贷只应用于有限的村庄，而深
圳先进技术研究院和中科祈乐提供的低成本医疗设备只覆盖了 1000 个村
庄，而全国有 50 万个村庄。如果没有其他合作者的参与，包容性创新模式
将难以得到推广和改进。

此外，一些包容性创新模式的商业可持续性仍是未知的。一些企业，如
联合科，虽然取得了商业上的成功并证明了资金流上的可持续性，但是，另
一些模式在商业可持续性上仍然不够清晰。例如，九康公司设计了一套看上
去可行的商业模式，但是该模式的利益潜力仍然难以确定，这是因为该公司
仅在 2010 年获得了生产杀虫剂的许可，而大规模的商业化生产尚未开始。
同样的问题也出现在由深圳先进技术研究院和中科强华提供的低成本医疗设
备上。这种售价仅 3.5 万元的低成本诊断床，如果年销售量低于 2 万台，就
无法实现盈利。但是，直到今日，该产品的销量仍远低于盈利门槛，这意味着深圳先进技术研究院只能在未来继续投入，推动产品的商业化。

### 4. 高校和公共研究机构的研究方向和激励

投身于包容性创新研究的高校和研究机构数量仍然极为有限。一些高校和公共研发机构的主要方向是农业、能源和健康，而另一些地方性机构只关注社会群体面临的技术问题。清华大学开发的太阳能热水器和深圳先进技术研究院开发的低成本医疗设备便是其中的典型案例。中国大部分研发机构仍然只关注前沿创新，较少关心包容性创新，尽管二者可以相互协调，正如深圳先进技术研究院研发的低成本医疗设备一样。高校和研发机构同样也缺少动力去参与包容性创新研究。尽管在一些农业研发机构，开发和推广实用技术已经被列入对教授的考核体系，但是，当前高校和研究院所的评估体系仍然强调在顶尖出版物上的论文发表数量，因为这有助于提高学校在全球教育体系中的位次。因此，教授和研究员更多地关注于前沿创新，因为在这些领域的国际期刊上更容易发表论文。包容性创新的社会影响面虽大，却难以与现在的评估体系相兼容。因此，教授和学者根本没有动力去参与包容性创新研究。

尽管一些与包容性创新相关的产品和技术已经得到开发，但是仍缺少技术转移和产品商业化。例如，太阳能热水器技术发明 20 年之后，才得以在中国农村迅速推广。而低成本医疗设备的商业化尚未开始。也很少有私营部门和其他实体找到一种可持续的商业模式，来推广并使包容性创新研究走向商业化。其结果便是，对科技资源的大量投入还未能流向包容性创新。公共研发体系和国家创新体系的一些制度性安排无法充分激励对包容性创新的研发投入，也无法转化为创新成果。这种自上而下的模式依然盛行，而弱势群体的实际需求却难以反映在包容性创新研究中。在当前体系下，包容性创新的作用和责任仍然主要由研发团队承担，并没有上升到研究院所的战略性目标中。2010 年，低成本医疗研究被纳入中科院“创新 2020”计划，便是这方面的极好例子，这说明包容性创新融入了研究机构的战略性目标。尽管如此，这种战略性活动在研发机构和高校中仍然极为罕见。
5. 监管和体制性障碍

由于存在许多监管领域的限制，阻碍了包容性创新产品和服务的开发与实施。在认识到开发市场性的创新解决方案后，更多的工作用于解决创新环境瓶颈和促使私营部门参与对穷人的创新。但是，当前的环境并不有利于创新。例如，（1）许多监管措施制约了私营部门参与包容性创新，一些企业如阿里巴巴和宜信都无法获得银行监管机构的支持，难以实现信贷记录方面的数据共享；（2）私营部门在市场竞争和竞争政策上难以与国有企业竞争，如个人便携电话系统（PHS），这种由日本人发明的“为穷人提供的蜂窝数据”，于20世纪90年代中期由UT斯达康公司引进，并在随后十年以极低廉的价格获得迅速发展。但是，2007年，工信部宣布原由PHS占据的数据通道被转换为TD-SCDMA，该产品也被迫退市；（3）一些成本较低的创新产品通常被认为质量不高，而政府则往往对此类产品采取限制措施，而非引导它们提高质量。山寨手机和电动自行车便面临着如此尴尬的境遇；（4）一些创新者，特别是草根创新者无法保护其知识型产品，这既是对知识产权重要性的忽视，也是由于获得专利的法律流程繁复。此外，许多草根创新者和其他发明者没有能力支付申请专利的费用以及年审费。

6. 政府对草根创新的支持

尽管某些政府科技项目和政策能够促进草根创新者的研究，支持草根创新的政府专项资金和项目仍极为有限。一些机构虽积极参与和推广草根创新，但是这些激励措施、政策和制度都远远不够。例如，向农民提供科技培训，提高他们的科技素养和创造力，并在农业生产中利用科技手段提高他们的生活水平。尽管这一做法尚未普及，但是，一些农民研究会和企业已经得到了政府科技项目的资助。例如，农业部和科技部都设立了技术升级和推广项目，包括草根创新者在内的机构，如合作社、研究会、研究机构、企业和其他机构，都可以申请，但是草根创新者需要在申请过程中与正规领域的研究者同场竞技，这使作为弱势群体的农民明显处于劣势状态。尽管草根创新
活动非常踊跃，但是，许多有价值的创新都是彼此孤立的。众所周周，贫困地区的人们面临的问题都有一定的共性，一旦出现解决方案，便可实现共享。但是，到目前为止，大部分草根创新的应用范围都极为有限，具有自发性和非正规性。

7. 包容性创新领域的国际合作

中国正在积极参与一些全球性的公共创新活动，但是从整体上来看，中国和全球科技机构之间的合作仍十分有限。目前，有一些国际性的合作范例，主要是支持满足穷人需求的创新，如比尔—梅琳达·盖茨基金会，他们向中国制药集团捐资开发一种低成本的脊髓灰质炎疫苗。一些外国援助项目也参与全球性包容性创新活动。由复星医药集团生产的物美价廉的药品，便出口到一些非洲国家。尽管如此，中国大部分双边和多边合作仍然集中在前沿创新领域，包容性创新领域的国际合作数量依然稀少。

8. 包容性创新的早期融资

尽管中国的风险资本供应量在不断增加，但是，用于支持小型创新企业扩张的资金仍然非常稀缺。中国的风投（VC）近年来发展迅猛，其在 GDP 中的比重甚至超越了一些 OECD 国家。① 但是，大部分风投基金中的资金都投资于那些处于成长和扩张期的企业，占到 2011 年全部新交易额的 40.9%、投资总额的 27.6% 和处于增长阶段的企业投资的 27.6%。② 尽管中国资金供应并没有限制，但是用于支持包容性创新企业的耐心资本数量十分稀缺，特别是在分配效率和资金增量方面，难以支持企业的风险资金需求和新企业的产品商业化需求。

与 BoP 相关的早期创业资本投资仍然非常有限。中国的风投正在加大

① 2011 年，中国风险投资占 GDP 的 0.171%，而 OECD 排名前五位的国家中，2008 年的平均投资也只占到 GDP 的 0.11%，2009 年为 0.042%。

② 《中国创业风险投资发展报告》（2011）。
对高新行业的支持，特别是一些战略性新兴产业。信息技术已经成为中国
接受风投最多的行业之一，风投的其他主要领域还包括清洁技术、通信、电
力、光电设备、机械制造等。但是，对于那些最有可能满足 BoP 群体需求
的行业，如农业、医疗、教育，却鲜有投资。中国政府正在积极推动国有风
投基金。从 1998 年开始，已经建立了 31 个政府指导基金，资金总量达到
319 亿元（约 47 亿美元）。此类基金通常都具有特殊使命，如为拥有专
业技术的中小企业提供早期创业资金，前提是这些技术要被认定为具有战略
意义。但是，大多数此类基金都集中在公共领域，对解决 BoP 需求的创新
型企业并不能提供太多的支持。

1 包括（a）信息技术；（b）先进材料，如纳米技术；（c）高端制造业、清洁技术和节能技
术；（d）生物技术，应用在医疗、农业和替代能源上的生命科学和技术；（e）新能源。
2 ZeroZipo 研究中心：《2012 年国内按行业分风险资本投资报告》，www. zdlchina.com
4 在中央层面，财政部和科技部于 2007 年 7 月联合建立了引导基金，促进对中小型技术企业
的风险资本投资。2009 年 10 月，中国新兴行业风险资本基金正式成立，旨在为高科技企业从创立
到发展阶段，提供资金支持。
第三章

包容性创新：国际经验

和中国类似，许多国家也开展了包容性创新。他们的经验展示了包容性创新的大量不同类型，包括包容性创新的过程、技术、代理机构以及促进包容性创新发展和应用的政策。

一、全国性的政府措施

许多国家，如巴西、印度、南非、泰国、越南、墨西哥和乌干达，已经启动了促进包容性创新的计划。这些计划在推动各国政府开展包容性创新中发挥了基础性和促进性的作用。总之，这些国家已经成功开展了包容性创新，采取的手段包括：为研发活动提供资金或协调融资，这些研发项目对人的权利将产生特殊的影响；改善政府作为一个市场参与者在提供公共产品中的作用；在不同领域乃至全球建立伙伴关系；促进 BoP 人群和行业间的交流；建设有助于包容性创新的人才网络；减轻监管负担和加强知识产权保护——促进源代码的开放，所有这些都有助于实现包容性创新的商业化，并在一个由私营部门驱动的市场中持续性地进行生产。

① 中国包容性创新现状详见第二章。
当前，包容性创新的主要驱动力来自政府部门、地方政府、RTIs 以及更加成熟、专注和协调一致的全国性项目。一些特殊的政策只能用于解决零散的全国性问题。例如，乌干达卫生部要求政府医疗护理中心使用 K1 自毁式注射器，因其不可重复实用性从而控制血液类疾病的传播。这项要求成为乌干达政府抗击艾滋病传播的一种有效手段，同时也表明政策指令的有效性，能够促进 BoP 创新在更大范围内的使用和传播。一些国家具有较强有利环境、存在大规模的扶贫措施、拥有较好的科技基础设施以及中小企业的健康发展，从而有益于包容性创新的综合性实施。

综合措施在发展广度和深度上都各有不同。2005 年，南非科技部出台了一项名为“能够产生社会影响力的科学技术”计划。该项目旨在实现该国 2002 年国家研究和开发战略中提出的减贫目标，即要求产生更多的“创新”，要“加快开发”，“与早前相比”要能够“提供更多新的、有效的解决办法”。目前，该项目通过南非国家研究基金向包容性创新提供资金支持，并和南非诸多的公共研究机构建立了合作伙伴关系。例如，利用生物多样性和传统知识进行药用植物技术的开发，从而为农民创造可持续性的生计来源。

与南非类似，泰国的公共研究机构同样也参与一系列帮助穷人的项目——随着“全国科学技术和创新政策办公室”这一综合性机构的建立，包容性创新成为泰国“国家科技创新政策十年规划”（2012～2021）的重要组成部分。通过强调科技和工程知识在解决 BoP 人群福祉中的作用，泰国寻求实现其国家创新政策在竞争性目标和社会性目标之间的平衡。与此同时，泰国的现有政策（但规模和影响有限）同样能够促进包容性创新，主要通过一家公共性研发机构——泰国科学和技术研究所（TISTR）来实现。泰国农村的主要融资机构——“乡村基金”和“人民银行”都为 TISTR 在农村的技术推广提供支持。同样，TISTR 的“皇家高地项目”旨在通过开发节能化肥并促进蘑菇种植技术的传播来提高农村妇女的生产力。泰国很早以前（考虑到政治动荡对项目的破坏）就启动了“一村一品”项目，为每个村庄提供技术、管理和资金上的支持，帮助它们生产具有本地特色、融合传统文化的产品，连接国内外市场。

---

同样，越南副总理、科技部部长以及来自主要研发机构、高校和私营机构的领袖们共同承诺，将把包容性创新作为该国科技改革的重要组成部分。越南政府最近也希望获得世界银行的帮助，支持其加强实现包容性创新的能力建设。世界银行将通过下述措施支持其开展相关活动：（1）出台政策；（2）吸收、改造和开发包容性技术；（3）提高中小企业的技术能力。越南当局关注的重点包括：不断扩大的贫富差距，特别是城乡差距；许多少数民族未能从经济腾飞中获益。因此，该国政府也将包容性创新作为解决贫富差距问题的一种手段，同时还将其作为增强企业竞争力、促进私营部门发展并实现中等收入目标的手段。

另外一个案例是印度的国家包容性创新项目。这是一个多角度和协调性较强的项目，旨在综合性地促进包容性创新。考虑到印度拥有的较强技术基础、蓬勃发展的私营部门、BoP 人群的巨大数量，以及不平等现状的巨大挑战，毫无疑问，印度必须采取坚实步骤，使包容性创新的任务得以规范化和制度化。尽管存在大量改进和完善的空间，一项综合性的措施将有助于产生大量的创新，并系统性地将 BoP 人群与现有创新生态系统相连接。印度总理于 2013 年 1 月 3 日正式公布了新的科学、技术和创新政策，其中对包容性创新给予了特别关注。①

该项计划旨在提高印度的整体创新生态体系：印度政府成立了国家创新委员会（NITI Aayog），旨在创造一个创新型的印度。同时在每个邦成立邦创新委员会。截至 2012 年年底，有 19 个邦相继成立创新委员会，中央政府也成立了 19 个部门性创新委员会，为未来十年制定创新路线图。国家创新委员会已经出台 （或计划出台）一系列旨在促进创新和培育创新的政策措施，例如：

（1）出台印度挑战奖励计划；
（2）建立包容性创新的专门奖学金；
（3）在每个教育和培训学院建立县级创新中心，对教师进行培训，使他们成为创造力和创新想法的促进者；
（4）创建国家创新促进服务机构，以取代或加入高校中的国家服务计

① www.dst.gov.in。
② http://innovationcouncil.gov.in/。
划，利用高校学生来发现当地创新；

（5）在国家重大项目研究院所中设立 20 个设计创新中心；

（6）在各地区、各行业和高校中成立创新群，并通过“集聚创新中心”使创新活动生根发芽；

（7）设置印度—欧盟包容性创新联合奖励。

该委员会将包容性创新作为与前沿创新并列的领域，旨在连接国家创新生态体系并满足 BoP 人群的需求。2011 年 11 月，国家创新基金会成立了印度包容性创新基金。该基金（规模计划达到 10 亿美元）的性质属于公私合作，促进企业参与开发包容性解决方案，并将社会性与商业性相结合。为了扩大影响，该基金还从各种渠道寻找潜在的投资对象，无论国内外或者公私营企业。基金会将通过公开广播寻找有潜在的企业，由于其成立和初始运营所产生宣传效应，预计将吸引大量的创新型群体。它可凭借既有投资，来弥补天使基金和风险资本网络在中小企业发展初、中期的缺失，并利用已经制度化的社会创业资金进行投资。考虑到基金的发展重点，在适当的监督和孵化支持前提下，社团类机构（如非营利性机构和 NGOs）将成为企业家和企业重要的融资来源。

为了支持草根创新者——他们受需求驱动的创造力和乡土知识可以激发包容性产品的产生，同时还能创造增加收入的机会。印度科技部于 10 年前成立了国家创新基金会（NIF）。该基金会的主要目标就是为草根创新和绿色创新提供制度化的支持，包括考察、生产、维持和扩大，从而帮助其转化为能够自我维持的活动。2010 年，基金会成为受印度科技部财政补贴的机构①。该基金会还和其他的 NGO、研究机构、行业协会以及微小金融组织建立了合作伙伴关系，因此能够利用这些机构的基础设施、资金和智力资源。国家创新委员会的核心职能如下所述；

（1）通过各种科技网络和其他机构对这些创新进行审查、记录和验证；
（2）将研究成果正式转化为传统知识；
（3）在知识提供者许可的前提下，将创新成果在公共领域进行分享；
（4）提供前案检索（prior art search）服务，以便维持创新者的竞争力；

① http://www.dst.gov.in/。
（5）帮助草根创新者在向企业转让技术时签订许可协议。

印度国家创新基金会还向各种孵化活动中的潜在创新提供技术和有限的金融服务。但是，无论是基金会的运营还是资金来源都是小规模的，因而限制了其活动和影响力。在审查过程中，在将好的创意进行商业化转化过程中，基金会都面临着严峻挑战。尽管如此，该基金会已经建立了一个大型数据库，涵盖了16万余条创新和从全国545个县收集到的创新和传统知识应用，申请了500项专利（包括7项美国专利和一项专利合作条约（PCT）申请），其中，有35项专利已经在印度获得批准，有4项获得美国专利批准。此外，通过其微小风险创新基金，该组织还为175个处于不同孵化阶段的项目提供了风险资金。

印度的研究执行机构，如科学与工业研究理事会（CSIR）①、印度医疗研究理事会（ICMR）②和印度农业研究理事会（ICAR）③，都将包容性创新作为其“十二五”计划的重要组成部分。印度科学与工业研究理事会启动的CSIR–800项目，旨在为印度8亿人均收入不足2美元的群体提供包容性创新服务。这些理事会下辖研究机构，并向高校和研究网络项目提供财力支持，这些研究网络汇聚了各级研究机构以及行业研究中心和私营部门的科学家。在该计划项下，相关国家实验室或其他专业科技研究机构间相互开展合作，从而加强专家力量投入，利用国家科技基础设施并将其与草根科技干预/行动计划相连接。印度医疗研究理事会和国家创新基金会之间的合作便是一个很好的例子，其旨在将印度顶尖医疗研究机构与非正式的、非标准化和非典型的乡土医学知识相互融合，发挥双方的合力。双方的合作重点是基于草根传统医药知识基础之上的药物开发。这种传统医药或是包含新的药用植物（而这种植物又从未被记录在印度的医药文献上），或是现有药用植物的新用法，或是包含多种草药的制剂（而制剂中的成分中应满足以上至少一个条件）。ICMR的工作主要在草根诊治者声称的疗效上，进一步验证其安全性和有效性。这种非正规研究机构和非正规研究领域之间的合作在印度也是一种全新的尝试，特别是在促进社会和农村发展的应用科技领域。

---

① www.csir.res.in。
② http://icmr.nic.in/。
③ http://www.icar.org.in/。
为了促进包容性创新，印度政府作为市场参与者在提供产品方面正发挥更大作用，见如下案例：Aakash——一种来自印度的低成本（35 美元）平板电脑。2010 年 7 月 22 日，印度推出了一种叫作“Aakash”的平板电脑，其目标是在满足教育需求的基础上，以最便宜的价格提供“足够好”的服务。这款产品的开发目的是服务于该国的一项远程教育项目，旨在连接 2.5 万个学院和 400 所大学。作为一款售价仅“35 美元的笔记本”，这款产品成为印度政府的采购对象并分配给高校学生——在新订单出现前的售价为 50 美元，预计最终将实现 35 美元的目标价位。印度政府还将以半价将这款电脑分发给数以千万计的学校。除了从公共研发机构和高校获得早期支持外，政府指令和采购政策还关注 BoP 人群的需求，因为，一旦这些需求得到解决，将产生较大的社会影响，必将大幅减少发展风险，扩大影响范围。实际上，Aakash 电脑的原件全部都是由私营企业通过竞标生产出来的。

二、研究和技术院所（RTIs）

研究和技术院所——无论发达国家或发展中国家——都可以成为促进 BoP 创新的源泉。科学、技术和创新（STI）在发展中国家扶贫中的作用已经得到了广泛了解和认可。千年发展目标（MDGs）中提出的发展重点和令人信服的产出驱动型框架，都有助于利用科技创新政策消除贫困并实现人的权利。如上所述，一些发展中国家的公共研究理事会和实验室既关注于探索前沿知识，也致力于满足 BoP 人群的需求。到目前为止，他们的成果包括：用于药品和化妆品生产的适应性植物和其他生物材料（印度、南非）、帮助农村妇女提高农业产量（泰国）、开发大型的浮动鱼箱以大幅降低进入成本并提高鳟鱼养殖者的生产率（南非）。一些地区性研究机构还和高校、公共

---


2. 2000 年，CSIR 推出了大奖赛——“新千年印度技术领袖行动”，旨在满足印度社会不同领域的需求。例如，将 2,000 美元一台的笔记本电脑降低到 200 美元一台（通过 Mobiliis 公司原创的“DSK”Mobiliis），甚至在 2011 年出现了售价仅 39 美元的 Aakash 电脑。在此案例中，正是大奖赛的推动使笔记本电脑从 2,000 美元降到 200 美元再降到 35 美元。
实验室、私营企业和地方政府建立了合作关系，共同解决地方性问题。例如，通过赠款、奖励、课题研究和出版物等形式，南非水工业学会提供饮用水和污水处理方面的研究支持。此外，公共研究机构还可以结成全球联盟，致力于解决共同面临的问题（详细情况见专栏9）。

专栏9

全球研究联盟

作为一个虚拟的联盟，全球研究联盟（GRA）是一个由全世界九个享有盛誉的知识型技术和创新机构组成的网络，其目标是“为全世界创造一个全球性的知识库”。联盟所承担的课题重要性和复杂性超出了任何单一机构的能力。该机构囊括了北半球和南半球6万余名科学家和工程师。联盟成员开展基础性和应用型研究、技术转移和商业化，并致力于实施兼具商业创新性和社会可行性的方案。GRA中那些具有高度创新性的成员曾经开发出了诸多突破性产品，例如，MP3播放器、施乐复印机技术、碳纤维复合材料制成的轻型战斗机机翼、空间卫星、抗旱苗条、用于农村互联网服务的同网网络、世界上首例预防流感药物、低成本艾滋病和肺结核药物、开源药物发现平台等。

GRA的价值取向:

（1）成员均具有较强的研究实力，研究领域覆盖面广，包括农业、生命科学、工程学、环境和空间研究。联盟的合作伙伴开展基础性和应用型研究，为大量客户提供具有创新性的解决方案；

（2）联盟还在以下领域开展了合作研究：
①水资源和环境，如以科学为基础的非洲水资源情景；
②气候变化，如应对气候变化的创新型适应战略；
③信息通讯技术，如为农村地区提供互联网接入服务的创新同网网络；
④健康，如可移动的临床流行病学实验室；
⑥能源，如作为农村发展催化剂的能源研究。

（3）在这些合作领域，GRA及其组成成员在技术、资源、经验、学术重要性和声望上，都拥有无可比拟的优势；

（4）基于其成员的能力和研究资历，GRA拥有足够的能力承担大型且高度复杂的研究项目，从开发创新型的技术项目到实施具有商业性和社会性的解决方案；

（5）团队能够将其成员的创新型前沿科技融入其整体研究方法以应对全球挑战；

（6）GRA组成成员还包括其股东所在国政府、非政府组织和全世界的私营企业。
在发展中国家，对包容性创新的支持还十分依赖于国家创新体系中不同要素的相互联系，以及所形成的复杂网络和混合结构。通常而言，规划、融资和指导研究是由不同的理事会/机构来完成。这最终会形成一种自我组合的网络，其动力来自科学家的需求或由谁来启动的市场需求。尽管这种动力在各国有所不同，但是，这些政策在本质上都是殊途同归，即创造就业、改善劣势人群的生存条件、促进经济增长和发展、为所有人提供教育和医疗，以及提高普通人的生活质量。此外，对特殊群体如妇女和儿童的关注也日益增长。低成本茶叶袋水净化器便是一个通过混合结构创造的高技术包容性产品。

斯泰伦博什大学科学系主任兼该校水资源研究所所长尤金·克罗伊特（Eugene Cloete）开发了一种分散化的应用技术，将普通的茶叶袋转化为独立包装的净水设备，当把这种密封的小茶包放进水杯的窄口处，不用浸泡，便能够吸收有毒污染物，并利用超薄纳米级纤维对污染物进行过滤，而包内的活性炭颗粒则能够杀灭细菌。这种过滤器无须任何基础设施就能够帮助没有水净化设备的社区进行污水处理。该产品每袋的成本仅价值3分南非货币（还不到半美分）。这种产品不仅价格便宜、清洁且不会破坏环境，可以在任何地方使用，并成功实现了商业化（“生命稻草”售价20美元）。既可以应用于发达国家的户外探险人群，也可以在NGO的支持下分发给穷人和受灾地区。缺少清洁的饮用水是导致全球腹泻发病的重要原因，年轻人、免疫抑制群体和穷人是高发人群。大约每五个孩子中就有一人——大约每年150万人——死于腹泻。实际上，死于腹泻的儿童要多于死于艾滋病、疟疾和麻疹的儿童之和。饮用被污染的水还会减少个人的劳动时间，并产生显著的经济影响。不光要确保水源地的供水安全，还要确保消费阶段的安全。尽管如此，该产品的大规模应用仍然是个挑战。

在发达国家，一些知名大学和研究中心已经建立了专门的包容性创新实验室和部门。例如，发展实验室（D-Lab）②就是美国麻省理工学院

② http://d-lab.mit.edu/
（MIT）创立的一个项目，旨在通过创新和应用低成本技术，提高全世界低收入家庭的生活质量。发展实验室的技术研发还可以作为一种教育工具，使学生在减贫中发挥的作用产生一种乐观和务实的认识。该实验室目前的研究成果非常喜人，包括利用农村普遍存在的松针生火的火炉、使便携式脚踏洗衣机。MIT 还赞助了一项创新竞赛，对那些满足 BoP 人群需求的项目提供赠款（详细情况见专栏 10）。但是，这些值得赞赏的努力仍然停留在实验室阶段，大规模的推广仍然是一大挑战。

专栏 10

麻省理工学院 IDEAS 全球挑战赛

作为公共服务中心的一个项目，麻省理工学院 IDEAS 全球挑战赛是一项年度发明和企业家竞赛，能够凭借创新的服务项目对弱势群体产生积极影响的队伍将能赢得 1 万美元的奖励。通过 IDEAS (即创新、开发、企业、行动和服务五个英文单词的首字母缩写)，MIT 的学生团队和他们的合作者与一位社区合作伙伴一起工作，设计和实施创新项目，旨在提高全球 BoP 群体的生活质量。自 2001 年成立以来，IDEAS 的奖励对象超过 90 个团队，发放奖金约 50 万美元，涌现了无数厕所水、电和污水处理方案，为偏远的零售商提供技术应用，低成本的医疗设备和假肢，受制于治疗方式而导致的行为问题的医疗诊断和解决方案，基于短信息的实地调研等创新项目。

资料来源：http://web.mit.edu/mitpsc/whatwedо/ideas-competition/index.html。

一些高校关注具体领域的研究，如超低成本医疗解决方案。MIT 的另一个创举是“创新国际医疗项目”，关注超低成本的医疗解决方案。在该项目推动下，已经开发出了低成本的太阳能高压锅，帮助农村医疗机构摆脱电力消毒设备的限制；与肺结核治疗方案相适应的成本极低的方法（“X Out TB”，利用短信息监督肺结核病人治疗的一种方法）；以及 DIY 医疗设备发明包，帮助发展中国家的出诊医生在场有所创新。

发达国家研究机构采用的其他方式还包括发掘设计人才的潜能，因为这一职业和研究领域已经被充分证明，需要极佳的社会意识并关注创新过程的所有方面，从确认 BoP 人群面对的问题到解决方案的产生、提供、扩大和后续影响研究。例如，斯坦福大学的哈索·普拉特纳设计学院与德国波茨坦
大学结为研究联盟，① 将商业和管理培训与传统的工程和产品设计教育相结合。除了为高收入消费者提供解决方案外，该学院还设计出了令人印象深刻的包容性创新产品，如“拥抱（Embrace）”毛毯———一款成本极低的婴儿保育箱（详细情况见专栏 11），② 以及太阳能 LED 光源。同样，一家位于旧金山的名叫 D-Rev 的非营利性组织，与商学院、援助机构、基金会和私营企业合作，在设计产品时主要满足每天收入不到 4 美元的人群。其产品包括成本极低的黄疸病治疗、膝关节假肢、太阳能解决方案和巴氏消毒法方案。

专栏 11

斯坦福大学设计院设计的“拥抱”婴儿保育箱

2007 年，在美国斯坦福大学哈索·普拉特纳设计院举行的“拥有极限承受能力的创业设计”③ 培训班上，出现了为婴儿设计低成本保育箱的概念。世界上每年有 2000 万早产儿和低体重婴儿。在发展中国家，由于缺乏保育箱，这些婴儿的死亡率非常高。保育箱的缺乏有两个方面的原因：第一，新型保育箱十分昂贵，价格约为 2 美元；第二，即使通过捐款提供了保育箱，要操作它们也需要经过培训。“拥抱”的开发团队在尼泊尔首都加德满都开始了他们的研究，队伍中包括研究生。他们意识到为了最大限度地保护生命，该设计将不得不在农村环境中运作：设备应当无需电力也可工作，同时可运输、可消毒、能够符合当地文化习俗，并且，最重要的是，该设备必须非常廉价。

为了达到这些目标，开发团队抛开现有保育箱的概念，开发了一种仅需 25 美元的解决方案，④ 比传统保育箱便宜近千倍。他们使用材料科学原理开发了一款外观近似睡袋的超低成本保育装置用于包裹早产儿，该装置还包含一个相变材料（PCM）袋，使婴儿处于正常体温，并可最多保温 4 个小时。4 小时之后，PCM 袋可通过浸入沸水数分钟重新获得热量。

② http: //embraceglobal.org/。
④ http: //extreme.stanford.edu/impact/embrace_02.html。
在荷兰，高校、研究机构、商学院和企业与 BoP 创新中心展开合作，一家荷兰非营利性机构在食品、能源、水和污水处理领域提供解决方案。①荷兰应用科技研究机构（TNO，同样也是 GRA 的成员）与瓦赫宁根大学和研究中心——一家非营利性的国际开发机构、“创新共同创造实验室”（ICCL）——一家由顶级商学院和跨国公司组建的实验室共同建立了合作伙伴关系，致力于在发达国家创造有利于包容性创新研究的环境。该机构可以提供孵化器支持（空间、联系资金、现场体验）、知识传播（出版报告、举办会议）和对有可能通过技术解决的 BoP 问题进行研究。

即使缺乏正式的研究机构和专门研究中心，高校的学者们也可以采取个人行动研究 BoP 解决方案。例如，哈佛大学教授乔治·怀特赛兹（George Whitesides）——世界上最著名的科学家，便利用前沿技术来帮助穷人，为他们开发低成本的纸质生化诊断（成本低于一美元）。他还创立了一个非营利的“为所有人诊断”项目，向全世界推广这项技术。正是这种认识催生了 MIT 的国际医疗创新项目“X out TB”（耐多种药物肺结核手机短信监测平台）②。

三、私营企业

对私营企业而言，包容性创新正在兴起——也许这将成为未来十年最大的商业机遇。③新的模式正在显现，私营企业不仅要实现盈利，造福社会，更要通过造福社会来实现盈利。这就与传统的世界观形成了鲜明对比。过去，人们认为满足 BoP 人群的需求主要通过慈善手段，而把包容性创新作为企业社会责任的看法正在发生转变。BoP 市场仍远未得到开发和满足，这也将越来越多地视为拥有一种有利可图的潜力——应重视他们在更高价格市场细分中的地位。

② http://iil.mit.edu/work.htm。
③ L.K. 莎尔玛：《印度创意》，Wisdom Tree，2011 年。
实际上，消费者支出的主要增长预期都将来自新兴市场，尽管其消费者的消费能力比发达国家的中产阶级落后许多。但是领先企业可以通过率先开发包容性产品，然后移动到消费曲线上方的新兴中产阶级，乃至发达国家的消费者。到2030年，新兴中产阶级的规模——那些日均收入介于4～20美元之间的群体——将翻三番，达到7.25亿人，占到总人口的49%，并将首次超过日均4美元以下的人群。消费者需求的爆炸——包括低收入和中等收入群体——可以使企业尝试不同的规模战略。实际上，在科技水平较高的发展中国家，企业的包容性创新产品甚至能够满足发达国家的市场需求，对发达国家的本地企业构成特殊的竞争威胁——即使面对跨国公司的谈善，依然能够进入市场。因此，通用电气公司才决定要“自我颠覆”（详细情况见专栏12）。①

私营企业在全球包容性创新领域的成功同样发生在中国。中国私营企业开展包容性创新的做法包括：利用技术创新，采用现有技术或应用重组后的创新，开展商业流程创新，克服将BoP市场隔离的基础设施瓶颈、融资和信息交换领域中的障碍。这些创新还来自于企业与高校、公共实验室、NGO、政府机构和一些特殊的合作伙伴——例如，通过开放源代码和众源，以及在知识产权保护下与其他私营企业的合作。

1. 技术创新

高校并非是利用前沿技术来开发包容性产品的唯一机构，私营企业同样可以依靠自身来实现。正如专栏12所示，GE已经为中国国家制造出拥有高技术含量、物美价廉的医疗产品。塔塔集团的各下属企业同样利用高端技术进行低成本汽车的生产。例如，Nano就是一款为大众生产的汽车，并且采用了高档车中的技术。通过塔塔的研究、开发和设计中心，塔塔化学公司生产出一种价格极低的水净化系统——塔塔Swatch。与“生命吸管”一样，Swatch同样利用纳米过滤器实现使用终端的过滤，但是其过滤器不能独立使用。

① http://hbr.org/2009/10/how-ge-is-disrupting-itself/ar/1。
专栏 12

通用电气的经济型便携式超声仪

创新并不一定具有利他性，也未必都来自专业的 BoP 公司。它们也可以来自具有超强研发能力的跨国公司，这些企业在利润的驱使下意欲进军 BoP 市场。而且，这些创新产品也并非都是低技术的，有的在技术上甚至非常复杂。这一点可以完美体现在通用电气公司生产的低成本便携式超声仪上。① 尽管 GE 公司的医疗产品在富裕国家的超声仪市场上占有相当高的比重，但是却无法在发展中国家获得同样的成功。GE 医疗集团中国团队却提供了一些有趣的启示。中国的绝大多数人口的基本医疗只能依赖于农村地区的低技术水平医院，因此，一台超声波仪器不仅要成本低、质量高，更要兼具便携性。因此，需要一场蕴含颠覆性创新的根本变革。

由此应运而生的是一种便携式超声仪，并成为目前 GE 在中国市场上超声波业务的主要增长引擎。这款便携式超声波诊断仪在设计上是从零开始，但是也大量借鉴了其位于以色列的产品研发中心的研究成果。开启了一种革命性的全新架构——去掉超声仪内部绝大多数硬件，将其转化为软件，这种以软件为中心的设计能够更加容易地调整机器。例如，在观察医生是如何使用之后，对界面进行改进。GE 团队还考虑到如何降低农村医生使用仪器的难度，以便提高使用率。正是基于这种对客户需求的分析，GE 设计出了更为简单的键盘，并且对某些任务进行预设。它所采用的营销策略是强化培训，提供在线指导和追踪顾客的满意度。2002 年，GE 的首台便携式超声仪售价为 3 万美元，在经过几次改进后，2007 年，其产品售价可低至 15,000 美元，不到 GE 高端超声仪设备的 15%。尽管该产品在某种程度上功能简单，但仍然在农村诊所中获得了成功，乡村医生可以开展简单的应用。

尽管该产品主要应用于发展中国家，但是在发达国家也有类似需求，特别是对便携性要求较高的地方或偏远的地方。在此类产品推出后的 6 年间，紧凑型超声仪成为 GE 公司价值 2.78 亿美元的全球生产线，即使在 2007～2009 年的经济衰退期间仍然获得了较快的发展。2011 年，GE 在位于中国西南地区的成都市建立了它在全球首个客户创新中心，该中心致力于适合新兴市场基层医疗产品的创新，这使产品研发团队通过创建一个开放、以客户为中心的创新生态系统，更加紧密地服务客户。GE 的经验现

① http: //www. gereports. com/reverse-innovation-how-ge-is-disrupting-itself/。
专栏 13

重组创新

企业也会采用现有技术并针对 BoP 阶层的技术进行重新设计。AEDC（为农村电力设计的低成本锌空气燃料电池）项目就是这样的一个例子。燃料电池技术现今已经存在了约 100 年。一位名为帕普斯托夫（Papsdorf）的德国机械工程师接受了这项挑战：以可承受的价格、可靠度高并且实用的方式为农村地区设计燃料电池。他在为一家加拿大汽车零部件公司工作时，确信锌空气燃料电池技术在农村地区电气化方面具有潜力。帕普斯托夫于 2000 年在南非成立了替代能源开发公司（AEDC）。他为燃料电池设计了一款廉价的塑料外包装，包括一个含有锌电极和电解质液体的塑料袋。他的专利设计可在两分钟内完成装配，并产生最多 240 小时的不间断电源。当电极不再起作用时，使用者无须任何特殊工具即可在 15 分钟内完成现场更换。这些燃料电池提供的能量可用于住宅照明、运行如冰箱和缝纫机等电器设备。AEDC 使整个村庄，而非单一住宅实现电气化。另外，AEDC 一般在每个村庄培训 2 名技术人员，以便在燃料电池能量耗尽时更换电极，确保项目的可持续性。AEDC 燃料电池不含可动组件、全天 24 小时都可供电且碳排放量为零。并且，当电池能量来源耗尽时，锌电极氧化留下的氧化锌残留物可被回收或用作菜园肥料。燃料电池替代了蜡烛、石蜡和煤油，减少了因吸入烟雾而对健康的危害，也减少了火灾隐患。

专栏 14

业务流程创新

CEMEX 是一家墨西哥建材供应商，自 1998 年开始实行“Patrimonio Hoy”小额信贷计划。该计划以资助原料采购、提供技术咨询以及全过程监督廉租住房建设的方式，持续支持超过 30 万个低收入家庭。实行此计划的催化剂是商业动机；CEMEX 指出，

---

注：V. Govindarajan, Jeffery Immelt & Chris Trimble:《逆向创新》，载《哈佛商业评价》2009 年第 10 期。
比起高收入客户，低收入客户群体有更稳定的利率需要（他们的借款通常是需求驱动和无弹性的）。此外，市场在很大程度上是未开发的——资金、技术匮乏以及社会（市场）使得如 CEMEX 一样先进的供应商处于供不应求的状态。因此，为了接触 BoP 消费者，该公司聘用有上进心的妇女为代表在目标社区发展分销、营销和融资网络，相较于单纯供应建材，公司创建了一套完整住房解决方案。由本地代理商（被称为“socios”）负责在其所在地监督项目进程和连续性、招募其他愿意参与该项目的人，并且以收益分配和佣金的形式获利。为了帮助项目参与者，在这个为期 70 周的项目中，CEMEX 还调整了挥发性物质的价格；该项目对资本匮乏、情况多样的 BoP 消费者格外有帮助。因此，CEMEX 重组了重要业务流程，使其能够服务 BoP 市场。该公司进入了一个全新的业务领域，对内包和外包服务做出不同的判断，并从零开始开发当地资源。这个成功的项目正在墨西哥、哥伦比亚、哥斯达黎加、尼加拉瓜和多米尼加共和国进行推广，以求接触更多低收入人群，并有希望在未来五年内覆盖超过 75 万个家庭。

现有的服务交付模式同样可以为 BoP 人群提供物美价廉的服务。医疗领域有两个著名的服务流程创新案例：阿拉文眼科医院是一家以低成本从事白内障手术的机构，而 Narayana Hrudayalaya（详情情况见专栏 16）则是一家低成本的心脏手术机构。由冯医生（G. Venkataswamy）创办的阿拉文眼科医院旨在消灭“无谓的失明”，并成功地将一台白内障手术的成本降至 30 美元，只相当于美国价格的百分之一。除了增加外科医生的数量，阿拉文还借鉴麦当劳的快餐供应链方式，增加每个医生的产出。例如，由一个训练有素的员工负责组装线的运营，从而将符合质量标准的产品发送至不同地区。通过创造性的方阵大幅降低人力成本：与其他医疗机构相比，阿拉文眼科医院雇佣的护理人员受教育程度较低，基本上来自农村和落后地区，但是其承担的责任却远多于同行。此外，这家医院还解决了服务外延问题：开发了一种双向服务模式，即寻找病人并带回眼科营地，从而为成千上万的病人进行手术。医院没有选择昂贵的进口药品，而是建立了自己的制药部门，把晶状体的成本从 100 美元降至 20 美元。通过对一些术后恢复的指标进行比对后发现，阿拉文眼科医院甚至在某些指标上超过了英国皇家眼科医院。该医院每年的手术量超过 30 万例，并和数百家医院合作，将其模式传播到更

---

① http://www.aravind.org/。
印 度 的 电 信 行 业 革 命

印度的电信工业特别是无线通信的革命，也是通过完全改变该行业的标准商业模式来提供超低成本服务的范例。印度电信将固定成本变为运营成本，让用户按使用次数付费而不是按用户订购来收费，成本大大低于外国竞争对手。印度巴帝电信一一开始便决定冒险使用一种高用量低利润的模式。它将注意力从用户平均收入（ARPU）和垂直合并转移到每分钟收益和外包上，并将这些概念系统化操作。它将大部分功能进行了外包——包括关键但昂贵的供应链部分，只留下了六个涉及合同合理安排的功能，使公司既可以保证质量，也能从增长中获利。它也与竞争对手在必要而没有竞争优势的基础设施方面合作。在分销上，巴帝电信很快将现有的印度小零售商联合起来，建立了低成本电话使用准入的应用开发生态系统。巴帝成为电信行业的典范公司之一，其创新是许多电信商试图模仿的对象。印度电信行业现在每月增加约两千万用户，每分钟手机费用不足一美分，为世界最低，而每条短信的成本降到千分之二美分，最低可以用 20 美元买到一部手机。

Nayana Hrudayalaya 低成本心脏外科手术

印度最知名的心脏外科医生谢蒂（Shetty）博士立志使用亨利・福特（Henry Ford）的管理方法将庞大的心脏外科手术行业变得更有效率。以更快的手术速度和更低的手术成本为契机，他在印度班加罗尔建立了Narayana Hrudayalaya 低成本心脏外科手术中心。它结合了规模化、专业化的经济，从根本上减少心脏外科手术的成本，班加罗尔的Narayana Hrudayalaya 医院拥有 1000 张床位（相比之下美国的心脏医院床位平均为 160 张）。谢蒂博士的团队中包含 40 余名心脏病专家，每周能够进行约 600 例手术。患者的绝对数量使得外科医生能够在具体操作中获得世界级的专业技术，同时，充足的后勤设施使他们得以专注于专业而无须在管理事务上浪费时间。医院的收费标准根据患者的情况有所差别，但相比美国 2 万～10 万美元的费用，开放式心脏手术的费用最低仅需 1200 美元，其成功率与最好的美国医院相比毫不逊色。

① C. K. 普拉哈拉德和 R. A. 马沙尔卡：《创新的圣杯》，载《哈佛商业评论》2010 年第 7 期。
② http://www.narayanaospitals.com。
第三章 包容性创新：国际经验

该医疗小组与许多地方自助组织共同建立了一个医疗保险计划，这些组织覆盖了250万人口，每人每月保险费用约11美元。医院的患者中约三分之一加入了此项计划。手术费用将视患者经济条件按比例增减，从而使得富有的患者能够补贴贫穷的患者。考虑到接待贫穷患者的数量，这个组织仍可实现盈余。与美国私人医院6.9%的平均利润率相比，谢蒂博士的私人医院集团税后利润为7.7%。① 谢蒂博士与印度、非洲和马来西亚的医院建立了视频和网络连接，使得他的外科医生可以向缺乏经验的同行提供专业建议。他还会向乡村医院派遣流动医生以掌握当地心脏病疾病情况。

印度分散化的“包容性”纺织业诠释了私营企业如何利用当地资源来大幅降低成本。与当下趋势不同，纺织厂将棉花纺成纱线这一步骤分散到农村，这样，整个生产链便可以在村里完成。这种分散化的纺织生产创新旨在遏制农民从农村向城市的迁移，尽管在城市里坐落着巨大的纺纱厂，但是通过这种方式可以使农民在乡村里找到工作。详细内容见专栏17。

专栏17

分散的纺织品生产：分形基金会

通过“微型纺纱”机——业内人士称作“全世界大型纺纱机中第一个台式纺纱机”、分形基金会②使得分散纺织以垂直统一的方式集合，在印度开启了重新组织价值链的机会。这些机器使生产以行业规模百分之一的方式进行。每个分散的纺织品生产“作坊”，负责从棉线到可出售的布料的整条产业链。这样一个作坊能为大约70人提供生计，年销售额大约可达20万美元。

创新为当地的纺织品生产提供了回报。棉线生产、染坊、织坊和制衣工坊都实现了本地化。新的流程能够节省能源、保护生态、尽到社会责任，还能生产出好的织物。这种革命性的梳棉机能够分离、清洁棉纤维并把它们编织成一条整齐的梳棉，并能达到每秒一百万根。并条机将多条梳棉合并成一条，并能使其更统一，纤维更平行整齐。并齐的梳棉被搓成铅笔芯粗细，整齐地绕在线筒上，能够方便后续的纺纱。第一架此类机器于2002年出现在印度安德拉邦的奇拉拉。现在，当地受过中学教育或职业教育的青年便可操作这种机器。

① L. K. 莎尔玛：《印度创意》，Wisdom Tree，2011年。
② www.fractal.in。
相比之下，使用传统方法的分散的纺织生产生意惨淡。传统的纺织和制衣业，规模生产是一种竞争优势。例如，在传统行业中，从棉花到织物，垂直协作生产三千吨需要一万六千个工人花费一年时间。这种集中需要1万个织布机、75个染色单位、一个大规模的纺织厂、30个纺织纤维带、4000个农田。而使用新流程的垂直协作、分散的群体，有240个工人每年生产40吨，相应使用130个织机、1个染色单位、4个微型纺织单位、一个裁缝单位、40个农场。新流程能汲取两种流程的优势，创造出价格合理的织物，既能出口到意大利、法国、挪威、英国、美国，当地从业者也能买得起。

2. 克服困难

ChotuKool 是印度 Godrej & Boyce 公司联合 BoP 妇女们共同开发的世界最便宜的冰箱——用长效电池来取代冰箱对稳定电力供应的需求。印度拥有世界上最大规模的无电人口——覆盖了印度农村人口的92% ，约为3.8亿人，或相当于7170万家庭没有通电。ChotuKool 解决了这一难题，并向这些家庭提供高效冰箱。这种便携式、从上面开盖的冰箱仅重7.8公斤，可以在没有电的情况下利用高端隔热装置保持数小时的清凉，售价仅69美元。为了实现高效节能，这款冰箱并没有安装压缩机，相反，它依靠一个降温芯片和一个类似于电脑散热的风扇——和电脑一样，风扇的运转需要依靠电池。这款产品产生了巨大影响：既降低了食物的成本，提高了生活质量，又能用于偏远地区疫苗和药品的储藏和运输。ChotuKool 的影响范围极为广泛，因为它不仅是联合农村妇女共同设计的，因此其接受程度也越来越高。本着“用更少、为更多”的原则，这款产品的零部件只有20个，而普通冰箱则超过200个，这就使其使用起来极为简单。在供应和融资上，它还利用了印度现有的微金融网络，而其销售则完全是依靠佣金挣钱的村民来完成的。

“生命吸管”① 是一种在设计上为个人使用的水过滤装置，无须通过电力、电池或替换零件即可提供可饮用的自来水或管道供水。生命吸管是一个31厘米长、直径30毫米的塑料管，含运费的价格仅售5.5美元。通过吸管抽上来的水首先要通过中空的纤维，过滤为15微米的微粒，这一过程只需

---

要物理过滤，不包含任何化学物质。整个过程都靠吸吸完成，类似于使用传
统的吸管。该产品最多能够过滤 1000 升的水，够一个人饮用一年。它能够
去除水中 99.9999% 的细菌，99.9% 的病毒和 99.99% 的寄生虫。该装置还
有易于清洗的前置过滤器和净化隔间，所有的原材料都符合或相当于美国食
品药品管理局的标准。“生命吸管”在发达国家的主要消费群是徒步旅行
者，其广泛使用仍受制于成本。在一些人道主义危机中，例如，在 2010 年
的海地地震、2010 年的巴基斯坦洪水和 2011 年的泰国洪水中，NGO 都向灾
区提供了该产品。

较低的成本使移动服务得以大规模推广，从而克服了基础设施障碍，极
大地促进了商业交易。一般科技领域的创新（如信息通信技术（ICT）已经
产生了巨大的乘数效应）可以在无数领域得以应用，并在大幅提高经济效
益的同时，减少信息的不对称性。例如，通讯技术不仅可以帮助渔民获得最
新天气信息和鱼群聚集区域，还能帮助他们获得准确的价格信息。移动通信
还能够创新医疗服务方式，提高社会的参与度。

四、基金会和国际开发机构

一些全球性的基金会，例如，比尔和梅琳达·盖茨基金会、克林顿全球
倡议、维康信托基金会等，都参与到与其他伙伴方建立包容性创新的合作中
来。他们中每一家基金会支持的领域和采取的方式都不尽相同。这些倡议已
经引起了一些最知名的研究机构的关注，包括哈佛、耶鲁、牛津和北大。比
尔和梅林达·盖茨基金会发起的“探索大挑战”项目，① 便是最近一段时期
最著名的创新活动之一，并对包容性创新产生了巨大的推动。这项为期 5
年、总金额高达 1 亿美元的挑战赛，鼓励开展大胆和非传统性的研究，从而
发现新颖的全球健康解决方案。全球的智力精英们将有机会赢取 10 万美元
的奖金来开展他们的研究。目前，该项目已经开展了八轮。

全球责任许可项目（Global Responsibility License，GRL）旨在寻求一

① www.grandchallenges.org。
种平衡，即知识产权（IP）的商业开发与为世界上最贫困的人提供知识之间的平衡。该机构是世界经济论坛“全球青年领袖”小组下的一个项目，与商业公司、研究机构和知识产权开发组织（如“农业公共知识产权”（IPRRA））开展合作。它致力于解决的挑战是：一些由少数几家公司、大学、政府机构和非营利机构所掌握的技术和资源，如果能够成功交易，便能够为发展中国家的穷人带来福音。也正因为如此，这种技术控制才导致全球在设计、开发和技术应用领域中的能力不足，无法提高BoP人群的生活质量。GRL解决这一问题的具体做法是，为了减少全球贫困而促进技术应用，帮助专利持有者出于人道主义目的而暂时性地放弃专利。该项目使专利持有者能够更加容易地为最贫穷国家的弱势群体做出更大的贡献。这种模式化的许可，只在用于发展目的时才能使用。企业仍对其开展的任何研究拥有所有权，同时也使NGO能够在利用其改善最贫困人群的生活质量。于是，GRL可以为全世界数十亿贫困人口提供知识产权方面的便利，同时也不妨碍企业、高校和其他IP持有者将知识产权用于其他商业目的。

2011年11月3日和4日在戛纳举办的二十国集团（G20）领导人峰会上，提出了“二十国集团在包容性创新上的挑战”，提出企业应寻求以创新性、规模性和商业性的方式与BoP群体开展合作并为其提供服务。这也反映了私营部门当前的真实想法，即包容性创新产品和服务将有可能成为未来十年最大的商机。“G20挑战”将包容性商业定义为，私营部门以规模化或可推广的商业模式，为金字塔底层人群提供商品、服务和生计，使他们以供货商、分销商、零售商或消费者的面目，成为企业核心价值链的一部分。创造性和聪明的商业思考出现在最富创新性的商业模式中。这种创新性的主要特点包括：提高BoP群体的能力、为BoP提供融资、设计适合BoP人群使用的产品、向BoP群体交付产品和服务。这项挑战的15家获胜者都具有上述这些特征。这些获胜者都是一些本土企业，并具有财务上的可持续性，涉及的领域包括农业、廉租房、医疗、教育、饮用水设施、金融和零售供货链。

① http://www.g20challenge.com。
五、伙伴关系和合作知识产权

成功的包容性创新有赖于不同参与方之间的合作。上述提到的许多产品都是跨领域的合作的成果。例如，麻省理工学院发展实验室开发的松针火炉便是在一家印度 NGO—Avani 的挑战下产生的。基于其为 BOP 服务的丰富经验，Avani 能够发现 BOP 群体的需求，并协调解决方案。南非的茶叶袋净水器正是通过类似“生命吸管”之类的产品商业化才得以推广，也正是在 NGO 的支持下才使其产品能够真正为 BOP 消费者所用，并被应用于减灾活动中。Aakash 同样是各方合作的产物；印度政府下达了指令；印度的高校和研究机构开发了该产品；私营企业则对需求做出反应，并在早期研究中进行创新，降低原价成本，并最终生产。同样，Patrimonio Hoy 的成功也有赖于美洲开发银行提供的信贷担保。类似这种通过多方合作开展的包容性创新活动详见专栏 18。

专栏 18

包容性创新案例

医学教育设计发明工具包。医学教育设计发明工具包（MEDI Kits）是一套为释放发展中国家医疗从业人员的创造力而设计的 DIY 医疗设备工具包。它受“来自医疗第一线的创新解决方案”启发，例如，由护士发明的新生儿重症监护病房配件，以及自主开发的缝合线替代品和植入体替代品等。这一麻省理工学院“国际医疗健康”项目（IIH）的积极行动发挥了破除障碍进行“后创新”的角色：通过向领先用户提供适当的工具，这些工具包促进了需求驱动、脚踏实地的创新，并避免了医疗保健基础设施领域投资的惰性。

螺旋形松针炉具。作为对印度非政府组织 Avani 所提出挑战的回应，美国麻省理工学院 2010 春季设计实验室的设计课程推出了一种可用松针作为燃料的炉具——一种稀缺性远低于木材燃料的可再生能源，在印度许多人依赖它作为燃料。该炉具设有螺旋形的腔室及其他创新构造以适应松针燃烧的独特困难，可在 15 至 22 分钟内，用约 1 磅松针煮沸 5 升水，目前炉具模型的成本为 20 至 25 美元。

---

2. http://www.youtube.com/watch?v=ntmX8aFuKOA
Bici – Lavadora。自行洗衣机（麻省理工学院发展实验室项目）是一部轻便的、以踏板驱动的洗衣机。①该发明原型机成本约127美元，能够极大地提高洗衣妇的生产力，并在低成本以及不依赖电力的环境下，实现世界上其他地区从家用电器中获得的一些优势。

安全手术消毒柜。比起化学消毒柜及沸水更加高效，这种低成本、使用太阳能的高压灭菌器设备使得农村医疗机构能够对器械进行现场消毒。②这也是麻省理工学院“国际医疗健康”项目（IIH）的另一项创新成果，旨在在缺乏电力或停电频繁的地区降低手术感染概率。

黄疸新生儿光疗法。美国斯坦福大学、美国全国大学生发明家和创新者联盟以及美国 D-Rev 设计革新工作室共同合作，为患有严重黄疸的新生儿开发了一种光学疗法。其成本仅相当于西方同类设备的 1/25，这一创新每年能够治疗发展中国家 2000 万罹患黄疸病的儿童。③

便携式“生命线”收音机④（南非）。“生命线”收音机为在最恶劣的环境和气候条件下工作的人群而设计。它坚固耐用、色彩鲜艳、易于使用，并且能够依靠自充电或太阳能运转，对 AM/FM/SW 频道信号接收良好。它可以连续播放 24 小时，经过广泛研究及实地使用，证明其性能、样式及易用性均适合需要持续收听广播的用户。“生命线”收音机可持续接收有关信息和教育的内容，并已用于提供增进健康、安全、教育、农业生产、减灾和政府治理的信息。“生命线”收音机也是首部为妇女和儿童使用而特别设计的收音机。

为贫困人群提供的低成本清洁能源灯（加拿大）。1998 年，加拿大阿尔伯塔省卡尔加里大学电子工程系教授戴夫·欧文·韩礼德（Dave Irvine – Halliday）开始在日本日亚化（Nichia）集团的设计基础上研发白色发光二极管（LED）（或称 WLED）。1999 年该发明在尼泊尔完成了现场测试，为 3 个尼泊尔村庄提供了照明。3 年之后，他得知“照亮世界”基金会（LUTW）⑤ 正在全球范围内向贫困人群推广 LED 技术。该非营利组织致力于将低耗能、低成本的白光 LED 引入 51 个国家的 2.6 万个家庭，为超过 30 万人提供照明。LED 拥有许多优势：使用非常小的电池即可运转；使用者无须接入某个中央电

② http://www.who.int/patientsafety/safesurgery/en/。
③ http://www.zzdiscon.com/products_list/。
④ http://www.freemplayfoundation.org/。
⑤ www.lutw.org。
网；同等面积条件下，它们可以提供比煤油灯亮 100 倍的照明；可持续照明 50000 小时。相比之下，传统的白炽灯泡只能使用 1000 小时，并且，LED 比白炽灯泡耗能少 80%。提供 LED 光源的目标是帮助贫困地区提高工作效率，使他们在夜间得到更多学习时间，并减少使用煤油灯带来的普通健康问题和火灾隐患。2003 年，LUTW 将其实践范围扩展到印度、巴基斯坦、菲律宾、墨西哥和厄瓜多尔。2004 年，在加纳实施的一个项目标志着基金会正式进军非洲。LUTW 为 2004 年斯里兰卡海啸所采取的行动是其最大型活动，为超过 2000 个临时庇护所提供光源。2008 年，基金会的重点活动地区在巴布亚新几内亚、厄瓜多尔、秘鲁和中国西藏地区。2009 年，该基金会与加拿大 CAUSE（Christian Aid For Under-assisted Societies Everywhere Canada）组织合作，将太阳能读写光源推广至洪都拉斯；2010 年，该组织还将此推广至海地、危地马拉和哥斯达黎加。为支持非营利组织及人道主义组织，LUTW 以补贴价格向它们提供照明系统组件。一套典型的家庭照明系统，不包括运费成本可低至 75 美元。通常情况下，这些资金可以由受助人向小额信贷组织申请贷款的方式提供。与此相反，在 LUTW 组织支持的国家当中，许多居民正以每年 200 美元的价格购买燃料，点燃既不安全也不清洁的煤油灯以获取夜间照明。安装由太阳能支持的照明系统仅相当于两年份煤油灯的价格，但是电池需要在两到三年内进行更换。

将牛肉推向市场项目。为所有利益相关者建立一个网络，以部署在该领域的包容性创新解决方案是很重要的。“主动将牛奶推向市场”项目涉及的一种低成本巴氏牛奶消毒法的创新便是一个很好的例子。为了解决牛奶储存中的变质和污染问题，美国 D – Rev 设计革新工作室、肯尼亚国际家畜研究所、墨西哥非营利组织 Niparaja、美国比尔和梅琳达·盖茨基金会、亚利桑那州大学、美国 Meridian 设计集团以及美国国际小母牛组织（Heifer International）正在策划三个低成本的、有望成功的创新，旨在帮助非洲小规模奶牛养殖户出售更多的牛奶。这包括两种巴氏消毒的新方法——低温巴氏消毒法仅需一个简单的厨房温度计和村民家中的炉灶；而冷冻巴氏消毒法使用 UV – C 电离辐射，并采用了一种低成本的方法，使含氯漂白剂能够更加高效地清洁牛奶储存和运输的容器。

合作性的知识产权（IP）还创造出人才网络来解决 BoP 面临的问题。一些新奇的概念如“开源”，即利用全世界各个领域的资源为 BoP 量身解决他们的需求。由英国的肯·班克斯（Ken Banks）发明的 FrontLine SMS 开源短信软件——将大部分 NGO 拥有的基础工具（电脑和移动电话）转化为一

---

种用于现场工作和调查的通信中心。这一软件能够将短信群发给大量组织，而这些组织的成员可以进行单独回复。基于 Frontline SMS 系统，还派生出其他大量软件，用于一些专门领域如医疗、教育、金融、法律和媒体。也许其最大的影响力还是源自医疗领域一个叫作“医疗移动”的组织，该机构利用 Frontline 短信系统帮助马拉维一家仅有两名医生的医院，为一个 25 万人的社区提供医疗服务。这家医院为 500 名医疗志愿服务者配备了手机和 Frontline SMS 系统，从而大大提高了与病人的沟通及其护理效率，同时节省了交通往返的时间和成本，病人只需发送实时病情短信，而无须进行长距离往返来当面阐述病情。目前，Frontline SMS 系统被 70 个国家的上万个社会组织所采用。这一发明在许多以通讯为基础的项目中发挥了重要作用，例如，海地的减灾协调工作、印度的农村医疗网络、一个人道主义机构在阿富汗开展的无线通信等。这一软件目前仍然是免费的，也正因为其源代码是公开的，开发者能够自由地创造属于自身的特色。这一软件当前能够支持的语言种类包括英语、阿拉伯语、阿塞拜疆语、孟加拉语、德语、西班牙语、芬兰语、法语、印度语、印度尼西亚语、高棉语、葡萄牙语、俄语、斯瓦西里语和汉语。

受到开源模式在软件开发中获得成功的鼓舞，开源原则也已经被应用于其他领域，如药物开发。在软件领域，众所周知的案例如 Linux 操作系统和阿帕奇服务器均已证明，开源方法可以创造出市场领袖。这一领域的成功使得很多人猜测，开源模式是否可以应用于其他行业并获得同样的成功。制药业经常被视为一个首选领域，将开源模式中的合作和公开 IP 进行转移和应用。世界卫生组织的研究、开发融资和协调专家组目前正在评估开源药物发现平台——其他一些开源药物发现项目正在运作中。Synaptic Leap 是一个在研研究社区网络，能够连接和开展开源生物医疗研究。这一网络下设的一个项目，致力于开发一种新的治疗血吸虫病的药物——环吡异喹酮。印度的 CSIR 同样建立了正式的“开源药物发现”（OSDD）项目（详细情况见专栏 19），以及一个叫做“开放社会的生物创新”的项目（BioS）。该项目在生物技术的应用中促进分散化的合作创新，融合知识产权信息学和分

1  http://www.osdd.net/.
2  http://www.bios.net/daisy/bios/home.html.
析，创新系统的结构性改革和开放技术的合作开发。“群源”创新同样极具前景——如 Innocentive，九西格玛和 Foldit，这些机构都通过公开招募来解决问题。这些问题得到了一个无名的大型群体的关注，来解决这些通常应由雇员来完成的任务。

专栏 19

印度 CSIRO——开发资源药物发现计划

印度 CSIRO 开发资源药物发现计划创立的目标是进行开放、合作的科学研究，发现和开发成本远低于传统创新药物。这种模式受到人类基因组合 Linux 操作系统处理这种开放合作过程的启发。这种模式与闭合环境大不相同。传统药物研发的特点是，药物的成功上市能够带来巨大收益，因此，机密性与知识产权保护是至高无上的。OSDD 创造了来自 135 个国家共 4500 多人的科学社区。OSDD 的发起是为抗击发展中国家的传染病生产更为有效的药物，特别是针对每年死亡人数高达 170 万的结核病（据世界卫生组织数据）。世界卫生组织统计表明，在世界上某些地方，每四个人中就有一个无法获得现有结核病药物体系的治疗。

OSDD 已经取得了显著的初步成功；2010 年，它通过设计“联合解码”大会，联合了几百位科学家，提出了第一个详细的结核杆菌基因图谱。结核杆菌有四近千基因，在这次大会之前，大概只有四分之一的基因得到测序，那还是十年前的成果。OSDD 促成了结核病图谱公开并提供给制药厂商。现在的 OSDD 模式主要用于开发全世界贫困人群所需的价格低廉的药物。但是，OSDD 也展现了激发集体想象力和“任何人、任何时候、任何地方”创造力的力量。

专利库为创造包容性创新产品提供了另一种合作机制。众所周知，专利是影响成本下降的重要障碍。但是，当市场的购买力极为有限时，正如发展中国家的情况一样，专利就无法有效刺激研发并创造新的产品。一个专利库允许不同个体持有专利，并供他人用于生产或进一步开发。专利持有者可以接受使用者支付的专利税。专利库是世界卫生组织最近批准的“全球公共卫生、创新和知识产权战略”的一部分，其目的是扩大药品的可获得性。有几项类似的行动正在开展中，例如，“知识生态国际”组织①正试图建立

① http://www.keionline.org/。
一个为中低收入国家服务的药品专利库。2009年2月，葛兰素史克公司（GSK）宣布了一项专利库倡议，将许多治疗热带疾病的药物专利纳入一个免费的专利库。

六、全球包容性创新面临的教训与挑战

包容性创新过程必须利用所有的创新性流程：高技术、低技术、商业模式、流程效率、支付方式，以及既能服务于发展中国家的BoP群体，又能适用于发达国家和发展中国家普通人群的技术。这意味着，必须要对传统的前沿创新要素、生态系统与前沿创新生态系统的联系进行重新评估，进行革新甚至要从头做起。实际上，全球面临的挑战更加任重道远：一个包容性创新生态系统必须是全球性的，但又要跨越地理、融资、教育、社会经济地位、文化和生活方式等方面的差异，服务于目标人群。通过支持研究院所的活动，并将这种国际交流正规化，这些碎片化的创新努力才能得以巩固，并产生卓越的成果。通过采取适当的促进措施，贸易和技术的方向可以发生改变：由北向南、由南向北或南南之间。

使包容性创新的想法获得采用并持续地扩大覆盖范围仍然是全球包容性创新面临的一项巨大挑战：这不仅因为包容性的创意没有得到充分开发，还因为其尚未实现商业化。一些创新行为如“生命吸管”和“Freepay生命线广播”的用途十分广泛，并不局限于特定的人群或地区。这些技术已经显示出了巨大的发展前景，但是却由于成本问题未能被BoP群体广泛采用。同样，正如早先讨论过的，有无数的发明尚处于模型阶段或在BoP人群中的商业应用十分有限。寻找此类创新，并探寻如何降低此类创新的成本，将成为实现既定目标的一条更为有效的路径，相比之下，针对特定目标开发的新产品就显得不那么划算。但是，问题在于，这些技术并不像它们在试验阶段所展现的那么诱人，就像“生命吸管”一样，尽管实现了商业化，但是只有高收入的消费者才能负担得起。这说明，企业要想进入BoP市场，仍需克服无数的困难。

实际上，若从整个创新生态系统的角度看，就能够发现解决办法——将
BoP 人群既作为消费者又作为参与者，这种办法最有可能获得广泛成功。传统的融资、营销、交付和设计方式都有可能遭遇失败，只有那些有能力克服 BoP 市场挑战的公司才能获得成功。只有对 BoP 人群需求有着深刻认识，才能明确定义产品的目标，避免出现像 Nano 汽车、“走遍天下仅靠一台笔记本”的教训——这两个产品明显错判了目标市场，消费者对之置之不理。此外，企业自身必须要成为他们和市场之间的中介——这意味着与消费者建立联系并将其作为一种资源。CEMEX 在水泥和其他建筑材料的融资、营销和交付上充分实现了本地化，以满足 BoP 群体的需求。在 ChotuKool 冰箱的例子中，整个销售和交付渠道都来源于社区，在建立信任的基础上使产品获得更广泛的使用，同时也为整个社区创造了增加收入的机会。尽管如此，挑战依然存在。对于包容性创新业务，例如新成立企业，为了获得关键性信息并开发新市场所需的投资成本极高——即使是富有经验的公司也很难做到这一点。降低成本负担、加强信息采集和传播将被证明是有益的。

成功的包容性创新需要更多的人在经营中遵循“用更少、为更多 (MLM)”的方式。一些业界中的远见卓识者，例如通用电气的杰弗里·伊梅尔特 (Jeffery Immelt)、塔塔集团的拉丹·塔塔 (Ratan Tata)，一些研究学者如乔治·怀特赛兹，以及一些公共研发机构的领导者和政府官员们，都将包容性创新从理念转化为现实（详细情况见专栏 20）。考虑到 MLM 方式中存在着根深蒂固的风险性、破坏性和认知特性——这些都不足为奇。即使在完善的创新生态系统中，如硅谷，也十分强调高附加值人才的重要性，并通过天使基金、孵化器、风险投资和跨界网络的方式将其影响最大化。包容性创新者同样可以做到这一点。

专栏 20

领导力很重要

包容性创新的成功领袖都有一些共同特征。第一，他们积极推动包容性增长。企业为了明确市场目标，要问自己“考虑到我们的成本结构，应该去服务于哪个市场?” 成功的包容性创新领袖通常会问道：“考虑到我们应该去服务于那些尚未得到服务的群体，我们需要什么样的成本结构?” 第二，这些领袖们以人性化的角度来实现他们的商
业愿景。像阿拉文眼科医院的冯医生（G. Venkatawamy）就是这种充满理想、致力于消除“不必要失明”的人。第三，他们建立了远大的目标和明确的时间表，如拉丹·塔塔提出要开发 2000 美元的汽车，德鲁拜·安巴尼（Dhirubhai Ambani）提出要把电话费降到一张明信片的价格。第四，成功的包容性创新领袖要求项目团队对消费者的需求有着极为深刻的理解，并在此范围内工作。这就会产生一种新颖的、以外部视角观察而产生的创新——甚至能够改变组织内部的语言，例如，视“消费者”为人，视“供应商”为合作伙伴，视“员工”为创新者。所有这些特征都能够让企业最根本的问题给予肯定回答，即“如果我们改变压缩成本的方式，较少关注运营利润，那么是否能够获得更高的资本回报？”如果我们能够有效降低价格，使我们的产品可以被穷人接受，而一旦他们很快发现产品的用途并购买，我们难道还怕不会出现爆炸性增长吗？

成功的故事可以激励国内外更多的创新，但也使与知识产权保护相关的问题变得更加突出。必须要寻求知识产权保护与促进竞争之间的平衡关系，但是，创新的成本——特别是包容性创新的成本问题更需要明确。此外，在社会责任和利润共同激励下的合作知识产权保护，可以通过某些市场的某些产品得到检验。

从全球包容性创新效果中，可以得到如下经验：

（1）需要强调的是，尽管包容性创新是一项非常有用的政策工具，有助于促进社会包容性和和谐，但是却并非“捷径”。它只是供政策制定者选择的诸多重要备选项目中的一个，绝不是一个可以解决所有社会问题的灵丹妙药。因此，政府需要考虑采取包括包容性创新在内的所有工具，同时制定战略来解决与社会包容和和谐相关的问题。

（2）考虑到包容性创新的概念仍然较新，截至目前，还不存在最佳实践，也不存在任何一个国家，由于采取了促进包容性创新的连贯且相互关联的政策，而产生显著效应。印度在这方面起了个好头，但是即便是印度也还在摸索中。因此，我们尚无法清晰地了解，如何从制度上或政策立场中推动包容性创新。

（3）包容性创新过程必须利用所有的创新性流程：高技术、低技术、商业模式、流程效率、支付方式，以及既能服务于发展中国家的 BoP 群体，又能适用于发达国家和发展中国家普通人群的技术。

（4）使包容性创新的想法获得采用并持续地扩大覆盖范围仍然是全球
包容性创新面临的一项巨大挑战：这不仅因为包容性的创意没有得到充分开发，还因为其远未实现商业化。有无数的发明创造仍处于模型阶段，或者仅在BoP层面上获得了有限的成功。

（5）若从整个创新生态系统的角度看，就能够发现解决办法——将BoP人群即作为消费者又作为参与者，这种办法最有可能获得广泛成功。

（6）和前沿性创新一样，成功的包容性创新需要更多的人在经营中遵循“用更少、为更多”方式。一些业界中的远见卓识者，例如，通用电气的杰弗里·伊梅尔特、塔塔集团的拉丹·塔塔，一些研究学者如乔治·怀特赛兹，以及一些公共研发机构的领导者和政府官员们，都将包容性创新从理念转化为现实。
第四章

促进中国包容性创新的政策建议

一、公共政策干预的目标

如前所述，中国政府已将建立和谐社会、减少收入差距、扩大基本公共服务作为其最重要的目标。2010年9月，时任胡锦涛主席提出了包容性增长战略，旨在减少贫困、缩小城乡收入差距并为城乡贫困人口和农民工提供基本公共服务。“十二五”规划（2011-2015）明确提出要“让全体中国人民共享发展成果”。包容性创新与中国密切相关，但这一概念无论是从理念角度还是从政策角度，对中国政府而言仍然是全新的。到目前为止，中国一直在强调前沿创新，但也开始认识到包容性创新的重要性，特别是对于解决不断扩大的贫富差距的作用。

包容性创新的五大基本要素：支付得起、高质量、低成本、可持续的商业模式和广覆盖。如前所述，在包容性创新领域中有许多政策倡议和前景光明的产品。然而，这方面的发展仍然远远不够，难以满足BoP人群庞大且未被满足的需求。此外，包容性创新的许多产品仍然处于模型（如Embrace婴儿保育箱）或小规模生产阶段（如贾普尔足）。只有少数产品实现了规模化的可持续生产。新产品技术作为创新的最终成果，需要转化为大规模的应
用/传播，并产生市场影响。从这个角度讲，如何实现商业化、如何将包容性创新成果推向市场，仍然是一个重大的挑战。显然，在一些情况下，当发明创造成为私营企业市场扩张战略的一部分时，企业就会有较强的动力去解决产品扩散的问题——一些成功的案例如印度电信、GE的便携式超声仪、Godrej Chotukool冰箱，这些成功的案例证明了市场的活力，私营企业要抓住市场机遇。但是，正如先前提到的，在另外一些包容性创新领域，由于缺乏私营部门的积极参与，难以产生新的创新成果（特别是欠缺质量优的产品），或者难以将创新推向市场。在这种情况下，要开发出足够新产品或实现商业化和扩散，就得更为重要，并需要适当的政策扶持和干预。

由于包容性创新仍然是一个相对崭新的概念，目前仍然没有这方面的最佳实践，也没有国家展现出由于采用了促进包容性创新连贯且相互关联的政策，产生了显著效应。印度在这方面起了个好头，包括成立了一个高级别的国家创新委员会，制定了明确的包容性创新战略，建立了专门基金，促进创新集群的发展等。但是即便如此，印度的努力仍在探索中。因此，我们对如何从系统或政策角度促进包容性创新仍然缺乏了解。草根创新者（他们缺乏正规的培训或教育，只能依靠“土”办法来解决自身问题）要面临的问题与企业创新者有着显著区别。

包容性创新是一项促进社会包容与和谐非常有用的政策工具，但是却并非“捷径”。它只是供政策制定者选择的诸多重要备选项之一，应在解决社会包容和和谐问题的过程中与其他工具一道使用。类似的政策工具还包括，有利的商业环境、实体和ICT基础设施（特别是农村的）、完善的FDI机制、对产权的保护、治理体系、强有力的机构、参与途径、直接补助、教育体系、劳动力流动、竞争性的市场经济环境、鼓励私营部门发展等。例如，对户籍制度的改革，将会给中国上亿的农村人口带来巨大的福利改善。这是包括包容性创新在内的任何方式所难以比拟的。对于农村基础设施来说同样如此，例如，通过修路将一个贫困的村庄与主干道相连。

正如第二章所述，中国具备成为包容性创新大国的前提条件：
（1）完备的国家创新体系，拥有本土知识和较强的技术能力；
（2）实力较强的研发机构和企业家文化；
（3）不断增长的商业阶层和专业人士数量；
（4）快速发展的私营部门，拥有较强的制造业能力和逆向创新能力；
（5）完善并覆盖广泛的基础设施和信息通信设施；
（6）市场和潜在的巨大购买力。

尽管如此，中国目前的包容性创新生态体系仍然面临着巨大的挑战。中国在该领域付出了巨大努力，但是仍缺少明确的国家战略和实施计划。尽管中国拥有数量庞大的公共支持项目，但是其中的许多都具有严重的缺陷，例如，一些政府项目和政策是临时性的，缺乏组织、协调且运转低效；私营部门的贡献有限（源于缺少激励，面临进入 BoP 市场的障碍，各种对私营企业的偏见、监管负担和早期融资的困难等）；高校和研究机构仍然对包容性创新重视不够，而他们的研究成果很少能转化为有效用的和能够广泛使用的产品；草根创新得不到应有的支持，无论是规模还是影响都十分有限并呈零星分散状；创新领域的国际合作对包容性创新重视不足；而所有这些因素之间的联系都非常脆弱，甚至在某种情况下毫无关联。这种情况产生了很多疑问：中国政府设立的各类与包容性创新相关的项目是否运转高效；是否具有广泛的影响力，并显著提高了所有参与者的能力和比较优势；是否能够持续性地生产服务于 BoP 人群的产品；是否能对目标人群带来最佳结果并产生最大影响。

完善的公共政策有助于解决这些挑战，并创造一个运转正常的创新基础设施，从而在一个可持续的基础上提高包容性创新产出。来自中国和全球的经验证明，包容性创新的产出十分依赖于一个充满活力的包容性创新生态系统。有效的政策要能促进协调，促进建立跨领域、跨机构和跨国界的伙伴关系，促进融资，从而实现 BoP 知识的创造、交流和转移，并促成理念创新的实施和广泛采用。这种政策工具应基于的原则包括：产生更大范围的影响力、实现更广范围的覆盖、促进各方更深程度的参与。为了提高私营部门的管理和组织效率、制造能力、市场知识、工艺和行业技能以及风险承担能力，公共政策应鼓励企业采用商业化、可持续性的包容性创新商业模式。政策框架也应包含独立的、经常性的监督和评价机制，旨在实现效率最大化，并使可持续生产最大限度地降低对政府资源构成的负担。
二、公共政策促进包容性创新的要素

综上所述，中国应考虑采用某些适合本国国情的政策工具。政府可以基于自身制度体系、经验和产业设计、实施、试点和调整不同的政策方案。政策选择包括：

（1）制定统一的国家包容性创新政策和所需的制度建设；
（2）建立监管体系和支持性的公共采购政策；
（3）建立专项资金支持包容性创新发展，包括支持 BoP 解决问题的私营风险资本；
（4）提高所有参与者的能力和比较优势，特别是私营部门；
（5）要求公共研究体系将最先进的技术和科技力量投向包容性创新；
（6）为草根企业家和创新者提供专项服务，提高和拓宽其创新能力；
（7）促进国别间、地区间和全球科技研究机构之间的合作，充分利用全球的人才、技术和资源；
（8）竞合和以包容性创新为特定目标，鼓励承担风险、试错和承认项目的失败；
（9）对政策和项目进行独立的、常规性的监督和评估，从而使其效率和影响实现最大化，并从中汲取教训。

1. 统一的全国性包容性创新政策和制度体系

一个统一的全国性包容性创新政策和相配套的制度体系，对于促进全国范围内的包容性创新是必不可少的。中国应当考虑成立一个包容性创新的高级别政策和协调机构，由总理负责或直接向总理汇报。中国有许多的包容性创新项目和项目，具有远大的目标和成熟的技术。但是，目前的政策和制度架构缺乏协调。如果希望整个包容性创新体系开足马力，就需要一个统一的全国性政策以及不同政府层级、机构和项目之间的协调。这个机构应为每个参与方提供明确的发展目标。具体的目标有助于调动各方参与者向既定的目标
标准去努力。应当由一个高级别的机构来承担这些职责，打造一个完备的政策框架，促进中国的包容性创新，以及不同参与方、政府部门和项目之间的合作。此外，在省级、地级政府中同样应考虑成立类似机构。考虑到政策干预对每个创新阶段的影响——从概念形成到创新成果的应用，在这一过程中，该机构应积极寻求来自包容性创新各方参与者的观点与建议，如行业领袖、著名学者、经济学家、部门、金融家、国际专家和来自 NGO 和 BoP 团体的专家和代表。

成立一家包容性创新研究院——作为一个智库，承担政策制定、分析、咨询和推广任务，同时连接各方参与者（如政府官员、研发机构、企业、NGO、国际组织、基金会），从而在促进中国的包容性创新事业中发挥重要作用。考虑到由企业、NGO 和不同政府机构推动的各种丰富多彩的包容性创新项目，一家智库可以提供制度化的机制，介绍中国和全球范围内的各种经验和尝试。这将有助于解决各参与方之间信息不对称的问题。同时，还能加深对包容性创新文化的了解，并引导中国丰富的人力资源投身于这一领域。智库将从不同国家的政策和项目中汲取经验教训。同样，全球范围内无论是由政府还是企业发起的包容性创新案例，都有助于定义各种政策和战略，加深对最佳经验和在什么情况下使用的理解。研究院还可以传播其编纂的文献，激发实践者、政策制定者、业余爱好者和公众对包容性创新的兴趣。研究院的作用还能将各类与创新和创新者相关的信息汇集到一处，作为知识交流的平台和包容性创新的门户。

2. 建立监管体系和支持性的公共采购政策

中国应放宽对包容性商业/创新的监管要求，以加快包容性商业活动的开展和增长。尽管中国的改革成效显著，其在全球商业环境排行榜上的名次也大幅提前，但是包容性创新企业仍然面临着许多监管阻力。为了克服这些障碍，政府部门可以出台指导意见，加快清关和处理进程。加快对此类企业破产的规范化处理，将使资源重新配置到更合适的用途。建立专门的监管框架同样能够释放强有力的信号，表明政府对包容性创新的强有力支持。此外，一个向 BoP 创新倾斜的、更加简单的知识产权保护体系将会发挥重要
作用。这样一种产权保护制度既能通过保护知识产权来鼓励创新，也能促进知识前沿的发展，进而寻求二者之间的平衡。包容性创新者在保护其发明时面临一些特殊的问题，这主要是由于成本高、缺少正规的知识产权保护造成的。因此，降低产权保护的申请和维护成本对许多小型企业和草根创新者来说是极为重要的，因为他们通常无力承担维持专利所需的年费。此外，还应加强对创新者有关知识产权的教育，支持他们申请、执行和维护专利权。

IPR框架中应含有创造性的机制条款，例如，全球责任许可（GRL）既能保护IP又能使BoP受益。

3. 支持包容性创新的专项基金

包容性创新专项基金可以为包容性创新的研究、技术开发、可持续生产和流通提供有效支持。这个基金可以以公私合作的形式，解决国家层面支持力度不足的问题。无论是赠款、“软”“硬”贷款、还是耐心资本和风投，都可以为包容性创新的各阶段提供支持，如满足“挑战赛”的要求、开发BoP解决方案，同时缓解各阶段的资金压力——特别是由于资金不济导致产品推迟上市。该基金还能加快创新从概念到实施的进程。为了减少投资对象的风险，帮助它们提高社会影响力、增加投资回报，该基金还应建立一个由孵化器和导师组成的网络，为创新者和企业家提供支持和指导。成功的包容性创新项目和商业活动将成为学习的“榜样”，激发人们的想象力，并对包容性创新产生更大的兴趣，使其成为一个有吸引力的商业机会。

政府需要协调和提供融资，特别是早期融资和产品扩大规模阶段的融资。包容性创新中存在的一些对项目本身产生威胁的风险，会较其他项目更大一些，创新的过程也更长一些，这主要源自对销售的挑战、产品新颖性和BoP群体对产品的接受度。因此，公共政策对融资的支持就应在稍晚阶段出现，在这一点上与典型的高技术创新路线不同。实际上，有几个案例开发出了前景广阔的包容性产品，成本极低却功能强大，但是却一直未能投入市场提供给穷人。相反，这些产品仍然停留在概念阶段，或者作为一种生活方式提供给更为富裕的消费者享用。在此背景下，政府应考虑重新调整一些现有
的政府资助项目，包括重新定义其范围、目标和任务，以支持包容性创新的发展。此外，作为必要产品和服务的提供者——即社会福利项目和公共物品的传统提供者——政府在创新生态体系中具有独特优势，可以与其他各方开展合作，以降低成本、提高质量、扩大必需品（包括公共服务）的覆盖范围。因此，他们应考虑减少对一些领域创新的直接干预，例如，供水、污水处理、发电和送电、交通等。相反，政府可以利用一些其他手段，例如，挑战赛、资助研究、采购担保等，向创新者提供需求方面的支持，减少项目的风险和不确定性。

此外，一些关注包容性创新的投资团队（如天使网络和风投机构）应该获得一定的支持，使更多的包容性创新项目更容易获得风险资本。中国已经在扩大私募股权和风险资本市场方面取得了很大进展，但是包容性创新所能获得的私人资本投资仍然处于起步阶段。建立和支持一些独特的融资机制，包括公私合作、商业天使网络以及对股权融资的特别关注，都能够激励和补充私募股权资本的流动。建立这样的团体有助于其获得各类投资的经验教训，在丰富信息来源的同时帮助其重新定义未来的融资方向，同时有助于某一地区或领域的投资团队与其他团体之间开展相互学习。政府建立的旨在促进中小企业创业和早期融资的基金，也可以为开发 BoP 创新解决方案的企业提供支持。为 BoP 提供生计机会的项目会直接导致新的包容性创新成果的产生，同时提高这些包容性创新机构的能力，加强企业与 BoP 成员的联系，促进包容性创新技术的转移。

4. 调动所有参与者的力量，特别是私营部门的参与

政府需要鼓励各方，开发和实施支付得起的包容性创新解决方案，以惠及 BoP 人群。创造包容性创新集群可以推动其发展和社会进步。激励机制应注重提高所有参与者，特别是私营企业的能力和比较优势。例如，创新集群可以促进 BoP 创新，使其成为有利可图的商业机会，从而促进包容性创新和社会进步。中国拥有蓬勃发展的专业群体和较强的工商业基础。但是，一个兴旺发达的包容性创新生态体系需要不同参与者之间更多的跨界交流。在这样一个汇集了研究、商业、风险资本和创造力的集群中，合作精神将会
把创意转化为产品、流程和服务，这也是硅谷成功的关键。打造创新型集群
将有助于增强相关群体之间的参与和合作，扩大包容性创新的影响和范围。
除了开展最前沿的、多学科的研究，这样一种集群还能促进研究者、企业
家、金融家和指导者之间的互动。同时，还能创造出一批支柱性的企业，去
t尝试新的概念如专利库。全球私营部门对进军 BoP 市场的兴趣不断高涨。
为了提高私营部门的参与度，集群可以推出一些成功的“样板”企业，推
动包容性持续发展。此类集群还可以成为企业各种合作实验的“熔炉”。
产业经济学家曾把设立某一行业，如 ICT 行业的专属经济区，作为该行业成
功的重要原因。

5. 鼓励公立大学和研究机构开展包容性创新

研究者和机构之间要形成一种激励结构，鼓励他们利用其智力资本和学
生的创造性来推动包容性创新，并实现发明创造的生产和商业化。为了创
造一个研究包容性创新的完整氛围，那种对研究者和研究部门零散的鼓励
是远远不够的。尽管很多的研究院所已经在包容性创新方面开展了一些开
拓性的研究，但总体而言，中国的学术界仍注重正规的、传统的研究模
式。为了引导研究机构和社团对包容性创新的研究，需要建立新的表彰、
奖励和激励机制，以满足包容性创新对新颖性和独特性的需求。在政策选
择上，要囊括中国主要的研究院所、配套资金、竞争性融资机制，以及以
包容性创新为重要的孵化设施。同样，专门的早期融资机制可以帮助研究
型创业企业和研究者分享子公司的股权，促进商业化与技术转移。研究
院所对研究者的评价和晋升标准也应做出相应调整，以鼓励对包容性创新
的研究。

对于社区外的成员，了解他们的需求，特别是社会文化需求，需要沉浸
其中，并具有良好的非正规信息收集和分析技能，但是即使是一些知名的科
学家也未必拥有这些技能。因此，中国政府可以进行干预，引导研究机构加
强对重点领域的研究，并发挥技术中介的作用。例如，支持开展对 BoP 需
求的评估研究，研发机构便可据此启动研究规划。
专栏 21

促进高校和研究机构参与包容性创新的工具

- 为了激励研究机构开展包容性创新，中国政府可以将这种激励机制正规化。科学委员会的资金可以与研究为 BoP 人群创造的成果和影响相挂钩。
  
- 研究机构的管理和执行机构应在经济社会发展部门、其他利益相关方如代表终端用户的 NGO 中派代表，从而为包容性创新项目提供支持，满足资源匮乏人群的需求。
  
- 应开发一套适用于项目申请阶段的方法，帮助研究人员明确他们的工作如何能对包容性产生积极影响。此外，尽管难以预测研究课题对包容性产生的影响，但是还是可以确认和筛选与包容性无关的项目申请。
  
- 绩效评价体系应包含那些能够为社会带来最大福祉的指标。科学委员会能够产生大量的成果，可以被细分为私人产品、公共产品、社会产品和战略性产品。
  
- 改变技术研究机构的价值体系，这样就可以对那些在包容性创新领域做出重大突破的人给予更大的认可。对于那些通过生产或服务领域，完成 BoP 产品最后一英里工作的科学家和工程师，应给予晋升和物质奖励。
  
- 能力建设对鼓励 BoP 创新也十分重要。研究机构的一项重要职能是提高 BoP 的技术能力。科研人员可以与穷人一道，对新的技术创新进行实地检验，看其是否具备支付得起、可获得性及适用性。
  
- 政府可以帮助科学委员会明确年度基础绩效指标，这些指标要与中国建设和谐社会的目标相一致。

包容性创新中心可以作为开展 BoP 相关研究和新技术开发的重要工具，同时对国内外现有技术进行升级和改进。此类为包容性创新专门设立的机构，有助于突出包容性创新的研究重点。这种机构拥有的创造力可以全部贡献给包容性创新，不仅能够产生包容性创新解决方案，还能记录和传播对包容性创新的研究体会。考虑到时间和成本，可以把现有机构打造为包容性创新中心，而无须设立新的机构。为了吸引和留住该领域的优秀研究人才，可以建立研究教授职位。为了吸引最优秀和最有前途的学生和学者关注包容性创新，并在该领域产生新一代的思想大师，可以考虑采用奖金、奖学金等激励方式。

研发往往并不是创新过程中最重要的一步。许多包容性创新都是现有技
术和商业流程创新的结合体。创新遭遇的最大失败，就包容性创新而言，通常源自最初的创新原型和接下来的开发、推广、商业化和广泛应用——即使最初的想法前景貌似广阔。加强不同领域的合作和拓展融资途径有助于克服这些困难：例如，找到合适的公司——在某一行业积累了一定的商业经验，抑或在另一个完全不同的行业中拥有完善的 BoP 销售网络，那么这家公司将具有独特的优势，能够将 NGO 或 RTI 开发的前景广阔的产品进行商业化；或者找一家中国的当地机构，无论是政府机构、企业还是研究院所——来验证一个海外研究者开发的模型是否有用，否则的话该模型仍将尘埋于纸上。

6. 支持草根创新

政府应从政策、激励手段和制度入手，促进草根创新的开发，发现有前途的草根创新产品并加以推广。尽管中国的一些政策、项目和制度是针对草根创新者的，但仍需加大关注力度和政策的协调力度，系统性地提高此类创新被发现并被成功实现的机会——这将直接解决当前中国草根创新面临的困境：规模小、推广难。向草根创新者提供融资、技术支持，完善现有项目（如农业部和科技部的项目），从而帮助他们抓住此类项目提供的机会，而不是简单地让他们与正规创新领域的参与者同台竞技。建立和维护数据库——在知识产权的适当保护下，将对草根企业家有所激励，并促进对传统知识的创新利用。

许多由政府提供的创新设施，包括检测设备和其他研究设备，分布于一些大学和研究院所中，应更多地向草根创新者开放。中国的许多机构已经参与到草根创新的促进与推广中。但是，尽管存在大量的草根创新活动，由于发明者资源匮乏，导致许多有价值的创新彼此隔离。向草根创新者提供更多的工程、设计、检测和科技工具，将大大增加他们成功的机会。专项资金和技术支持将帮助更多的草根创新成果得以推广。进一步加强草根创新者之间的合作和与创新生态系统其他参与者之间的合作：如“创业周末”，① 就是一种时间短、强度大的经验交流与合作方式。充满灵感的创业者们可以在此期间决

① http://startupweekend.org/。
定他们的想法是否可行。此外，政府可以考虑建立一个中央级的机构负责推广 BoP 草根创新者的成果（如印度的国家创新基金会），对提交的创新申请进行意见征集、记录和分类；获得技术专家的支持，推动有前景的创意进行转化，至少也要形成完整的概念；促进专利和许可安排，并妥善向有意向者进行技术转移。

7. 加强与基金会和国际开发机构的合作

包容性创新项目都是跨学科的，因此，政府应致力于不同学科和机构之间的合作，发挥其合力。尽管中国拥有旺盛的创新力，但是涉及包容性创新的研究机构之间和内部的互动仍然有限。此外，具有突破性的 BoP 解决策略通常都来自于现有的传统解决方式之外。因此，学科间的研究就显得至关重要。应考虑制定特殊的激励措施，指令和融资选择方式，促进不同机构间或同一机构不同部门间开展包容性创新联合项目。为了引导国内和国际人才参与包容性创新研究，研究院所应为其提供激励，尝试新理念，如众源——这将有效降低标准创新流程的成本。

许多生产出的创新产品仍处于模型阶段。因此，政策制定者需要考虑如何在更深层次上完善创新生态体系，并鼓励拥有比较优势的各参与方之间开展更多合作。

中国可以受益于与国际研究机构的合作，促进不同国家间的研究机构形成网络化合作，共享最佳做法并合作解决 BoP 面临的共同问题。许多与 BoP 相关的领域——脱网解决方案、水净化、医疗护理、农业生产力、污水处理和卫生产品、信贷、教育等——都是超越国界的课题。尽管中国拥有大量的尖端科技人才，但是仍然可以利用全球的人才和技术，为一个更大的思想库提供支持。新网络的形成需要汇聚全世界的科学家和工程师。例如，全球研究联盟（GRA）汇集了 9 个国家的 9 家研究网络和 6 万名科学家，开展对贫困、水、能源、健康和其他问题的研究。这样一个融合了多样性和研究声誉的网络被用来解决一些最为迫切的问题。

① www.globalresearchalliance.org/。
在开展包容性创新研究。开展与国际机构的合作能够促进知识的利用，并与中国的优势研究机构一同创造合力。各类交换项目、实地调研和机构间的联合研究都能加深和扩大中国机构在包容性创新领域的知识积累。此外，一些国际性大学创造的商业化模式还需在实践中检验，而本土化则更易于检验其效果。一些 BoP 解决方案可能来自前沿技术而不局限于传统技术，因此，此类合作可以为中国的研究者们提供更多的机会。

8. 挑战赛、竞赛和奖励

中国可以开展全国性的“挑战赛”来解决 BoP 群体面临的相关挑战。类似比尔和梅琳达·盖茨基金会成立的“探索大挑战”项目，或解决 BoP 问题的专项竞争性融资机制，都能够通过协调资金的使用来解决 BoP 创新中面临的巨大智力挑战。类似的挑战赛可以激发社区的活力，并利用他们的智慧实现与 BoP 创新相关的特定目标，并关注一些显而易见的 BoP 需求。尽管这些国际性挑战赛一般都与千年发展目标相关，但是，中国的挑战赛可以针对其特有的挑战或作为千年发展目标的补充。中国还可以利用挑战赛的机会促进创新，降低成本并提高公共产品和服务的质量，正如印度在 Aakash 笔记本电脑上的做法。

为了奖励那些对解决 BoP 需求做出突出贡献的项目，应考虑设置竞赛和奖金。设置奖金的重要性日益凸显，因为这可以作为一种促进变革的强大手段，带来很多的潜在合作伙伴①（例如，私人投资者、创新者、研发机构等），还包括许多尖端的合作者，因为他们非常看重从一项饱受赞誉的 BoP 创新中获得的声誉。奖励不仅意味着认可，还能够增强竞争力，从而带来更多更好的创新。大部分重要的奖励都是驱动参与者向着一个既定的目标奋斗。为了鼓励更多的人勇于尝试风险，奖励除了要祝贺成功者，也要对那些虽然失败但仍然充满新意且耗费了大量精力的创新予以鼓励。

印度标志性的塔塔集团发起了一项令人惊讶的竞赛：奖励最佳失败创

① http://www.mckinseyquarterly.com/Nonprofit/Philanthropy/Using_prizes_to_spur_innovation_2396/?st=spur_2396_1。
意！为了激发创新并鼓励承担风险，这一奖项旨在强调尝试和失败的重要性。构思这项创意的前任主席曾说过：“失败是座宝藏！”①

专栏 22

包容性创新：公共政策和实践的区别

各国政府正在尝试建立“国家创新生态体系”。但是，创建一个“国家包容性创新生态体系”要求对现有的做法进行重大（甚至是勇敢的）改变。

激励科学家和研究机构。促进科技创新意味着转变科学家的商业眼光，从创造“新知识”到创造“可以转变为现金的知识”。这种激励要基于相关标准对科学家进行奖励——例如，申请的专利数量（商业化专利数量）——并向科学家提供股份。对于包容性创新，科学家应获得特殊的许可，从事有助于包容性的尖端科技。为此，需要新的制度性评估体系。

早期公共支持。包容性创新毫无疑问会产生新的产品、新的市场。对于通过标准创新模式生产的正规产品，并不需要政府太多的支持或干预。但是，对于包容性创新产品的早期投入和开发，需要前期政府强有力的采购或补贴支持。没有这种支持，包容性创新产品/服务的失败率将会奇高。在正规的创新体系中，风险资本可以为企业的增长和扩张阶段提供资金。但是，包容性创新需要大量的耐心资本，以及政府可能给予的强大支持。

支持草根创新。草根创新（指穷人的创新）可以为包容性创新做出重大贡献。在正规创新中，政府政策对于如何发现、如何开发、如何走向市场都作出了明确规定。但是在草根创新中，需要新的政策架构。例如，“微小金融”模式改善了金融领域的包容性，“微小风险资本”模式成为草根与市场联系的桥梁。政府应对此类风险资本予以支持，而私营部门对创建此类基金兴趣有限。

维持政府兴趣，区别与私营部门的责任。例如，中国的星火项目，就是为了向农村的穷人传播科技成果，满足此类需求。星火项目在 20 世纪 80 和 90 年代获得了政府的高度重视和支持。但是，在 20 世纪的最后十年，该项目的资金就主要来自于政府和私营企业。在产品和服务向最终消费者传递的过程中，政府应将其责任交由私营部门，确保基于“包容性创新”或“包容性商业”的活动具有可持续性。

支持性的监管体系。“技术创新”在正创创新模式中发挥了关键性作用。在“包容性创新”中，非技术创新如商业模式创新、经营方式创新等，同样发挥了关键作用。这些创新行为需要相应的政策创新。为了促进真正的包容性创新，政府需要“放管”并减少“限制”措施。

资料来源：拉米什·马沙尔卡和维诺德·戈尔：《包容性创新：用更多、为更多》（即将出版）。

三、完善设计、监督和评估机制

所有的公共政策和支持项目都应该使相关参与者在设计阶段就能有效参与。中国的一些项目和活动已经在范围和规模上取得了明显成效，但包容性创新起到了显著推动作用。但是，随着对 BoP 需求理解的加深，这些政策和项目将会提高和扩大包容性创新项目和活动的可行性和影响。BoP 可以为创新过程贡献力量，而那些基于对 BoP 生态系统的深刻了解而创造出的解决方案则更易获得成功。

为了扩大政府支出的影响力，中国的决策者们应在项目设计和评估有效性时充分考虑评价指标和标准的制定（如对潜在受益者的影响、提供的产品和服务的质量和承受力影响范围）。建立影响评价标准，关注那些社会上最大的项目和那些有助于实现国家目标和挑战的项目。例如，能够利用碳中性或碳中性开展脱碳解决方案的项目；通过电网接入提高 BoP 的生产力，并缓解气候变化趋势的项目。

应所有政策中对项目成果和影响进行系统化的独立监管和评估。应强调对项目结果和产出的评估，而非投入——如投入了多少钱、分配了多少补贴。评估和监督的标准要明确，包括目标和成果、产出和影响、指标、监督和评估的成本。在细化标准的同时还应考虑包容性创新的乘数效应。应从项目的整体角度，对包容性创新的政策影响进行评估，例如，影响范围、成

1 例如，据估计，在星火计划中，有超过 4 000 万农村家庭接受了培训并参加了科技特派员项目。全国有 17 万科技特派员，使超过 5 000 万农村家庭受益。
社会审计将为包容性创新提供动力。目前，各政府部门和机构的审计者负责对项目的财务情况进行审计，但是，有必要开展对部门的经济社会性审计。政府机构应确保这些指标的质量、相关性和重要性。同时，可以把某些业绩指标予以公开，以便公众了解其作用并做出比较。建立此类指标并将其公开可以为实现特定目标提供动力。
Chapter 1

Inclusive Innovation: A Conceptual Framework

“Inclusive Innovation” seeks to expand affordable access to quality basic goods and services for excluded populations—primarily those at the “Base of the Pyramid.”

I. The Context: Inequality of Access to Basic Services

The “Base of the Pyramid”\(^\text{1}\) is the world’s largest but poorest socio-economic group. It comprises the 2.6 billion people worldwide—a majority of whom live in Asia—subsisting on less than US $2 a day (PPP). Their size and means speak to substantial inequality even in fast-growing and prosperous nations; BoP members constitute 40 percent of the world’s population, but live on the cost of a Starbucks coffee or two packs of M&M chocolates. The immense size of the BoP

\(^{1}\) Referred to as the “BoP” (also known as the Bottom of the Pyramid) in the literature and remainder of this report.
### Table 1  
**Poverty and Inequality Indicators: A Global Comparison**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>China</th>
<th>Brazil</th>
<th>India</th>
<th>Indonesia</th>
<th>Japan</th>
<th>Mexico</th>
<th>Russia</th>
<th>Philippines</th>
<th>S. Africa</th>
<th>Korea</th>
<th>Thailand</th>
<th>Turkey</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (million)</td>
<td>1 339</td>
<td>190.7</td>
<td>1 210</td>
<td>229.9</td>
<td>127.9</td>
<td>107.4</td>
<td>142.9</td>
<td>92.0</td>
<td>49.3</td>
<td>49.0</td>
<td>67.8</td>
<td>73.7</td>
<td>87.3</td>
</tr>
<tr>
<td>GDP per capita (current US $)</td>
<td>4 393</td>
<td>10 710</td>
<td>1 477</td>
<td>3 039</td>
<td>43 161</td>
<td>9 580</td>
<td>10 440</td>
<td>2 132</td>
<td>7 280</td>
<td>20 757</td>
<td>4 679</td>
<td>9 712</td>
<td>1 172</td>
</tr>
<tr>
<td>Gini index</td>
<td>47.0</td>
<td>53.9</td>
<td>36.8</td>
<td>36.76</td>
<td>24.9</td>
<td>51.74</td>
<td>42.3</td>
<td>44.0</td>
<td>57.8</td>
<td>31.6</td>
<td>53.6</td>
<td>39.7</td>
<td>37.6</td>
</tr>
<tr>
<td>Income share held by highest 20%</td>
<td>47.8</td>
<td>58.1</td>
<td>45.3</td>
<td>44.9</td>
<td>35.7</td>
<td>56.2</td>
<td>48.9</td>
<td>50.4</td>
<td>62.2</td>
<td>39.3</td>
<td>58.6</td>
<td>45.8</td>
<td>45.4</td>
</tr>
<tr>
<td>Income share held by lowest 20%</td>
<td>5.7</td>
<td>3.3</td>
<td>8.1</td>
<td>7.6</td>
<td>10.6</td>
<td>3.9</td>
<td>6.0</td>
<td>5.6</td>
<td>3.5</td>
<td>7.5</td>
<td>3.9</td>
<td>5.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Income share held by highest 10%</td>
<td>31.4</td>
<td>42.5</td>
<td>31.1</td>
<td>29.9</td>
<td>21.7</td>
<td>41.4</td>
<td>33.5</td>
<td>33.9</td>
<td>44.9</td>
<td>22.5</td>
<td>42.6</td>
<td>30.3</td>
<td>30.2</td>
</tr>
<tr>
<td>Income share held by lowest 10%</td>
<td>2.4</td>
<td>1.2</td>
<td>3.6</td>
<td>3.3</td>
<td>4.8</td>
<td>1.4</td>
<td>2.6</td>
<td>2.4</td>
<td>1.5</td>
<td>2.9</td>
<td>1.6</td>
<td>2.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Poverty headcount ratio at US $2 a day (PPP) (% of population)</td>
<td>36.3</td>
<td>9.9</td>
<td>75.6</td>
<td>50.6</td>
<td>8.1</td>
<td>45.0</td>
<td>35.7</td>
<td>26.5</td>
<td>9.1</td>
<td>38.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty headcount ratio at US $1.25 a day (PPP) (% of population)</td>
<td>15.9</td>
<td>3.8</td>
<td>41.6</td>
<td>18.7</td>
<td>3.4</td>
<td>22.6</td>
<td>17.4</td>
<td>10.8</td>
<td>2.7</td>
<td>13.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural population (as % of total population)</td>
<td>56.0</td>
<td>14.0</td>
<td>70.2</td>
<td>47.4</td>
<td>33.4</td>
<td>22.5</td>
<td>27.2</td>
<td>34.3</td>
<td>38.8</td>
<td>18.3</td>
<td>66.3</td>
<td>30.9</td>
<td>71.7</td>
</tr>
</tbody>
</table>

*Source: World Development Indicators; Human Development Report; World Inequality Database.*
poses significant challenges to poverty eradication efforts and social harmony. Given the fiscal constraints prevailing in most countries, social policies can only achieve nation-wide coverage if innovative ways are adopted to ensure that social support programs are efficient, innovative, scalable and financially sustainable.

China’s rapid and consistent economic growth over the past several decades substantially reduced the number of people living in poverty, but sharply increased income inequality. The Gini coefficient\(^1\) of income inequality increased from 38.2 in 1988 to 48.0 in 2007 (Figure 1), and urban-rural disparities in household income grew from 1.9:1 in 1985 to 3.2:1 in 2010 (Figure 2). \(^2\) In 2005, the richest 10 percent of households possessed 31.4 percent of all disposable income—13 times higher than the 2.4 percent share held by the poorest 10 percent. \(^3\) Disparities between the coastal and the interior regions are also widening. The overall Gini Coefficient across regions rose from 0.12 in 1978 to 0.21 in 2007. \(^4\) In the 1980s, western China’s output per capita was over 50 percent of eastern China’s output; now, that figure is 41.5 percent. Indeed, China ranks 116\(^{th}\) among 144 world economies in income equality. \(^5\)

Income offers just one measure of inequality, China also has high inequality of access to essential goods and services. In China and all over the world, the “disadvantaged,” “economically excluded” or “resource-poor” (a group even larger than the BoP) \(^6\) lack access to the basic necessities of life such as clean water, sanitation services, affordable housing, food, basic health care, electricity, roads, basic education, and financial services (Table 2). Significant

\(^1\) The Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. A Gini index of zero represents perfect equality, while an index of 100 implies perfect inequality.

\(^2\) Income inequality in China, which climbed continuously over the past two decades, is showing some signs of flattening and possibly even decline.

\(^3\) Source: World Development Indicators 2011.


\(^5\) Source: World Development Indicators 2011.

\(^6\) Economic exclusion need not result only from low incomes. Other factors such as gender, ethnicity, geographic separation, illiteracy, age, and tribal status, etc., can have similar effects.
disparities in access between urban and rural citizens (Table 3) make the nature of the exclusion more visible, particularly when considering that over 90 percent of BoP members live in rural areas. Moreover, despite their extremely large aggregate purchasing power (well over a trillion US dollars per year world-wide), this group lacks access to non-essential but empowering consumer products and modern markets that the rest of the world has come to take for granted.
### Table 2

**Rural and Urban Disparities in BRICS Countries**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Indonesia</th>
<th>Japan</th>
<th>Mexico</th>
<th>Russia</th>
<th>Philippines</th>
<th>S. Africa</th>
<th>S. Korea</th>
<th>Thailand</th>
<th>Turkey</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy (%)</td>
<td>90</td>
<td>94</td>
<td>63</td>
<td>92</td>
<td>93</td>
<td>100</td>
<td>94</td>
<td>89</td>
<td>94</td>
<td>89</td>
<td>93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial inclusion (bank accounts per 100 people)</td>
<td>107</td>
<td>82</td>
<td>51</td>
<td>717</td>
<td>120</td>
<td>57</td>
<td>84</td>
<td>145</td>
<td>466</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Water and Sanitation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to improved water source-urban (%)</td>
<td>99</td>
<td>98</td>
<td>96</td>
<td>89</td>
<td>100</td>
<td>96</td>
<td>98</td>
<td>93</td>
<td>99</td>
<td>100</td>
<td>99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to improved water source-rural (%)</td>
<td>84</td>
<td>82</td>
<td>84</td>
<td>71</td>
<td>100</td>
<td>87</td>
<td>89</td>
<td>87</td>
<td>78</td>
<td>88</td>
<td>98</td>
<td>96</td>
<td>92</td>
</tr>
<tr>
<td>Access to improved sanitation facilities-urban (%)</td>
<td>87</td>
<td>58</td>
<td>54</td>
<td>67</td>
<td>100</td>
<td>90</td>
<td>93</td>
<td>80</td>
<td>84</td>
<td>100</td>
<td>95</td>
<td>97</td>
<td>94</td>
</tr>
<tr>
<td>Access to improved sanitation facilities-rural (%)</td>
<td>37</td>
<td>52</td>
<td>21</td>
<td>36</td>
<td>100</td>
<td>68</td>
<td>70</td>
<td>69</td>
<td>65</td>
<td>100</td>
<td>96</td>
<td>75</td>
<td>67</td>
</tr>
<tr>
<td><strong>Health Care</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant mortality rate (%)</td>
<td>1.7</td>
<td>1.6</td>
<td>5.3</td>
<td>2.7</td>
<td>0.2</td>
<td>1.4</td>
<td>0.9</td>
<td>2.3</td>
<td>4.1</td>
<td>0.4</td>
<td>1.1</td>
<td>1.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>73</td>
<td>74</td>
<td>64</td>
<td>68</td>
<td>83</td>
<td>76</td>
<td>68</td>
<td>70</td>
<td>54</td>
<td>80</td>
<td>70</td>
<td>75</td>
<td>72</td>
</tr>
<tr>
<td>Dentists (per 10 000 people)</td>
<td>11.5</td>
<td>0.4</td>
<td>0.7</td>
<td>0.6</td>
<td>7.4</td>
<td>14.2</td>
<td>3.2</td>
<td>1.3</td>
<td>5.0</td>
<td>0.7</td>
<td>2.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicians (per 10 000 people)</td>
<td>17.2</td>
<td>14.2</td>
<td>6</td>
<td>2.9</td>
<td>20.6</td>
<td>43.1</td>
<td>11.5</td>
<td>7.7</td>
<td>19.7</td>
<td>3.0</td>
<td>14.5</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>Measles immunization, infants (%)</td>
<td>99</td>
<td>94</td>
<td>71</td>
<td>82</td>
<td>94</td>
<td>95</td>
<td>98</td>
<td>88</td>
<td>62</td>
<td>93</td>
<td>98</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>DTP immunization, infants (%)</td>
<td>99</td>
<td>97</td>
<td>66</td>
<td>82</td>
<td>98</td>
<td>89</td>
<td>98</td>
<td>87</td>
<td>69</td>
<td>94</td>
<td>99</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>Indicators</td>
<td>Brazil</td>
<td>China</td>
<td>India</td>
<td>Indonesia</td>
<td>Japan</td>
<td>Mexico</td>
<td>Russia</td>
<td>Philippines</td>
<td>S. Africa</td>
<td>S. Korea</td>
<td>Thailand</td>
<td>Turkey</td>
<td>Vietnam</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>--------</td>
<td>-------</td>
<td>-------</td>
<td>-----------</td>
<td>-------</td>
<td>--------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>BCG immunization, infants (%)</td>
<td>99</td>
<td>97</td>
<td>87</td>
<td>93</td>
<td>90</td>
<td>96</td>
<td>90</td>
<td>81</td>
<td>96</td>
<td>99</td>
<td>96</td>
<td>97</td>
<td></td>
</tr>
<tr>
<td>Polio immunization, infants (%)</td>
<td>99</td>
<td>99</td>
<td>70</td>
<td>89</td>
<td>99</td>
<td>89</td>
<td>98</td>
<td>86</td>
<td>70</td>
<td>95</td>
<td>99</td>
<td>96</td>
<td>97</td>
</tr>
<tr>
<td>Stillbirths (per 100 total births)</td>
<td>1.0</td>
<td>1.0</td>
<td>2.2</td>
<td>1.5</td>
<td>0.3</td>
<td>0.5</td>
<td>1.6</td>
<td>2.0</td>
<td>0.3</td>
<td>0.4</td>
<td>1.1</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Underweight children (%)</td>
<td>2.0</td>
<td>5.0</td>
<td>44.0</td>
<td>18.0</td>
<td>3.0</td>
<td>21.0</td>
<td>7.0</td>
<td>4.0</td>
<td>20.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Transportation**

| Roads paved (%)                              | 54     | 49    | 59    | 80       | 35    | 80     | 35     | 17          | 79       | 48       |
| Kilometers of roads per 100 sq km land       | 21.0   | 39.0  | 129.0 | 23.0     | 318.0 | 19.0   | 6.0    | 67.0        | 105.0    | 35.0     | 54.0     | 48.0   |

**Communication**

| Telephone lines (per 100 people)              | 22.0   | 22.0  | 3.0   | 16.0     | 32.0  | 32.0   | 7.0    | 8.0          | 58.0     | 10.0     | 22.0     | 19.0   |
| Mobile phone subscriptions (per 100 people)   | 104.0  | 64.0  | 64.0  | 92.0     | 95.0  | 81.0   | 168.0  | 86.0         | 101.0    | 104.0    | 104.0    | 85.0   | 177.0  |
| Internet users (per 100 people)               | 41.0   | 34.0  | 8.0   | 9.0      | 79.0  | 31.0   | 43.0   | 9.0          | 12.0     | 83.0     | 21.0     | 40.0   | 28.0   |

**Energy**

| Access to electricity (%)                    | 98.0   | 99.0  | 66.0  | 65.0     | 90.0  | 75.0   | 99.0   | 98.0         |

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Countries</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>Income disparities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per capita consumption expenditure</td>
<td>4 176</td>
<td>1 592</td>
<td>1 893</td>
<td>616</td>
<td>34</td>
<td>18</td>
</tr>
<tr>
<td>Poverty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poverty headcount rate under US $</td>
<td>13.0</td>
<td>34.8</td>
<td>2.0</td>
<td>26.0</td>
<td>36.0</td>
<td>44.0</td>
</tr>
<tr>
<td>No education (%)</td>
<td>13.0</td>
<td>27.8</td>
<td>5.2</td>
<td>13.8</td>
<td>18.7</td>
<td>37.2</td>
</tr>
</tbody>
</table>

① Data for Brazil are from 2001; data for China are from 2010 and from China statistical yearbook; data for India are from 2007; data for Russia are from 2009; data for South Africa are from 2005–2006. Data for Brazil are from the Pesquisa Nacional por Amostra de Domicílios (2007); data for China, India and Russia are from the BRICS Joint Statistical Publication 2011; data for South Africa are from the Income and Expenditures of Households survey. All are converted to US $ using yearly average currency exchange rates from the IRS.

② Data for Brazil are instead 2001 income levels.

③ Data for India, from 2005, are from UN ESCAP “Social Protection in Asian Cities” and data for China are from World Bank (2009); data for Russia are from 2006 and from World Development Indicators and measured by national poverty line; data for Brazil, Russia and South Africa are from “growth, employment and inequality in BRICS Countries; an overview,” and measured by national poverty line.

④ Data for Brazil (1996), India (2005–2006) and South Africa (1998) are from MEASURE DHS, weighting the separate statistics for the male and female population by the share of the population that is male and female from the World Development Indicators; data for Russia are from NOBUS (2003). Data for China are from 2005 and from 2005 population census survey.
<table>
<thead>
<tr>
<th>Indicators</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Primary school (%)</td>
<td>36.9</td>
<td>51.1</td>
<td>58.1</td>
<td>79.2</td>
<td>22.7</td>
</tr>
<tr>
<td>Secondary school (%)</td>
<td>43.4</td>
<td>19.2</td>
<td>36.8</td>
<td>7.1</td>
<td>44.4</td>
</tr>
<tr>
<td>Tertiary education (%)</td>
<td>6.7</td>
<td>1.9</td>
<td>14.4</td>
<td>2.1</td>
<td>14.2</td>
</tr>
<tr>
<td>Access to health services(^1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newborn mortality rate (%)</td>
<td>2.1</td>
<td>2.6</td>
<td>0.5</td>
<td>1.1</td>
<td>3.2</td>
</tr>
<tr>
<td>Infant mortality rate (%)</td>
<td>4.2</td>
<td>6.5</td>
<td>0.6</td>
<td>1.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Access to safe water(^2)</td>
<td>99</td>
<td>84</td>
<td>98.2</td>
<td>60.5</td>
<td>96</td>
</tr>
<tr>
<td>Access to electricity(^3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households with access to electricity (%)</td>
<td>97.8</td>
<td>88</td>
<td>100</td>
<td>99</td>
<td>93.1</td>
</tr>
<tr>
<td>Access to telecommunication Infrastructure (^4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Data for Brazil (1996), India (2005 – 2006) and South Africa (1998) are from MEASURE DHS. Data for China are from 2009 and from China statistical yearbook.

\(^2\) World Development Indicators 2008 for Brazil, India, Russia, South Africa; data for China are from 2009 and from China statistics yearbook.

\(^3\) Data or Brazil, China, India, South Africa, from 2008, are from “the energy access situation in developing countries” http://content.un.org/go/cms-service/stream/asset/? asset_id = 2205620.

\(^4\) Data for Brazil (2005), India (2005 – 2006) and computers in South Africa (2005 – 2006) give the percents of households with access rather than the number per hundred households; data for the other South African statistics (2010) and Russia (2009 – 2010) give the percent of individuals with access; data for South African internet users (2010) give the percent of individuals who have internet access at home. Data for Brazil are from the Pesquisa Nacional por Amostra de Domicílios, data for India are from MEASURE DHS and report on internet in India (1 – Cube) 2011 and give the percent of individuals who are internet users, data for Russian televisions are from the Russian TV and Radio Broadcasting Network (2010), other data for Russia are from the Russian Longitudinal Monitoring Survey (2009), data for computers in South Africa are from the Income and Expenditure of Households survey (2005 – 2006), data for other South African statistics are from the General Household Survey (2010), and data for China is from 2008 and from Rural household fix-sited survey 2000 – 2009, China urban life and price yearbook 2009 and statistical report on Internet development in China 2009.
<table>
<thead>
<tr>
<th>Indicators</th>
<th>Countries</th>
<th>Brazil</th>
<th>China</th>
<th>India</th>
<th>Russia</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of telephones installed (per hundred households)</td>
<td>Urban</td>
<td>55.2</td>
<td>82.0</td>
<td>26.7</td>
<td>25.0</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>59.3</td>
<td>8.0</td>
<td>57.2</td>
<td>35.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Number of mobile phones (per hundred households)</td>
<td>Urban</td>
<td>172.0</td>
<td></td>
<td></td>
<td>92.6</td>
<td>91.1</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>115.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households owning computers (per hundred households)</td>
<td>Urban</td>
<td>21.5</td>
<td>59.3</td>
<td>7.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>73.2</td>
<td>30.1</td>
<td>99.0</td>
<td>99.0</td>
<td>67.4</td>
</tr>
<tr>
<td>Number of color TVs (per hundred households)</td>
<td>Urban</td>
<td>73.2</td>
<td>30.1</td>
<td>99.0</td>
<td>99.0</td>
<td>89.4</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>93.1</td>
<td>132.9</td>
<td>104.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of internet users (per hundred people)</td>
<td>Urban</td>
<td>16.0</td>
<td>35.2</td>
<td>11.7</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>29.1</td>
<td>4.0</td>
<td>38.8</td>
<td>17.4</td>
<td>14.3</td>
</tr>
<tr>
<td>Access to financial services&lt;sup&gt;①&lt;/sup&gt;</td>
<td>Urban</td>
<td>18.03</td>
<td>12.68</td>
<td></td>
<td>4.79</td>
<td>8.11</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<sup>①</sup> Data for China, from 2006, are from CBRC rural finance service map 2007 and PBC rural finance report; data for India are from 2009 and from financial access 2010 and measured by number of banking branches per 100 000 adults.
Access to health resources and health outcomes in China vary widely across urban and rural areas and disadvantaged and advantaged regions. In 2010, there were 7.62 medical technical personnel, 2.97 licensed and assistant doctors and 3.09 registered nurses per 1,000 people in urban areas, but only 3.04 medical technical personnel, 1.32 licensed and assistant doctors and 0.89 registered nurses in rural areas (Figure 3). Similar disparities can be seen in the newborn mortality rate, the infant mortality rate and the mortality rate for children less than five years of age and maternal mortality. For example, the newborn mortality rate in urban areas is 4.1 percent, compared to 10.0 percent in rural areas (Figure 4).

Differences in education attainment between urban and rural areas are also significant. Although disparities between rural and urban areas have decreased after achieving nearly universal access to primary and secondary education, they remain significant for access to senior secondary and tertiary education. During 1999–2006, 84.5 percent of school-age urban students attended senior secondary school after graduating from secondary education, compared with only 25.2 percent for the rural population. Similarly, 58.7 percent of urban students

![Figure 3 Medical technical personnel in health care institutions (2010)](image)

Source: China Statistical Yearbook 2011.
transit from senior secondary school to college, but for rural students the ratio is only 24.4 percent (Table 4). According to data collected from 2009 national population sample survey data, among those populations age six or above, 20.29 percent of urban residents attend college, compared with only 5.87 percent in town and 1.46 percent in rural areas (Table 5).

**Figure 4  Infant Mortality rate (2010)**


**Table 4  Education attainment in urban and rural areas, 1979 – 2006**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of primary education</td>
<td>Urban 96.1</td>
<td>Rural 73.6</td>
<td>Urban 98.2</td>
<td>Rural 75.6</td>
</tr>
<tr>
<td>Transition from primary education to junior secondary education</td>
<td>Urban 92.4</td>
<td>Rural 65.1</td>
<td>Urban 94.5</td>
<td>Rural 71.1</td>
</tr>
<tr>
<td>Transition from junior secondary education to senior secondary education</td>
<td>Urban 53.7</td>
<td>Rural 13.0</td>
<td>Urban 64.6</td>
<td>Rural 17.6</td>
</tr>
<tr>
<td>Transition from senior secondary education to tertiary education</td>
<td>Urban 22.3</td>
<td>Rural 3.7</td>
<td>Urban 34.8</td>
<td>Rural 11.3</td>
</tr>
</tbody>
</table>

*Source*: World Bank staff calculated from CHNS database.
Table 5  Rural-urban disparities in educational attainment
(Population age 6 and above, 2009)

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Town</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>College and higher level</td>
<td>20.29</td>
<td>5.87</td>
<td>1.46</td>
</tr>
<tr>
<td>Senior secondary school</td>
<td>24.17</td>
<td>14.84</td>
<td>8.26</td>
</tr>
<tr>
<td>Junior secondary school</td>
<td>35.59</td>
<td>44.66</td>
<td>43.44</td>
</tr>
<tr>
<td>Primary school</td>
<td>16.94</td>
<td>28.39</td>
<td>37.33</td>
</tr>
<tr>
<td>No schooling</td>
<td>3.01</td>
<td>6.24</td>
<td>9.50</td>
</tr>
</tbody>
</table>

Source: China population and employment statistical yearbook 2010.

Disparities in access to information technology in China are large-and widening. In urban areas, there are 71.16 personal computers per 100 households, but in rural areas the number is only 10.37 per 100 households. Similarly, there are 188.86 mobile phones for every 100 households in urban areas, but in rural areas this falls to 136.54 (Table 6). During 2005 ~ 2010, the internet penetration ratio in rural areas increased 15.9 percent, compared with an increase of 33.1 percent in urban areas; and in 2010, 50.0 percent of the urban population had access to the internet, compared with only 18.5 percent for the rural population (Figure 6). Digital gaps also exist between advantaged and disadvantaged areas. In 2010, internet penetration reached 69.4 percent in Beijing and 64.5 percent in Shanghai. In comparison the penetration rate for Guizhou and Jiangxi provinces are only 19.8 percent and 21.4 percent, respectively.

Table 6  Penetration rate of computer, mobile phone, telephone and Internet
(Per 100 households, 2000 ~ 2010)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>9.7</td>
<td>41.52</td>
<td>59.26</td>
<td>65.74</td>
<td>71.16</td>
</tr>
<tr>
<td>Rural</td>
<td>0.47</td>
<td>2.10</td>
<td>5.36</td>
<td>7.46</td>
<td>10.37</td>
</tr>
</tbody>
</table>
China also has significant inequalities in access to financial services. 82 percent of urban adults hold bank accounts at a formal financial institution, as compared with 58 percent in rural areas (Figure 7). Compared with medium and large-size enterprises, access to formal credit by small firms remains limited (Figure 8).

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mobile phone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>19.50</td>
<td>137.00</td>
<td>172.02</td>
<td>181.04</td>
<td>188.86</td>
</tr>
<tr>
<td>Rural</td>
<td>4.32</td>
<td>50.24</td>
<td>96.13</td>
<td>115.24</td>
<td>136.54</td>
</tr>
<tr>
<td><strong>Telephone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>94.40</td>
<td>82.01</td>
<td>81.86</td>
<td>80.94</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>26.38</td>
<td>58.37</td>
<td>67.01</td>
<td>62.68</td>
<td>60.76</td>
</tr>
<tr>
<td><strong>Internet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>16.9</td>
<td>35.2</td>
<td>44.6</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>2.6</td>
<td>11.7</td>
<td>15.0</td>
<td>18.5</td>
<td></td>
</tr>
</tbody>
</table>


**Figure 5 Penetration rate of mobile phone (2005 – 2010)**


*Note*: Penetration rate of mobile phone is measured by number of mobile phones owned by urban and rural households.
Figure 6  Penetration rate of internet (2005 ~ 2010)

Note: Penetration rate of internet is measured by percentage of surveyed population who are internet users.

Figure 7  Adult have an account at a formal financial institution (2010)

Some 58 percent of China’s urban population and 52 percent of the rural population has access to improved sanitation facilities. The gap is greater for access to clean water; 98 percent of the urban population compared to 60 percent of the rural population has access to an improved water source.¹

People need access to essential services in order to achieve the basic level of human empowerment needed to participate in economic development productively. Indicators of access to essential services provide insight into the well-being of the BoP and “resource poor” that are not sufficiently captured by reports of their income alone. Just as importantly, however, indicators of access measure human capability. Those without access remain too consumed with the continuing struggle for survival to take risks; too vulnerable to uncontrollable changes in their life to create and seize economic opportunities; and too disconnected from markets to sell or provide knowledge to them, or to consume and extract knowledge from them. The result is that BoP members are not just excluded from the benefits of economic growth, but also from the ability to contribute to it.

¹ World Development Indicator 2011.
A well-designed inclusive growth agenda must therefore address both well-being and human empowerment. The message dominating policy discussions is powerful: *inclusive growth is not just a moral imperative—it is smart economics.* Perceived injustices breed social upheaval (as evident from the recent developments in the Middle East, Thailand, and lower-level disruptions all across the globe), and the periods of economic instability that inevitably ensue. Class-dominated politics often result in the deliberate adoption of wealth-reducing policies or the failure to adjust policies to accommodate growth opportunities presented by foreign direct investment (FDI), trade, and new technologies. Inequality increases the challenge of complementing export-led growth with growth in domestic consumption, as domestic markets struggle to penetrate all levels of society. Most importantly, an economy in which large numbers of its population devote their time, effort, and energy to the exigencies of daily survival will never fire on all cylinders. It will squander its most valuable resource—its people—and transform what should be a demographic dividend into a demographic liability.

Policies can address issues of access, improving quality of life, and empowering resource-poor people—without necessarily raising incomes. As emerging economies continue to design special policies and programs that focus directly on the needs of the economically excluded, they cannot simply wait for a “rising tide to lift all boats” while addressing income inequality exclusively through standard policy levers like tax and transfer mechanisms, subsidies, welfare and entitlements, and standard economic development practices focused on competitive-

---

1. Examples of such initiatives include micro-finance schemes, and cash support programs for the poor that are tied with certain conditions (such as keeping children vaccinated and in schools, pregnant mothers going to hospitals, and so on). A few years ago, India launched its NREGA program to provide guaranteed employment to the rural poor, and is starting to use a national ID system ("Aadhar") as a foundation for more efficiently delivered and more effectively monitored cash transfer scheme (source: http://in.news.yahoo.com/aadhaar-based-direct-cash-transfer-scheme-reduce-poverty-084408803-finance.html, accessed December 15, 2012). Indeed, India is following the footsteps of countries like Brazil, whose conditional cash transfer program ("Bolsa Familia") has distributed US $7.8 billion to 12.7 million needy families covering some 53 million people—a quarter of the nation’s population. Indonesia is adopting a version of the Brazilian program and in October 2010 the Philippines launched its own initiative that will reach 2.3 million families. Source: Newsweek Special Edition-Issues 2011.
ness. Those initiatives are unquestionably important. But an agenda which also facili-
ticates the provision of access to essential goods and services at affordable prices
and helps to increase the purchasing power of the BoP will better equip them to par-
ticipate economically, and will help reduce the injustice of income inequality by
making them more productive thereby generating incomes and improving livelihood.

II. Inclusive Innovation: An Introduction and
Basic Principles

“Inclusive Innovation” seeks to expand access to essential goods and
services, thereby improving quality of life, and enhancing economic em-
powerment through knowledge creation, acquisition, adaption, absorp-
tion, and deployment efforts targeted directly at the needs of excluded popu-
lations, primarily at the Base of the Pyramid (BoP). It is inspired by the
simple fact that truly inclusive growth will happen only through participation; the
BoP must become consumers directly served by the world’s most sophisticated
firms, users of the world’s best available know-how, innovators whose ideas be-
come products used across the globe, and more productive workers and entrepre-
eurs empowered by unprecedented access to basic goods, services, skills, tech-
nology and information. Two key aspects help structure the concept of “inclusive
innovation” and make it suitable for robust analysis and policy design: first, the
characteristics which make an innovation truly inclusive (i.e., defining an “in-
clusive innovation”), and second, the objectives, content, and rationale behind
an “inclusive innovation strategy,” which forms the basis for initiatives by govern-
ments, enterprises, universities, NGOs, and nonprofits alike.

An “inclusive innovation” is any innovation that helps expand afford-
able access to quality products and services which help create livelihood op-
portunities for excluded populations on a sustainable basis and with signifi-
cant outreach. Box 1 provides an explanation of the features which make innova-
tions truly inclusive, are likely to have broad social impact, and can be achieved by innovative processes of any stripe. Indeed, the most important insight about the methods of production of inclusive innovations is their heterogeneity. Inclusive innovations may be a newly-developed or disseminated good and service, or the result of recombining or adapting existing technologies. They may be based on new research and advanced technologies, but also on traditional ways of doing things and low levels of technology. They may not necessarily result from conventional science and technology innovations as much as from organizational, workflow, process, business model, and delivery system innovations. This suggests key roles for governments, public sector agencies, private firms, universities, NGOs, foundations, and even individuals (including BoP members themselves) with disparate areas of expertise or lines of business, varying levels of sophistication and formality, and distinct client, donor, and consumer bases. In short, there is a need to look beyond the high technology emphasis of the current innovation policies and practices.

It must be emphasized that while inclusive innovation is a very useful policy instrument to improve social inclusion and harmony, it is not a ‘silver bullet’. Inclusive Innovation is one important tool in the basket of many tools available to policy makers, but it is by no means the solution to all social problems. Therefore, Governments need to consider deployment of all possible tools including inclusive innovation while designing strategies to deal with the issue of social inclusion and harmony. Such tools include, but not limited to: a supportive business environment, physical and ICT infrastructure (especially rural), sound FDI regime, protection of property rights, governance systems, strong institutions, participatory approach, direct subsidies, sound education system, labor mobility, market based competitive economic environment including encouragement of private sector, etc. inclusive innovation.
Box 1

**Key Features of Inclusive**

An “Inclusive Innovation” is any innovation that leads to affordable access of quality goods and services which help create livelihood opportunities for excluded populations—primarily at the base of the pyramid (BoP)—on a long-term sustainable basis and with significant outreach.

There are five key features of Inclusive Innovation:

1. Affordable access. “Affordability” obviously depends on the target consumer’s position in the economic pyramid, the type of product, and its value and the opportunities it may help create. But for the 2.6 billion people in the world earning less than US $2 per day, what remains fixed is the notion that inclusive products cannot just be “low-cost,” but must be “ultra-low-cost” in order to credibly expand access. Appropriate, “ultra-low-cost” affordability thresholds thus represent extreme reduction targets that are immensely useful in the innovation process, definitive of true inclusiveness, and incredible as it may sound have already been met by products in a number of areas.

2. Sustainable production. In the long term, an inclusive innovation must promote affordable access by relying on basic market principles with which the private sector works comfortably, and not on continued government subsidies or procurement support. The crucial importance of this feature is obvious; higher output, better competition (i.e., competition induced by market-oriented players and not intermediated by political actors), lower cost to taxpayers, and—most importantly—the critical market check that ensures inclusive products provide a good value to consumers and represent a worthwhile social undertaking. It must be noted that the principle of long-term sustainable production does not negate—rather helps to highlight—the critical role of the government to establish and maintain a well-functioning inclusive innovation ecosystem capable of producing inclusive innovations at a socially optimal level. The role of the government, and the market failures which result in the underproduction of inclusive innovations and justify public intervention, are addressed in Section IV of this chapter, in paragraphs 24–26.

3. Quality goods and services which help create livelihood opportunities. A truly inclusive type of innovation cannot just produce low-performing, cheap, knock-off versions of rich country technologies, and market them to poor people—or in other words, use existing know-how to get
“less for less.” Inclusive products must get “more for less” by innovating to overcome cost constraints so that the BoP can enjoy a sound level of quality of basic services as the more economically advantaged. This means harnessing sophisticated science and technology, or truly creative non-technological innovations, to invent, design, produce, and distribute-and reach a price-performance envelope that creates truly affordable access. The emphasis on “livelihood opportunities” refers to products which allow users to secure the necessities of life, and which have the kind of fundamental, empowering impact on the quality of life that would take unrealistic increases in income to achieve-if they could be practically achieved at all given other constraints. Inclusive products primarily help create economic opportunities for the resource-poor through the ends of the innovation-i.e., by increasing access to empowering goods and services-and not through the means of innovation-i.e., by income-generating participation in the innovative process. In important ways, this rationale invokes a return to the traditional case for innovation-its ability to produce breakthrough improvements in the quality of life-alongside the more contemporary objective of enhancing competitiveness.

4. Serves excluded populations, primarily those at the Base of the Pyramid. The 2.6 billion people with income levels less than US $2 per day should be the primary beneficiary of inclusive innovation. They are economically excluded from sharing the full benefits of economic growth, as they often participate in shadow economies that are highly informal, underproductive, and isolated. They are also socially excluded for many reasons, at least one of which is the qualitative difference in their way of life relative to the more economically secure-particularly the emerging middle class which is beginning to define national identities in many countries. Alongside other pro-BoP policies, inclusive innovation can help mitigate these causes of economic and social exclusion.

5. Significant outreach. True inclusion can only happen if the benefits of inclusive innovation reach a large scale, i.e., a significant portion of the population. Depending on the product, the target population may only be a few hundred thousand, or a few million, though in some cases, it may reach hundreds of millions (e.g., low-cost incubators designed to assist premature babies). In all cases, however, inclusive innovations must be widely deployed to merit public support. They cannot simply remain “good ideas,” or be useful for only small groups of idiosyncratic consumers.
Inclusive Innovation is one important tool in the basket of many tools available to policy makers—but it is not the silver bullet. It needs to be deployed along with other policy instruments to deal with social inclusion and harmony issues.


Figure 9 Characteristics of Inclusive Innovations

Consider some inclusive innovations stemming from cutting-edge research and development of significant new technologies. A novel brilliance photo-therapy treatment for newborn babies with severe jaundice costs 25 times lower than the comparable Western devices, and will help clinics treat each year over 20 million children, who suffer from jaundice. The Chotukool, a low-cost (US $69) refrigerator uses high-end insulation to stay cool for hours without power, and consumes half the energy used by regular refrigerators, thereby increasing access to food and healthcare products such as vaccines and therapeutics. The US $39 Aakash computer tablet is another potentially ground-breaking product resulting from new technologies developed by private firms in collaboration
with public R&D institutions. This low cost computing-cum-access device with powerful features could revolutionize education in rural India. Though none of these innovations are yet widespread, they show promises that need to be backed by performance in the field—a problem of “demonstration but not deployment” that inclusive innovation policies can address.

Other inclusive innovations involve fairly rudimentary or existing technologies—but can nonetheless produce a powerful impact. For example, the low-cost (US $100), foot-powered Kick Start Money Maker Irrigation Pump has enabled poor farmers in Africa to move from rain-fed agriculture to irrigated farming without having to invest in more elaborate commercial pumps that are more expensive (and rely on electricity). The Freeplay Lifeline Radio also adapted readily available technologies for the harsh conditions and seclusion of rural South Africa. The sturdy, self-sufficient AM/FM/SW1/SW2 radio is easy to operate, has excellent reception, runs on self-charge or solar power, and has been used to provide information to hundreds of thousands in rural Africa for improved health, safety, education, agricultural productivity, and disaster mitigation. The Bici–Lavadora (MIT D–Lab), a portable, pedal-powered washing machine with an estimated prototype price of US $127, stands to vastly increase the productivity of wash women, and bring some of the benefits of an appliance often taken for granted elsewhere in the world at low-cost and without reliance on electricity (if the prototype can be successfully deployed). Perhaps the most impressive “low-tech” inclusive innovations have come in the area of healthcare: the Jaipur Foot (US $28) currently supplied to 18 countries, and Jaipur Knee, for example, enhanced existing low-cost prosthetic designs with new materials and highly-tested refinements geared towards improving performance for patients and allowing local manufacturing to keep costs ultra low.

Inclusive innovations also rely on workflow, delivery system, and business process innovation (and not just science and technology innovation) to lower costs and expand access. For example, India’s Aravind Eyecare Hospital performs ultra-low cost (US $30) cataract surgeries with quality that
measures up to international benchmarks by making more efficient use of scarce (and highly-paid) surgeons; rather than having a surgeon perform the entire surgery, each medical personnel performs a specific task during the operation (Figure 10). Similar workflow innovations have been applied to perform low-cost open-heart surgeries (at a cost of US $3,000) at the Narayana Hrudayalaya Hospital in Bangalore, India with success rates that match their western counterparts.

**Figure 10  Approaches to Inclusive Innovation**

Other inclusive products use alternative delivery mechanisms designed to bypass some of the constraints that prevent current systems from penetrating excluded populations. New vaccines that do not require refrigeration or that can be completed in a single dose, and the Embrace Incubator (costing US $25) for premature babies that does not require electricity, offer a few examples. All of the examples discussed are a few of many existing inclusive innovations (some still at the development stage and others successfully deployed). A more complete account of existing accomplishments appears in Chapter 3, and descriptions of potential areas for inclusive innovation appear in Box 2 below.
Box 2

**Inclusive Innovation: More from Less for More (MLM)**

To How Many of These Questions Can Innovation Answer Yes?

- Can we make a hepatitis-B vaccine costing US $20 per dose available at 40 times less?
- Can we make a comfortable, safe and fuel efficient car available not at US $20,000 but at ten times less?
- Can we make an artificial foot costing US $10,000 made available at 300 times less?
- Can we make a high-quality cataract eye surgery made available not at US $3,000 but at 100 times less
- Can we make a prostate treatment drug costing US $10,000 available at a price that is 60 times less?
- Can we make a computer tablet available at US $39?

Innovative methods that are low-cost and high-performance have already found solutions that allow the world to emphatically answer ‘yes’ to each of the above questions. Continued efforts and appropriate policies could further expand inclusive products, improving access and quality of life for resource-poor people in the following areas of life:

- Access to affordable technology-computers, mobile phones, internet.
- Access to education-access to information, remote access to class room and laboratory facilities, distance learning, online training, access to virtual libraries, books and journals, collaboration with other institutions in the country and abroad to expand education access fast and at lower costs.
- Access to financial services-financial inclusion, online banking, bill payment, delivery of micro-finance services, ATM machines, insurance and investments products.
- Access to health services-low cost diagnostics, therapeutics and vaccines, patient information, access to doctors, information about disease, child and maternity care, etc.
- Farmer services-information on crop patterns and prices, markets conditions, weather forecasts, use of fertilizers and pesticides, crop and livestock insurance.
- Town management-smart towns, access to internet and education services, crime and transport management, and reduction in pollution.
- Use of radio and television broadcasts (sometimes via satellites) for education, agriculture, entertainment, providing information on laws, emergencies and disasters, etc.

- Climate change-energy efficiency, use of renewable energy, use of solar lamps and solar cooking stoves, grid less electricity supply.

- Emergency and disaster management-forecasting tsunami, hurricanes, floods, storms; evacuation plans; and delivery of emergency assistance to victims.

- Access to government-information about policies, laws, rules and regulations, access to land, property and birth records, targeting of public services, etc.


In addition to the above innovative methods, disruptive “mindsets,” like Frugal Innovation (or Jugaad Innovation), and Reverse Innovation, are gaining attention in the business world. “Frugal Innovation” describes a method of “responding to limitations in resources, whether financial, material or institutional, and turning these constraints into an advantage.”\(^1\) It has been practiced successfully by large firms, both in developed markets (e.g., GE) and emerging (e.g., Tata Motors), and by startup entrepreneurs alike, resulting in inclusive products. Similarly, “frugal science” imagines scientific and technological innovation driven less by curiosity and more by the “pressing problems whose solutions require relevant science and technology know how,” and has already influenced research agendas in premier institutions worldwide.\(^2\) “Reverse Innovation” leverages the low-cost and “frugal” mindset of workforces in countries like China and India to reach dramatic changes in the price-performance envelope unattainable by a workforce operating with “abundance,” and not an “austerity,”

---

mindset. Several principles support these approaches to innovation. First, firms can benefit from seeking alternatives to high-cost and bloated traditional innovative processes. Second, they can benefit from innovating over constraint-induced hurdles, rather than avoiding those challenges by lowering product quality or changing the target market. Finally, mindset matters: accomplishing those tasks requires a frugal and flexible attitude, and output of inclusive innovation depends on approaches to business, and research that have yet to fully catch on in organizations—and yet to be fully understood. These principles provide extremely valuable lessons for innovative firms, but they do not address the points of failure in national innovation systems that keep BoP innovations limited in number and impact. That is the objective of an inclusive innovation strategy.

An “inclusive innovation strategy” is a set of policies which promote the sustainable production, dissemination, and absorption of inclusive innovations by connecting excluded populations to a nation’s innovation ecosystem. Given the BoP’s immense aggregate purchasing power, their needs can theoretically be satisfied on a sustainable basis by private firms working in conjunction with other actors in the innovation production process. However, failures in BoP markets (discussed in Section IV, paragraph 25) result in the severe underproduction of inclusive innovations, and policies designed to promote “frontier innovation” do not adequately address those failures. BoP members remain disconnected from typical innovation ecosystems primarily designed to pursue “frontier innovation.” Limited and low-cost public sector interventions-informed by a deep understanding of how inclusive innovations are developed, disseminated, and absorbed—will create a more optimal level of pro—BoP output. These interventions rely on public and private sector initiatives and global partnerships to create high-performance products and solutions that are affordable by resource-poor people.

\footnote{Vijay Govindarajan and Chris Timble, “Reverse Innovation.”}
In a developing economy with a significant capacity for innovation, but with underserved rural economies reliant on agriculture and underproductive relevant to potential, an inclusive innovation strategy should equip a national innovation system to serve the following goals:

- Promote innovations which provide greater access to the most fundamental basic services-like clean water, sanitation, education, health, food, electricity, telephones, and financial services—so they are produced at a more optimal level;
- Facilitate the creation, diffusion, absorption and deployment of knowledge to continuously enlarge the set of beneficiaries of new (and existing) BoP innovations;
- Provide opportunities for grassroots innovators to bring their ideas to the market (and participate in the gains enabled by their contributions) thereby democratizing innovation;
- Improve competitiveness of agriculture, industry (especially small and medium enterprises, SMEs), informal businesses and farmers. \(^1\)

The objective of an inclusive innovation strategy is not to simply bring a handful of discrete products to the market. It is to forge lasting connections between resource-poor individuals and national innovation eco-systems, overcoming market failures in BoP markets and equipping innovation systems geared for other kinds of innovation to adequately serve them. Sections III and IV address the rationale for pursuing an inclusive innovation strategy, including the justification for, and shape of, appropriate public interventions. Section V makes clear that a strategy cannot be implemented exclusively through government initiatives; enterprises, research and technical institutions (RTIs), international financial institutions (IFIs), global partnerships, and foundations must all be included.

---

1 For example, less than three percent of the Indian workforce is in the modern private sector, while roughly 90 percent is in the informal sector. This heterogeneity translates into a wide dispersion in productivity levels. The average productivity of finance-related businesses is 23 times that of agricultural activities. The least productive formal enterprises in auto components and textiles are hundreds of times less productive than the most productive firms in those sectors in India. Such differences are even starker among informal enterprises.

III. The Rationale: Addressing Multiple Dimensions of Inequality Through a Multi-Pronged Innovation Agenda

Until recently, most discussions on innovation policy have focused on accelerating the pace of technological catch-up and encouraging innovation activities at the technological frontier, in order to enhance national competitiveness. The current innovation strategy, however, seldom sheds light on the livelihood of the common people, especially those in rural areas where the poor and disadvantaged are concentrated. Given the persistent inequality and heterogeneity of emerging economies, the pursuit of “inclusive innovation” should complement “elite innovation” efforts in a multi-pronged and mutually supportive framework for innovation, so that innovation becomes a key driver for social equity and poverty alleviation, as well as increasing productivity and competitiveness.

Box 3

**Frontier Innovation vs Inclusive Innovation: Need for a Multi-Pronged Innovation Strategy**

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Frontier Innovation</th>
<th>Inclusive Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity-driven science and research</td>
<td>Applications-driven and cost conscious science and research</td>
<td></td>
</tr>
<tr>
<td>Driven by</td>
<td>Sophisticated research capabilities, popular among policy makers and STI community</td>
<td>Innovative entrepreneurs faced with challenge of scarcity and aspiration</td>
</tr>
<tr>
<td>Market</td>
<td>Well established route from idea to product to market</td>
<td>Newer routes to not yet established markets</td>
</tr>
<tr>
<td>Margins</td>
<td>High R&amp;D investments recouped by long-lasting premiums (high margins)</td>
<td>High volume low margin products</td>
</tr>
<tr>
<td>Goals</td>
<td>Improving productivity and economic growth</td>
<td>Improving lives of people (access, productivity, and purchasing power), livelihood and social harmony</td>
</tr>
</tbody>
</table>
A coherent inclusive innovation strategy would complement frontier innovation efforts by improving access to essentials and increasing the purchasing power of the resource-poor-while also enhancing productivity and income-generating opportunities for BoP members.

(a) Improving access to essential goods and services. Promoting inclusive innovation can help in achieving the government goal of universal access to high-quality basic services in an efficient and sustainable basis. Countries must expand access to essential goods and services to extract significant returns from their most valuable assets-their people. The “demographic dividend” – a key ingredient for long-term success in many emerging economies-can be achieved only when accompanied by reforms that enable working-age people to become economically productive. Indeed, in some regions where a high percentage of young people are at the BoP or otherwise economically excluded, theoretically favorable demographics (i.e., high ratios of working age to young and old populations) have been negatively correlated with growth.

Inclusive innovation programs promote efforts that enhance human capabilities and productivity thereby enabling more people to participate in economic development. Innovations that have drastically lowered the cost of health care treatments (e.g., jaundice treatments, prosthetics, surgery sterilizations, cataract surgeries) and preventative services (e.g., vaccines, immunizations, diagnostics, clean water systems) can introduce millions more to the workforce and make them far more productive members of it. Similarly, ultra low-cost pre-fabricated shelters and diffusion of knowledge in home construction and improvement can bring affordable, more stable housing to people whose homes are vulnerable to natural disasters and even everyday weather. Breakthroughs in rural-area financial intermediation have increased access to credit, while mobile phones, radios, and literacy-toolkits (computer based literacy system so powerful that an investment of US $1.5 billion could raise literacy rates in Southeast Asia to OECD levels) have increased access to markets, skills and information.

Inclusive innovation can help accelerate progress in meeting the Millennium
Development Goals (MDGs) by promoting the development, deployment and dissemination of low-cost health products for use by resource-poor people and in rural areas. For instance, under-five and infant mortality rates could improve significantly if the US $25 non-electric Embrace incubator makes it to market and becomes readily available even in poorer and remote parts of the world.

Finally, governments commit considerable fiscal resources to programs designed to improve access to social services for the disadvantaged, with an increasing emphasis to expand the scope, coverage and quality of such programs, and to include more social groups. However, given the huge number of BoP and fiscal constraints, social policies can achieve the universal and nationwide coverage with high-quality services only when innovative ways are adapted to ensure these programs are scalable and financially sustainable. That is precisely the objective of pursuing inclusive innovation, and government support for inclusive innovation can have a multiplier effect on increased access that direct purchases and investments cannot.

(b) *Increasing purchasing power and enhancing economic empowerment.* Income inequality, even if reduced, will likely remain a persistent feature of even the most successful (and equitable) growth stories. Thus, any inclusive growth agenda must also directly address the quality of life affordable at very low income levels. Policymakers are rightly concerned about the purchasing power of the BoP, as evidenced by the uproar surrounding commodity and food price instability and inflation. But those issues present only limited opportunity for policy interventions because of their exogenous causes and the extremely large countervailing benefits of high growth and open markets.

Inclusive innovation programs, on the other hand, can credibly help expand what even meager incomes can afford without altering or diluting pro-growth policies. What currently appears far from cost-effective for the private sector—and feats that seem impossible for the public sector given fiscal constraints—need not always be

---

1 Public policy, in medium and long term development and transformation of the Chinese economy—an international perspective (Chapter 7), by Edwin Lim, Ian Porter, Paul Romer and Michael Spence.
so. Applying current technology and know-how to targeted ends, and producing more of it for the precise purpose of lifting up the BoP, has already served millions across the globe. These programs invoke a return to the traditional case for innovation—its ability to produce break-through improvements in the quality of life—alongside its more recent place in development circles, where the primary focus has been enhancing national competitiveness and creating high paying jobs. Put simply, there must be a parallel track of development for the BoP that relies less on redistribution of gains, and more on the direct expansion of the bundle of goods and services against which we traditionally measure purchasing power—and at an ever-accelerating rate.

Consider for instance, the quality of life improvements that come with an affordable non-electric washing machine, a low-cost refrigerator, and non-essential but life-improving health care associated with “modern medicine.” Similarly, computer tablets, phones and radios provide entertainment, and allow excluded people to establish a more connected self-identity informed by participation in the larger national culture previously less accessible to them. Ultra low-cost hygiene products can make tough living conditions more manageable (and reduce the spread of disease). These products do not only make life more comfortable; they empower people. They facilitate economic activity and entrepreneurship by freeing up time, making labor more productive and improving health, and they dull the currently sharp distinctions between low-income and high-income people by increasing access to products that promote dignity, self-worth and identification with the broader society.

(c) Reducing income inequality. The above efforts are the main focus of inclusive innovation, and complement current inclusive growth policies focused on reducing income inequality. Inclusive innovation programs can also help provide income-generating opportunities for BoP members—both as producers and consumers of inclusive innovations. With the right policies in place, the needs-driven innovation and creativity inherent in the BoP way of life can be brought to market, to the benefit of grassroots innovators (and society at large). At the same time, diffusion of knowledge to (and adaptation of products for use by) the resource poor can enhance productivity, again improving earnings for BoP businesses, many of which
are small, informal, and severely lag in their productivity potential. Take for example the previously discussed Money Maker Irrigation Pump, which increased incomes for low-income farmers by an average of US $1,000 a year and has lifted almost a half-million people out of poverty.

In some countries, inclusive innovations can help build macro-economically significant industries and kick-start economic development. For example, the growing of medicinal and aromatic plants could be an attractive proposition to provide alternative means of livelihoods for the people of Afghanistan. This sector has high value-added potential by establishing thousands of small processing and distribution businesses, increasing the participation of women, increasing exports, and substituting domestic herbal medicines for expensive imported drugs.

The productivity enhancements made possible by some inclusive innovations can also help address stagnant income mobility, which remains an issue even in fast-growing emerging markets. Indeed, the probability of being stuck in a relatively low level of income has increased in recent years in China. Such trends have a multitude of causes, but persistent productivity dispersion demonstrates that producing and disseminating knowledge useful to the resource-poor remains one of several barriers to climbing the economic ladder.

Box 4

**Inclusive Innovation – A tool in the public policy options basket**

Some 40 percent of world’s population (the BoP) lives on less than US $2 per day. This BoP segment deserves good quality of life as the rest 60 percent do, because all life is important. To meet this challenge, nations need to provide affordable access to basic necessities of life (education, health, food, water, sanitation, etc.) to the BoP, and this has to be achieved despite the income inequality.

---

All the Governments want to achieve three objectives simultaneously and rapidly. First, improving the access to essential services. Second, increasing the purchasing power. And third, reducing the income inequality. But the progress has fallen well short of our aspirations.

Even today, several hundred million people go to bed hungry every night. Why? Nobel laureate Amartya Sen’s research findings on Bengal famine (*Poverty and famines: an essay on entitlement and deprivation* by Amartya Sen, *Oxford University Press*) showed that the famine occurred not because there wasn’t enough food grain; it occurred because people did not have money, or means, to buy it. Standard policies by the governments around the world are designed to increase the means of the poor but through subsidies, entitlements, direct cash transfers and so on. These standard instruments help. But we need to go beyond ‘means’ and achieve the ‘end’, which is the quality of life. Further, we need to achieve not just ‘growth’ but ‘inclusive growth’ – and even more so, an ‘accelerated inclusive growth’.

Such challenges can be met by taking, inter alia, recourse to ‘inclusive innovation’, which means affordable access of high quality products and services, which help create livelihood opportunities for excluded populations on a sustainable basis with a significant outreach.

In some way, ‘inclusive innovation’ will be good for the whole world, not just for the deprived world. A Hepatitis B vaccine that is 20 times cheaper, a high quality cataract eye surgery that is 100 times cheaper, a heart surgery that is 20 times cheaper look like dreams but they have been achieved through inclusive innovation. In all these cases, the quality of vaccine or surgery offered is as good (or even better) than what is offered in the developed world. So this is not just ‘affordable access’ but ‘affordable excellence’. Can we imagine what impact such ‘high quality affordable healthcare’ can mean, not only for the poor but for the rich nations that are grappling with a significant proportion of their budgets being spent on exponentially rising healthcare costs!

To achieve the goal of true ‘inclusive innovation’, we will have to ‘orchestrate’ our actions not only on a national scale but at a global level. The orchestration will involve national governments, NGOs, private sector, research community, international development institutions, etc. Further not just technological innovations, but innovative combination of business model, workflow, system delivery and organizational innovations will have to be harnessed.

It is the synergistic combination of standard policies that the Governments currently use for including the economically excluded combined with ‘inclusive innovation’ that can help create a world, where we can make our dream of seeing a smile on the face of 7 billion people of the world come true, and sooner, rather than later.
IV. The Role of the Government: Building Alliances to Overcome Market Failures

Though a multi-pronged innovation agenda addresses the needs of the BoP, it also has a more distinctly economic rationale: overcoming market failures which lower the output of inclusive innovations. As challenging as market conditions may be, they do not adequately explain the limited scale and scope of pro–BoP products, and the limited commitments of resources devoted to inclusive innovation. Market failures unquestionably form part of the story, and should guide and justify public policy interventions:

(a) Imperfect financial markets. As with any innovative venture, risk permeates the inclusive innovation process. Risks can be higher or more difficult to quantify (i.e., more uncertain) in the context of inclusive innovation because of the drastic price-performance requirements involved, and the layering of risks from delivery and distribution (including consumer financing) challenges once a suitable product is developed.¹

In the context of risky ventures, not every positive net present value project receives funding. Financiers often avoid such projects, even when the payoffs, ap-

¹ A “more for less for many” strategy—more quantity and quality of goods and services, from less resources, for many people—often requires radical re-conceptions of existing business models, organizational structures, and product development, manufacturing and distribution processes. Slight changes to existing ways of doing business to serve the BoP do not always work—either the target is missed completely, or the end product are highly inferior in quality. To overcome that inertia requires initiative and investment, an acceptance of uncertainty, an appetite for risk—and considerably more experimentation and explanation to determine which pro–BoP business models work.

For example, lower-cost inputs do not explain why Indian telcos were able to introduce mobile phone service in India at a cost, orders of magnitude lower than in the USA. Rather, the telcos decided at the outset to adopt a high-volume low-cost strategy. That strategy prompted radically different decisions on when to “make or buy” than adopted by their Western counterparts, who dispersed the risk of up-front investments amongst various players involved in mobile service provision. The end-result was that service providers could charge rates far closer to the (ultra-low) marginal cost of adding a new user to a network, allowing cell phones to emerge as a powerful poverty-fighting and empowerment tool for the BoP, especially among ruralites in India.
appropriately discounted by the risk (if known), are high. This problem is particularly acute when collateral (or hard, reasonably liquid assets even if they do not formally secure a loan) is unavailable, as the absence of collateral makes the chance of recovery in the event of a failure prohibitively small, and introduces prohibitively high costs of contracting and monitoring the efforts of innovators (to the extent their efforts are meaningfully observable at all). Unfortunately, these ventures offer little in the way of collateral, but have positive expected value, describe many innovative projects. Moreover, substitutes for collateral, such as reputation, legal enforcement, and observation of effort, are less available for many inclusive innovations, which are not necessarily driven by large, reputable, and sophisticated firms.

(b) Divergent social and investor risk appetites. A related problem lies in mismatched appetites for risk: even if collateral (or appropriate substitutes for collateral) are available, many financiers simply will not undertake risky projects that are positive expected value if the probability of success is too low. Mechanisms which distribute risk across a wide range of investors mitigate this issue, but do not eliminate it, and introduce new inefficiencies in the form of higher agency and monitoring costs. The end result: projects which may succeed and produce huge social benefits are not undertaken—even assuming that those benefits can be fully captured by investors.

(c) Externalities inherent in any innovation. The assumption that benefits from an investment can be fully captured fails in the context of many innovations, and more so for inclusive innovations. Innovations also produce public goods; that is to say, they produce knowledge, which is non-rivalrous and non-excludable. Intellectual property protections can help secure some, but not all, of the benefits of such knowledge for innovators, and, in any event, are insufficiently implemented in many parts of the world. The result, again, is an underallocation of resources to innovative endeavors.

(d) Additional externalities from inclusive innovation. Successfully deployed inclusive innovations produce other benefits in addition to knowledge that are not
fully internalized by innovators. They promote economic development by improving access to essentials, raising productivity of resource-poor businesses, and decreasing barriers to entrepreneurship among the resource-poor. Benefits in social inclusion, and perceived social equity, enhance national well-being by satisfying people’s desires to live in a more equitable society, by reducing the risk of disruptive social instability, and by increasing the likelihood that wealth-improving policies will be adopted (or reducing the likelihood that wealth-reducing policies induced by perceived unfairness will be adopted). Many inclusive innovations also take a “more from less for more” approach to delivering products, which allows a more acceptable trade-off between environmental damage and prosperity; extreme cost reductions generally involve extreme reductions in the use of resources and energy. It is worth noting that BoP, especially the rural population, is affected most from the adverse effects of poor climatic and environmental conditions.

(e) BoP market isolation: information asymmetries and innovation system failures. BoP markets are currently small, poorly-served, dominated by the informal economy, unproductive relative to potential, and plagued by inefficiencies. Poorer people are often limited to goods and services that are more expensive and of lower quality—if they are available at all. Although the BoP market segment has substantial aggregate purchasing power (in the trillions of dollars), it is largely overlooked by more sophisticated firms, who generally focus on adapting traditional goods, services, business models, production and distribution processes for a lower price point by heavily compromising quality and performance. Most businesses have not yet succeeded in finding innovative approaches to creating and distributing low-cost high-quality products which individuals in this group can afford, and hence are unable to respond to the needs and demands of the disadvantaged or BoP segment in a profitable manner.

(i) Information asymmetry. The problem is not one of businesses simply ignoring a latent market; BoP markets remain underdeveloped and harder to penetrate than traditional markets. Literacy, language, geographic separation (among other barriers) isolate many BoP, and burden the exchange of information (and physi-
cal goods) necessary for markets to function and develop in the first instance. So too does elite “capture” of sophisticated firms; though well-meaning, those in charge and otherwise participating in product development and marketing processes struggle to identify with, understand, and adequately serve people with whom they share little connection. Poor information flows are manifested in the reluctance and inability of consumers to try new products, and the ignorance of businesses with respect to the actual needs, environment and traditions of economically excluded people. \(^1\)

Thus, the information asymmetries at issue do not cause the kind of market-destroying opportunism behind problems like moral hazard and adverse selection. Rather, information exchanges between innovators (in industry, research institutions, and at home and abroad) and BoP populations remain so challenging that appropriate markets never launch in the first place. Producers of knowledge struggle to understand the needs of the BoP, resulting in an inability to identify opportunities to serve them, or to develop products that will be accepted by them. Similarly, BoP members, as repositories of traditional knowledge and needs-driven creativity, struggle to transform those assets into marketable prod-

---

\(^1\) Consider, for instance, some recent and very prominent pro–BoP products developed by large firms, which did not achieve desired scale because of, among other things, a basic lack of understanding of the needs and habits of the target consumer group. The Tata Nano, originally billed as a new “people’s car” that would make auto ownership accessible to people of more moderate means, became a trendy second car for the more wealthy as the auto maker struggled to reach its target consumer. That consumer was disinclined to visit showrooms and trust new-age, seemingly “delicate” cars, and struggled to access standard bank financing (many prospective buyers were unsalaried). The “One Laptop Per Child” initiative faced similar problems; basic design of the PC and its software were poorly matched to local needs, cultures, and expectations, and the initiative was criticized for conceiving the billions-strong BoP as a monolithic group.

Though many critics allege that the problem was marketing failure—i.e., ambitious targets of a US $2,000 car and a US $100 laptop created lofty expectations that would not be met—in fact the problem was plain and simple market failure—poor information exchange between producers and consumers about their habits, traditions and living environment. The ambition to create new products aimed at the BoP should be celebrated; it spurs the radical thinking and changes needed to serve BoP markets, even if a few products miss targets along the way. Promoting and facilitating that information exchange can reduce such misfires in the future, and make sure that innovation—“the successful exploitation of a new idea”—truly runs from end-to-end (and addresses sales, delivery, marketing and financing, in addition to standard criteria for product design and development).
ucts. Many of the failures regarding information exchange can be remedied by promoting the establishment of a well-functioning national innovation system that reaches the BoP, and treats its members as both consumers and producers of knowledge.

(ii) System failures. A well-functioning innovation system generates incentives, builds competence, establishes platforms for experimentation, guides research, facilitates exchanges of information, articulates demand (and reduces uncertainty), and legitimates and promotes innovative endeavors. Networks are fundamental to innovation at all stages of the innovative process. Consider early-stage financing as an example: established networks of angel investors can more effectively syndicate (and disperse risk) to finance a risky venture, and can better match expertise and talent to merge technical skills, ownership, and control.① Currently, however, even highly sophisticated and well-formed innovation systems remain disinterested in inclusive innovation. But just like frontier and catch-up innovation, inclusive innovation also relies on strong networks of information, financing, technical expertise, and even social connections, to inform, incentivize, and guide the creative process, and to transform ideas into marketable products. Efforts to orient national innovation systems for inclusive innovation should increase the output and quality of inclusive innovations to a level more in line with the raw innovative capabilities of a country (i.e., its human capital, existing non-inclusive R&D infrastructure, and so on).

To equip national innovation systems for inclusive innovation and overcome market failures, governments can facilitate the creation and enhancement of market-oriented alliances to tailor (and create) innovative products for unusual markets that balance the four A’s: affordability, accessibility, availability and acceptability. Inclusive innovations have been developed in both emerging and developed economies, but remain sporadic, operate on a limited

① Reduction of agency costs and merging skills, ownership, and control, explain why certain angel investors experience higher success rates than others. Indeed, cursory examinations of angel support for technology companies in the U. S. show that a 7x higher chance of success for a venture funded by a hands-on angel relative to ventures who use angels for financing only.
scale and have a limited impact. A lack of systematic pro–BoP public policies has left too much of this work to be performed by philanthropists, rather than by those motivated by profit, even though many of these products could become very profitable. Governments can help create a self-sustainable system that increases the volume of inclusive innovations, expands the market for low-cost and high-performance products, focuses resources and attention on the “resource poor or BoP” market segment, and makes the provision of products cheaper and more efficient,
and thus more enjoyable by more and more people.

Thus, public support should focus on the creation of a supportive ecosystem and related infrastructure to promote inclusive innovation. Figure 12 illustrates the systemic functioning of the innovative process. But in many countries, the financing, intellectual property rights (IPR), and modes of skills, knowledge and technology transfers that strengthen the innovation chain and pave the path from ideas to products to markets simply are not present, particularly with respect to inclusive innovations. For example, the ecosystem that connects university research (which has produced many inclusive innovations) to markets is weak and does not penetrate the BoP in emerging economies. The constraints that hinder inclusive innovation also inhibit the diffusion of knowledge and the scaling-up of promising new products. Moreover, while an inclusive innovation agenda must promote new pro–BoP innovations, it must also scale-up innovations done in the ‘laboratories of life’—needs-driven “grassroots” achievements that remain isolated in scope, number and impact, but present promise if the inherent creativity of the resource-poor can be encouraged, accessed and successfully disseminated.

The Role of Public Policy. Increased competition constitutes the most effective driver to stimulate innovation, but policy measures and innovation support mechanisms have an important role to play as well. Public policy can enable fundamental investments and resource commitments to create a functioning innovation infrastructure that increases innovation output on a sustainable basis. Thus the main objective of innovation policy should be to create an innovation ecosystem that responds to the challenges of the 21st century, with a focus on inclusive growth. The ecosystem must be able to create, adopt, disseminate and scale-up pro–BoP innovations (including grassroots innovations) through incentives, value assessment, effective commercialization, use, financing, and pro–BoP IPR mechanisms. Due to the alliances necessary to serve the BoP markets, these policies must employ innovative public-private and global partnerships to leverage the strengths of each and develop, produce and distribute inclusive products on a wider scale and sustainable basis. The government’s major focus should
be to facilitate, support, incentivize and leverage the strengths of all stakeholders in order to create sustainable inclusive solutions with significant outreach at maximum efficiency with least possible burden on the public resources.

The term “inclusive innovation” can, and often is, interpreted in different ways: (i) Innovation to make products and services more affordable, and to support their delivery to the poor. This category could also include innovations that address attributes other than cost, for example quality or transparency (in the case of public services); (ii) Innovation whose source lies in the informal sector, also referred to as “grassroots” innovation; and (iii) Innovation that increases the productivity of the BoP, or enables them to widen their income-generating abilities. While the BoP represents an important and untapped market opportunity, from a public policy perspective, the focus of inclusive innovation ought to be on income and productivity-generating opportunities, that will enable the BoP to increase their productivity, widen the range of income-generating activities they can participate in, and in that way enhancing their standard of living.

Another important domain of inclusive innovation is that which helps generate (or preserve) public goods, whether local or global. For example, the BoP often depend on environmental and ecosystem resources. Innovations that help maintain or enhance non-market ecosystem services may play a particularly important function for the BoP; especially the rural poor, who have a stronger dependence on such local environmental and ecological resources than the urban middle-class. The economic rationale for supporting innovation that helps generate local (and global) public goods is particularly compelling. Poorer households have lower consumption because of lower purchasing power, and at times due to the lack of access. Policy interventions for access vis-à-vis affordability are likely to be different-for example, the latter might require direct income supplementation, whereas the former might require market creation or institutional change.
Figure 12  Functional Inputs and Innovation Stages

Specifically, government policies should perform the following functions to address the points of weakness in inclusive innovation ecosystems:

(a) Coordinate and provide financing, particularly early-stage financing and financing to scale-up proven products. The segment of the innovative process where significant risk threatens to sink viable projects is longer in inclusive innovation because of the challenges of distribution, newness of markets, and adoption of products by BoP members. Thus, public support for financing may need to be present at later stages than in typical high-tech innovation. Indeed, several examples exist
of promising, inclusive products that cost little to make and serve vital functions, but have yet to be marketed to the resource-poor. Instead, they remain in a proof of concept stage, or get deployed for use as lifestyle items by more affluent consumers.

(b) Demand-side support. As providers of essential goods and services—both through social welfare programs and in their traditional role as suppliers of public goods—governments remain uniquely equipped to collaborate with other actors in the innovation ecosystem to lower costs, improve quality, and improve access to essentials, including public services. Thus, they should consider limited direct support for innovations in areas like water provision, sanitation, electricity production and transmission, transportation, and other areas. Using instruments such as grand challenges, sponsored research, and procurement guarantees, governments can lend demand-side support to innovators, decreasing the risk and uncertainty of projects.

(c) Orient public research institutions (and non-public ones which use public funds) toward inclusive innovation. Many countries sponsor or directly perform research in areas of national importance through state-run R&D labs and partnerships with universities. Programs directed at providing livelihood opportunities could result in the direct production of viable inclusive innovations, while also building capacity in these institutions for inclusive innovation, and promoting linkages with industry and BoP members that facilitate transfers of promising inclusive technologies. Similarly, a publically-supported Inclusive Innovation Academy—a think tank focused on amassing and disseminating information on BoP needs, potential solutions, and promising approaches to design and delivery of BoP products—could marshal a country’s academic resources in the numerous disciplines relevant to inclusive innovation.

(d) Promote grassroots innovation. Grassroots innovators have important role to play in the inclusive innovation domain. They typically try to address a local problem or respond to specific resource constraint. Governments might consider establishing a central agency responsible for outreach to BoP grassroots innovators (e.g., India’s National Innovation Foundation); soliciting, documenting, and
sorting through submitted innovations; marshalling assistance from technical experts to push promising ideas at least to a proof of concept phase; facilitating patent and licensing arrangements and generally coordinating technology transfers to interested parties.

(e) Jumpstart networks and facilitate collaboration across sectors. In the long-run networks oriented around inclusive innovation should self-assemble. But the government can leverage its institutionalized connections to jumpstart an inclusive innovation ecosystem (or re-orient an existing innovation system for both inclusive and frontier innovation). For example, the government may create a high-level body like an Inclusive Innovation Council to interface with government agencies at all levels, as well as firms, labs, and universities. It can also promote agglomeration—another driver of innovation—through land use policies and the creation of parks and clusters geared towards inclusive innovation. Similarly, government sponsored inclusive innovation portals can streamline procedures and assist interested firms in securing available public support, and expose them to other relevant non-public initiatives.

<table>
<thead>
<tr>
<th>Instruments to promote inclusive innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Policy</td>
</tr>
<tr>
<td>Inclusive Innovation Council</td>
</tr>
<tr>
<td>Inclusive Innovation Academy</td>
</tr>
<tr>
<td>Inclusive Innovation Fund</td>
</tr>
<tr>
<td>Inclusive Innovation Centers</td>
</tr>
<tr>
<td>Inclusive Innovation Clusters</td>
</tr>
<tr>
<td>Innovation Portal</td>
</tr>
</tbody>
</table>

Figure 13 Instruments to Promote Inclusive Innovation

V. Other Agents and Their Roles

A national inclusive innovation agenda should invite contributions from all stakeholders. Well-designed public policy can create a supportive environment that incentivizes and equips all stakeholders to participate in inclusive innovation at
their full potential. But an inclusive innovation system must rely heavily on contributions from the private sector (including the financial sector), the research and academic community, NGOs, and global partnerships—as well as the BoP population itself.

**Private Sector.** Large companies can use their considerable technological, organizational and marketing capabilities to create and deliver products for the BoP people—and turn a profit for their efforts.\(^1\) They benefit from collaborations with other companies and R&D organizations. Low-cost surgeries, mobile phone services, agricultural equipment, automobiles and electronic devices are a few areas where firms have successfully developed pro–BoP products. In addition to standard research and development, these firms disrupted tried-and-true business models, modified organizational structures and created and sourced new capabilities. Their examples demonstrate that other companies can follow suit by establishing a clear vision, setting “stretch” targets, exercising entrepreneurial creativity within constraints, and focusing on people rather than short-term increases in shareholder value (with confidence that profits will come later).\(^2\)

**Smaller businesses and start-ups also have a role to play as suppliers and users of inclusive innovations, and as intermediaries facilitating exchanges between the large firms and the BOP.** These firms have been particularly successful in adapting existing technology and products to the BoP market. Small businesses that are often informal and highly unproductive may also adopt inclusive innovations to increase their incomes and lower prices for the mostly BoP consumers they serve. Small local firms also have powerful information advantages which enable them to facilitate the distribution of products, skills and information to resource-poor people. For example, this advantage has already been leveraged by India’s largest private sector bank ICICI, which uses local outfits for loan assessment and monitoring, while transferring risk to the broader financial system, thus

---

increasing access to credit and other financial services in underserved areas.

**Universities and the R&D Community.** In developing countries, academic and R&D institutions have a special responsibility to support inclusive growth and social equity. Governments support them with the clear objective that their activities and programs benefit society as a whole. As repositories of knowledge and given their immense research capabilities, these institutions must develop solutions for the BoP as they promote growth and competitiveness through “high-end” innovation. Indeed, universities may also benefit financially from inclusive innovation, just as they do with frontier innovation. Institutions should also recognize that inclusive innovation can serve core educational functions in ways that traditional innovation does not by promoting a diverse educational experience, merging multiple areas of study, and fostering greater participation in product design and development by more students.

**Global Partnerships.** International organizations and foreign governments can provide funding, technical assistance, technology transfer and capacity building to help generate, acquire, adapt, produce and disseminate inclusive innovations. They can also enhance innovation capability in developing countries through cooperation and twinning arrangements that strengthen local capacities to develop and implement inclusive innovation. International Finance Institutions (IFIs) like the World Bank should take the lead in promoting inclusive innovation agenda in developing countries in collaboration with other IFIs such as ADB, AfDB, IFAD, IDB, etc. They can leverage their convening power to bring IFIs, donors, philanthropists, patient capital, business, NGOs together and facilitate strategic partnerships. IFIs can also help promote and leverage global partnerships among the R&D community-from developing and developed countries alike. The Global Research Alliance (GRA) offers a good example of a global partnership amongst public R&D institutions from diverse countries such as India, South Africa, Australia, Germany, Finland, and the USA, which is now becoming a knowledge partner in the World Bank-supported inclusive innovation program in Vietnam and other countries.
Importantly, developed countries should realize that they have a stake in this agenda as well. Though inclusive innovation focuses on addressing the needs of the “resource poor,” it can also be useful for wealthier people in poor countries as well as people in developed countries. There is no reason that the US $ 28 Jaipur Foot or the US $ 25 Embrace Incubator cannot find demand in OECD countries—there is nothing inherently “poor” about these innovations. The key features of these innovations are that they are: (i) very low cost; (ii) created or invented with an eye on the needs of the BoP; and (iii) have performance characteristics that are roughly equal to or greater than the performance of more expensive products initially designed and invented for wealthier customers. Nowhere else are the successes of inclusive innovation more relevant to these nations than in the area of health care: not only does lack of access to health care describe a form of first-world exclusion, but the soaring cost of that care has become the single most important fiscal challenge facing the United States today. Global trade and competitiveness frameworks also have implication for inclusive innovation. For example, technology transfer has traditionally been framed in terms of technology maturing in the North, and then being transferred to the South. Inclusive innovation presents the possibility that in many instances the first point of market entry for technologies may well be in the global South.

**NGO Community.** The NGOs can promote development of inclusive products by raising and administering funds, identifying the needs and habits of the BoP and screening ideas and prototypes to determine their fitness and impact for BoP communities (information exchange function), and coordinating projects. Many NGOs are quite small but if they focus in the niche areas, their impact could be significant. NGOs could also play an advocacy role in bringing appropriate messages to the policy makers at different levels of the government.

**The “Excluded,” “Resource – Poor,” and “BoP.”** Excluded and disadvantaged individuals must function as more than just users of inclusive innovations. They must communicate their needs and problems in appropriate forums and work with the other stakeholders to ensure that the solutions created fit their
needs and cultural traditions. They must also improve the diffusion of knowledge and skills (from BoP to outside firms and vice-versa) by interfacing with firms, NGOs and the research sector seeking to reach their communities. Moreover, many in the BoP are innovators themselves. Their “grassroots” efforts must be commercialized to maximize their impact (and provide income and incentives for further innovation).
Chapter 2

The Landscape for Inclusive Innovation in China

I. The Enabling Environment to Promote Inclusive Innovation in China

China has a strong enabling environment for inclusive innovation. Elements of the environment include; (i) the Government’s commitment to create a harmonious society, reduce income disparities and improve access to basic services, providing sound motivation and fiscal resources to pursue inclusive innovation; (ii) a strong and nation-wide physical and ICT infrastructure, facilitating private sector and other actors to pursue inclusive innovation in underdeveloped areas; (iii) a well-developed innovation system, providing the knowledge base, human capital and research and development (R&D) capacity needed to promote inclusive innovation; (iv) a growing private sector with strong manufacturing and reverse innovation capabilities, providing the capacity to develop, produce and deploy low-cost high-performance products to reach BoP customers; (v) an
enormous BoP market with huge potential purchasing power, providing new
growth opportunity for the private sector and other actors to engage in inclusive in-
novation.

Government Commitment to Addressing Disparities

Efforts to address disparities have been ongoing for over past two dec-
ades, with the government launching several policy initiatives for reducing
poverty and bringing economic growth to under-developed regions. In 1986,
the central government initiated the China Poverty Alleviation Program, which tar-
geted 592 designated poor counties, and revised the Program in 2001 to focus on
over 148 000 villages.\(^1\)From 2001 to 2007, on an average about 28 billion RMB
has been provided annually by the central government for poverty alleviation pro-
grams.\(^2\)By the late 1990s, there was increased realization that non-coastal regions
 lagged behind the coastal region. As a response, the government initiated the
“Western Development Strategy” in 1998,\(^3\) continuing with the “Plan on Revital-
izing Northeast” in 2003, which invested billions of dollars in the under-devel-
oped western and northeastern regions.

Recognizing the urgency to address the widening disparities, building a
harmonious society has been placed on top of the government agenda in the
11th Five – Year Plan (2006 ~ 2010). In September 2010 President Hu Jintao
proposed an inclusive growth strategy aimed at reducing poverty, narrowing rural
and urban income gap and promoting equal access to basic social services for urban
and rural poor as well as migrant workers. The 12th Five – Year Plan (2011 ~

\(^1\) This is partly in recognition of the dispersed nature of poverty, and the fact that many of the poor did
not live in the designated poor counties, and the designated poor counties also have many non-poor.

\(^2\) “From poor areas to poor people: China’s evolving poverty reduction agenda—an assessment of poverty

\(^3\) For an overview of China’s Western Development Program, see Goodman, D. S. G. (Ed.)
(2004), China’s campaign to ‘open up the West’ – national, provincial and local perspectives, the China
Quarterly special issues.
2015) marks the shift of creed from ‘pursuing economic growth’ to ‘sharing benefits of development by its all people’, which is reflected in the key initiatives in different sectors, like social security, education, health, transportation infrastructure, sanitation and agriculture.

Consequently, government spending related to broadening access to basic services has dramatically increased. From 2005 to 2012, the central government spending in budget related to people’s livelihood-agriculture, social security, education, health and affordable housing-has expanded from 507 billion RMB to about 2.6 trillion RMB. As such, government spending related to social welfare represents more than 40 percent of total government expenditure in budget in 2012, compared to 25 percent in 2005 (Table 7). With these efforts, significant progress has been achieved in reducing poverty and promoting equal access to basic services.

<table>
<thead>
<tr>
<th>Table 7</th>
<th>Central government spending related to social welfare budget (RMB billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005</td>
</tr>
<tr>
<td>Total central government spending on social welfare</td>
<td>507</td>
</tr>
<tr>
<td>– Healthcare</td>
<td>8.3</td>
</tr>
<tr>
<td>– Education</td>
<td>38.4</td>
</tr>
<tr>
<td>– Social security and employment</td>
<td>162.4</td>
</tr>
<tr>
<td>– Affordable housing</td>
<td></td>
</tr>
<tr>
<td>– Agriculture and subsidies to rural farmers</td>
<td>297.5</td>
</tr>
</tbody>
</table>

(1) Between 1981 and 2008, the share of population earning below US $1.25 a day fell from 84.0 percent to 13.1 percent and more than 600 million people were lifted out of poverty. The coverage rate at county level by the New Rural Cooperative Medical System has expanded from 21.7 percent in 2005 to 95.0 percent in 2011. Free compulsory education in rural areas which was implemented in 2006, achieved nationwide coverage in 2008. Benefitting from the national wastewater treatment project, the rural population with access to clean water has increased from 56.6 percent in 2005 to 84.7 percent in 2010.
However, current government programs face the daunting challenge of expanding in scope, coverage, quality, and efficiency to sufficiently serve other disadvantaged groups, such as migrant workers. Fiscal and budget constraints will place a difficult hurdle for achieving universal and nation-wide coverage, absent innovative ways of making social services scalable, financially sustainable, and delivered in effective and efficient manner. That is precisely the rationale for pursuing inclusive innovation-leveraging fiscal expenditures to promote the development, deployment and dissemination of low-cost and high-performance solutions and thus expand essential social services at an affordable price to excluded populations.

**Strong Physical and ICT Infrastructure**

China has strong nationwide physical and ICT infrastructure which facilitates BoP businesses, especially in underdeveloped areas. Lack of infrastructure is a significant barrier keeping companies from entering the BoP market; as building infrastructure for BoP is a resource-and management-intensive task, few local entrepreneurs have the resources to create this infrastructure. In China, however, strong government efforts have created most of the infrastructure needed

---

1. See Chapter 7: Public policy, in medium and long term development and transformation of the Chinese economy—an international perspective, by Edwin Lim, Ian porter, Paul Romer and Michael Spence.
for BoP business. For instance, 61.3 percent of villages are covered with solid roads, and rural households with access to electricity reached 97.4 percent by the end of 2009. ¹Significant progress has been achieved in providing universal access to ICT infrastructure. Most villages have access to broadcasting and TV, telephone, mobile networks and internet. ²Alongside the hardware infrastructure, government agencies and other actors have also established various rural information service stations to provide farmers with comprehensive, low-cost and accessible information services. ³The presence of such infrastructure facilitates widespread adoption of ICT based inclusive innovation products and services. For instance, rural farmers could make a phone call and access internet to acquire agricultural, market, and technical information through rural information hotlines and platforms launched by local governments, thus improving agricultural productivity and raising farmers’ income.

Well – Developed National Innovation System

Box 5

Key Actors of the Chinese National Innovation System

The Chinese government plays an important role in providing a favorable environment for innovation and offering stable resources for certain areas of research. The central government initiated


² The overall coverage of broadcasting and TV increased from 88.3 percent to 89.0 percent during 1998 – 2009. Nationwide, the villages with over 20 households with electricity access have been connected with broadcasting and TV by 2010. The administrative villages with telephone access have increased from 89.2 percent in 2004 to 100 percent by 2010; it grew to 94 percent for villages with more than 20 households. The proportion of towns connecting with internet has risen to 99.3 percent, and 91.5 percent for administrative villages by 2009. Source: Rural household fix-sited survey, 2000 – 2009.

³ For instance, led by Ministry of Industrial and Information Technology (MIIT) and Ministry of Science and Technology (MOST), 11724 county-level and 107695 village-level information service stations were established by 2011. Jointed with local governments, China Mobile and China Telecom established 118000 and 180000 rural information service stations by 2011. As a result, each county and administrative village could be covered by the information services stations.
some S&T programs to support the most important basic research (Table 18). The National Natural Science Foundation is an important tool leveraged by the government to promote basic research in various areas. Companies are allowed tax deduction for 150 percent of their R&D expenditure.

The higher education system in China has expanded considerably during the last decade from 1,054 institutions of higher education in 1995 to 2,358 in 2010. With almost 700 higher education institutes involved in R&D, a few of these, such as Tsinghua University, enjoy international reputation as major research-oriented universities. Compared to their counterparts in other countries, Chinese universities have two main distinctive features: a greater relative number of enrollments in science and engineering disciplines, which provide a larger base for related research activities; and a strong orientation towards applied research. Over the last decade, Chinese universities have become the fundamental knowledge source and the key bridge in industry-science linkage.

Public research institutes play a key role in supporting basic and strategic research, as well as mission-oriented research, mainly in natural sciences and high-technology-related disciplines. The Chinese Academy of Sciences, the country’s most prestigious research institution network, is the national academy for the natural sciences of the country. The China Academy of Agriculture Research also has a wide spread network on R&D institutions.

Businesses have become active R&D players, now performing over 70 percent of total R&D activities (with 17 percent by foreign firms), up from under 40 percent in 1990. At the same time, the share of public research institutes engaged in R&D has declined from almost half of total to less than one-quarter over the same period (Table 9).


China has excelled in mobilizing resources for science and technology on an unprecedented scale and with exceptional speed, which provides the huge potential and capability for inclusive innovation. China has main components of a national innovation system for pursuing inclusive innovation, including strong

---

1️⃣ The CAS, headquartered in Beijing with institutes all over the country, with over 50,000 staff has 12 branch offices, 117 institutes, more than 100 national laboratories and national engineering research centers, and some 1,000 field stations throughout the country. These CAS branches and offices are located in 20 provinces and municipalities throughout China. CAS has invested in or created over 430 science-and-technology-based enterprises in eleven industries including eight companies listed on the stock exchanges.
public sector institutions, universities, research institutes, enterprises, financing mechanisms, (Box 5). If oriented towards inclusion, the existing innovation system could also be deployed to work on the needs and problems of the excluded population. For example, two institutes of the Chinese Academy of Sciences (CAS) – Shenzhen Institute of Advanced Technology and Technical Institute of Physics and Chemistry—are already working on developing low-cost medical solutions for rural areas. These endeavors can benefit from the considerable intellectual capital the Chinese innovation system possesses that could be potentially deployed to work on the technological problems of the excluded.

Table 8 National S&T programs (million RMB, 2005 ~ 2010)

<table>
<thead>
<tr>
<th>Programs</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>973 basic research</td>
<td>983</td>
<td>1354</td>
<td>1645</td>
<td>1900</td>
<td>2600</td>
<td>4000</td>
</tr>
<tr>
<td>Key technologies R&amp;D program</td>
<td>1624</td>
<td>2888</td>
<td>5423</td>
<td>5066</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Torch program</td>
<td>70</td>
<td>108</td>
<td>139</td>
<td>152</td>
<td>228</td>
<td>220</td>
</tr>
<tr>
<td>Spark program (1988 for rural SME)</td>
<td>117</td>
<td>102</td>
<td>150</td>
<td>200</td>
<td>219</td>
<td>200</td>
</tr>
</tbody>
</table>

Source: China Statistical Yearbook on Science and Technology, 2011.

Table 9 R&D expenditures of different actors (billion RMB, 2005 ~ 2010)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Institutes</td>
<td>51.3</td>
<td>56.7</td>
<td>68.8</td>
<td>81.1</td>
<td>99.6</td>
<td>118.6</td>
</tr>
<tr>
<td>Universities</td>
<td>24.2</td>
<td>27.7</td>
<td>31.5</td>
<td>39</td>
<td>46.8</td>
<td>59.7</td>
</tr>
<tr>
<td>Enterprises</td>
<td>163.0</td>
<td>213.5</td>
<td>268.2</td>
<td>338.2</td>
<td>424.9</td>
<td>518.5</td>
</tr>
<tr>
<td>Large and Medium-sized Enterprises</td>
<td>125</td>
<td>163</td>
<td>211.2</td>
<td>268.1</td>
<td>321</td>
<td>401.5</td>
</tr>
</tbody>
</table>

Source: China Statistical Yearbook on Science and Technology, 2011.

China is now a major S&T player with R&D spending increasing by over 20 percent annually since 2005 and reaching US $112 billion in 2010. ¹

R&D input/GDP ratio has more than doubled in a decade and reached 1.76 percent in 2010 (Table 10). China ranks second in the world after the United States in the number of researchers. A total of 218 national priority labs cover all the major basic science fields. Continuous improvement of national innovation system has resulted in a rapid increase of innovation outcome. For instance, China now stands at 2nd place in terms of scientific research publications and 1st place in terms of patent applications by residents (Table 11).

### Table 10  China’s R&D input and output (2005 – 2010)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Expenditure (US $ billion)</td>
<td>38.7</td>
<td>47.5</td>
<td>58.5</td>
<td>73.0</td>
<td>91.8</td>
<td>111.7</td>
</tr>
<tr>
<td>R&amp;D Expenditure as % of GDP</td>
<td>1.32</td>
<td>1.39</td>
<td>1.4</td>
<td>1.47</td>
<td>1.7</td>
<td>1.76</td>
</tr>
<tr>
<td>Growth rate of R&amp;D (%)</td>
<td>24.6</td>
<td>22.6</td>
<td>23.5</td>
<td>24.4</td>
<td>25.7</td>
<td>21.7</td>
</tr>
<tr>
<td>R&amp;D personnel-full-time equivalent (000)</td>
<td>136.5</td>
<td>150.2</td>
<td>173.6</td>
<td>196.5</td>
<td>229.1</td>
<td>255.4</td>
</tr>
<tr>
<td>Number of PhD graduates (000)</td>
<td>27.68</td>
<td>36.25</td>
<td>41.46</td>
<td>43.76</td>
<td>48.66</td>
<td>48.99</td>
</tr>
<tr>
<td>Domestic patent applications accepted (000)</td>
<td>38.32</td>
<td>47.03</td>
<td>58.65</td>
<td>71.71</td>
<td>87.76</td>
<td>110.94</td>
</tr>
<tr>
<td>Domestic patents granted (000)</td>
<td>17.16</td>
<td>22.39</td>
<td>30.16</td>
<td>35.24</td>
<td>50.18</td>
<td>74.06</td>
</tr>
<tr>
<td>International patent applications (000)</td>
<td>17.33</td>
<td>21.05</td>
<td>24.52</td>
<td>28.98</td>
<td>31.46</td>
<td>39.12</td>
</tr>
<tr>
<td>International patent granted (000)</td>
<td>5.33</td>
<td>5.78</td>
<td>6.79</td>
<td>9.37</td>
<td>12.84</td>
<td>13.51</td>
</tr>
<tr>
<td>No of papers by Chinese scientists and technicians taken by SCI (000)</td>
<td>63.15</td>
<td>71.18</td>
<td>79.67</td>
<td>95.51</td>
<td>108.81</td>
<td></td>
</tr>
</tbody>
</table>


### Table 11  Key education, technology and innovation indicators in selected countries

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident patent applications, 2010 (000)</td>
<td>India: 7.26, China: 293.07, Korea, Rep. of: 131.81, Brazil: 2.71, Russia: 28.72, United States: 241.98, Japan: 290.08, South Africa: 0.82</td>
</tr>
<tr>
<td>No of scientific &amp; technical articles, 2009 (000)</td>
<td>India: 19.92, China: 74.02, Korea, Rep. of: 22.27, Brazil: 12.31, Russia: 14.02, United States: 208.60, Japan: 49.63, South Africa: 2.86</td>
</tr>
<tr>
<td>Current expenditure on education, 2009 (% GNI)</td>
<td>India: 3.07, China: 1.8, Korea, Rep. of: 3.94, Brazil: 4.82, Russia: 3.54, United States: 4.79, Japan: 3.19, South Africa: 5.43</td>
</tr>
<tr>
<td>Pupil-teacher ratio, secondary</td>
<td>India: 32.70, China: 15.46, Korea, Rep. of: 17.98, Brazil: 17.14, Russia: 8.47, United States: 13.76, Japan: 11.97, South Africa: 25.05</td>
</tr>
<tr>
<td>Indicator</td>
<td>Countries</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Tertiary enrollment, 2009 ( % gross)</td>
<td></td>
</tr>
<tr>
<td>Researchers, headcounts /million people, 2008</td>
<td></td>
</tr>
<tr>
<td>Gross expenditure on R&amp;D, 2009 ( % of GDP)</td>
<td></td>
</tr>
<tr>
<td>Quality of scientific research institutions, 2011 ( 1 = very poor; 7 = best in their field internationally)</td>
<td></td>
</tr>
<tr>
<td>University/industry research collaboration, 2011 ( 1 = do not collaborate; 7 = collaborate extensively)</td>
<td></td>
</tr>
<tr>
<td>Number of venture capital deals/ tr PPP $ GDP, 2011</td>
<td></td>
</tr>
<tr>
<td>Domestic resident patent application/bn PPP $ GDP, 2010</td>
<td></td>
</tr>
<tr>
<td>Number of scientific &amp; technical articles, 2009 ( per bn PPP $ GDP)</td>
<td></td>
</tr>
<tr>
<td>Number of domestic trademark registrations/bn PPP $ GDP</td>
<td></td>
</tr>
<tr>
<td>High-technology net exports as share of total net exports, 2010 ( % )</td>
<td></td>
</tr>
</tbody>
</table>

*Source:* The Global Innovation Index, 2012; World Development Indicators, 2012.

China leads the BRICS countries in STI capacity and is catching up fast with OECD countries. With a comprehensive national innovation system, China ranked 29th in innovation index and was top ranking among BRICS in key innovation indicators (Figure 14). Indeed China has made tremendous efforts to mobilize its S&T human resources in order to upgrade the technological level of its economy, and has become a key player in the global competition for talent (Table 12). Moreover,
the STI supporting entities like consulting company, information service business and Venture Capital, etc., are booming as well. Besides basic research, China is rising also in industrial R&D – 5 out of top 15 firms from emerging economies in terms of R&D investment are from China (2011).①

![Figure 14: Ranking of BIRCS countries in the innovation index](source)


**Rapidly Growing Private Sector with Strong Manufacturing Capability**

China’s private sector is increasing its presence in the national innovation system, which provides a solid basis for businesses to pursue inclusive innovation. Official estimates indicate that the number of S&T – based private firms② increased from just 7,000 in 1986 to 150,000 in 2006. Among large and medium-sized industrial enterprises, R&D expenditures by private enterprises were only 10.5 billion RMB in 2006, 63 percent of that of state-owned enterprises (SOEs), but increased to 41.3 billion RMB in 2010, and exceeded that of SOEs.


② By official count S&T – based private firm is defined as private firm that focused on technology acquisition, technology transfer and industrialization, with certain amount of expenditure on R&D and R&D personnel, and should have certain S&T outputs and results such as patents and new products.
in 2010 (Table 12). Furthermore, the number of domestic invention patent applications of large and medium-sized Chinese private industrial enterprises dramatically increased from 1,885 in 2006 to 8,659 in 2010. Many Chinese private firms are catching up in technological capabilities, and some are approaching the international technological frontier, such as Huawei and ZTE in the ICT industry, Suntech Power in solar technologies, and Dalian Machine Tool Group in engineering.

**Table 12**

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>State owned enterprises</td>
<td>16.5</td>
<td>18.2</td>
<td>26.9</td>
<td>32.2</td>
<td>39.2</td>
</tr>
<tr>
<td>Private enterprises</td>
<td>10.5</td>
<td>14.8</td>
<td>23.4</td>
<td>32.2</td>
<td>41.3</td>
</tr>
<tr>
<td>Foreign owned enterprises</td>
<td>44.4</td>
<td>61.5</td>
<td>72.9</td>
<td>86.7</td>
<td>104.8</td>
</tr>
</tbody>
</table>

*Source: China Statistical Yearbook, 2011.*

China possesses immense capacity for producing low-cost and high-performance physical products, led by its strong manufacturing capabilities and the availability of a low-cost and high-quality labor force. The integration of the low-cost manufacturing capability with the R&D capacity provides possibilities to co-create inclusive innovation. Inclusive innovation needs to break the mass production process involving sophisticated machinery, extensive automation and high capital expenditure, and radically recombine it to better suit the needs of the BoP and characteristics of the local resources. A growing number of private firms are now targeting and successful tapping into the BoP market to reach BoP customers. Those enterprises that are close to the BoP have a natural advantage in understanding the needs of BoP and identifying business opportunities. Credit Ease in financial sector, Haier in home appliances industry, and Tsinghua Solar in energy sector, are some successful examples. Many local champions have at their core an innovative business model that taps the pool of low-cost manufacturing capability instead of relying on

---

1 China statistical yearbook, 2011.
automation to provide low-cost solution. For example, BYD broke the automation production line of battery manufacturing to half automation and half labor-intensive processes, thus driving down the prices of batteries dramatically, enabling low-cost battery solutions for those products that need battery as key component.

A Large BoP Market with Rising Aspirations and Purchasing Power

China has an enormous BoP market with rising aspirations huge potential purchasing power. Measured by income of US $1.25 per day (2005 PPP), there were 173 million people living below the poverty line in 2005 in China and if measured by US $2 per day (2005 PPP), the number of BoP stand at 394.6 million. By either criterion, China is currently the second largest national concentration of BoP after India, and represents more than 13 percent of the global BoPs. BoPs in China are concentrated in rural areas. Furthermore, some 250 million rural migrant workers represent another important excluded group. While large number of rural workers have migrated and settled in the cities, they fare considerably worse than local residents (due to household registration (hukou) system) in nearly all non-income measures of welfare, including the quality and costs of housing, access to education, and access to social assistance programs.

The BoP market in China is also growing as its members consume more, demonstrating the huge potential for inclusive innovation. From 2005 – 2010, consumption expenditure of low income rural households has increased from 1 548 RMB to 2 535 RMB. As incomes rises, the share spent on food declines, while

---

1. This does not include some disadvantaged groups that have a higher income but lack access to basic necessities of life, such as clean water and sanitation service, affordable housing, quality education, health care and modern financial services.

2. According to a recent World Bank assessment (World Bank report, 2009, “From poor areas to poor people, China's evolving poverty reduction agenda”), estimated by the income level using the World Bank poverty line of 888 (1124) RMB per person per year at 2003 rural (urban) prices, 93.3 percent of the BoPs are in rural areas, 5.9 percent are migrants working in urban areas for six months or more a year, 0.8 percent urban residents.
the shares for transportation and telecommunications, household facilities and health services grow rapidly. The large BoP market (with rising aspirations and increasing purchasing power) provides a new growth opportunity for the private sector to engage in inclusive innovation to expand scale, reduce costs, and improve quality of products. The BoP markets can also provide companies with increased understanding of issues and needs that companies can help address. Once firms approach this market focusing on the BoP consumers’ interests and demands, it can foster competition, and enhance competitiveness leading to significant growth of the sector due to large profits. It is not only BoP – but the ‘new billion’ market as new consumers with rising incomes emerging from BoP (with aspirations for high quality products) that will be the consumers of inclusive innovation based products and services.

II. The Status of Inclusive Innovation Programs and Initiatives in China

Government Programs and Initiatives

The Chinese government has made concerted efforts to foster the creation and dissemination of innovations relevant to the rural population. A prime example is the Spark Program, which was launched in 1986 and aimed at diffusing advanced and applied technology for development of agriculture and rural areas (Box 6). The Spark program alone has had an average of 150 million RMB (or US $23.7 million) funding earmarked by the central government in the past consecutive five years. Programs and initiatives were also launched for the healthcare sector in the later 1990s to diffuse practical technology to rural hospitals and clinics. Recognizing the large gap between rural and urban area in utilizing information technology, various distance education and e-health programs were initiated by the government from the early 2000s to channel superior medical and educational resources to the countryside.
Box 6

**Spark Program in China**

The Spark program was initiated by the Ministry of Science and Technology (MOST) in 1986 and soon spread to virtually every province all around China. Its name came from the Chinese proverb “A single spark can start a prairie fire,” meaning that the spark of science and technology will extend over the vast rural areas of China. The primary objective was to help transfer and diffuse technology and knowledge to rural areas and thus stimulate the development of local agricultural and other industries and benefit the rural farmers and rural households.

The development of the Spark program went through three stages. Before 1994, the Spark program mainly focused on supporting town and village enterprises (TVEs) through grant funds, technology training to the farmers, and solving of local technology problems using know-how from research institutes. Several dramatic changes happened around 1994, when the main funding for Spark programs started coming through bank loans and capital raised by participants, and not from government agencies, and the program began to support private enterprises and rural entrepreneurs. Also, local governments started playing a leading role in selecting, implementing and supporting the programs. In recent years, the range of the Spark program has become quite comprehensive. Some newly launched projects are granted funding by the Spark program, including promoting rural ICT, promoting the rural science and technology commissioner projects, providing technological training to rural farmers and entrepreneurs, supporting the establishment of rural technology parks and rural industrial clusters, promoting the creation and dissemination of technology for the poor, and so on.

During the “11th Five-year” period (2006–2010), 57,000 projects were established, with a total investment of about RMB 194 billion. The program once accounted for a high percentage of the government’s expenditure on R&D in the late 1980s and early 1990s, but in recent years, the central government provides only a small fraction (an average of 150 million RMB) to support some major projects, which are usually recommended by the local Ministry of Agriculture (MOA) and local Ministry of Science and Technology and decided by the central MOST. Although the local governments provide some matching funds, most of the capital raised for the programs comes from the banks and private enterprises.

*Source: Unleashing India’s Innovation: Toward Sustainable and Inclusive Growth (Chapter 4),* edited by Mark A. Dutz, World Bank, 2007; interview with China Rural Technology Development Center, MOST.
As building a harmonious society has been placed on top of the agenda of the Chinese government, more efforts have been devoted in promoting innovation concerning to the excluded. During the 11th FYP, various programs covering a wide range of sectors including sanitation, health, education, transport, energy, ecological environment, were launched to serve excluded populations (Table 13). Strengthening technology development for improving livelihoods has been assigned a featured role in the 12th FYP on National Scientific and Technology Development (2011–2015). Some of the defined priority areas are strongly related to inclusive innovation, including strengthening the promotion and diffusion of agricultural technology and developing national IT health system.

Table 13 Various government programs aimed at promoting innovation for the excluded

<table>
<thead>
<tr>
<th>Sector</th>
<th>Champions</th>
<th>Year Initiated</th>
<th>Initiatives</th>
<th>Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health care</td>
<td>MOST, MOH</td>
<td>2008</td>
<td>• Organizing the regional coordinated distance Health IT Initiative</td>
<td>• Deep brain stimulation for Parkinson’s Disease; Multi-slice spiral CT; automatic biochemical analyzer; electrical impedance tomography</td>
</tr>
<tr>
<td>Sanitation, Ecological, and environment</td>
<td>MOST, MEP</td>
<td>2006</td>
<td>• Drinking water purification technology</td>
<td>• Purification catalyst for auto exhaust gas</td>
</tr>
<tr>
<td>Education</td>
<td>MOST, MOE</td>
<td>2006</td>
<td>• Pilot project for Public Education by Utilizing Digital Education</td>
<td>• Building a public education platform for a life-long learning society</td>
</tr>
<tr>
<td>Energy</td>
<td>MOF, MOST, NEA</td>
<td>2009</td>
<td>• Golden Sun Program-building photovoltaic power plants in remote area without electricity access</td>
<td>• The Program covers Gansu, Qinghai, Tibet, Xinjiang, Inner Mongolia, Hunan and Yunnan with a total installed capacity 31,095 KW</td>
</tr>
<tr>
<td>Agriculture</td>
<td>MOST, MOA</td>
<td>2009</td>
<td>• S&amp;T special commissioner to create start-ups with farmers in the countryside</td>
<td>• More than 170,000 special commissioners sent to counties across the country</td>
</tr>
</tbody>
</table>
The government has mobilized public funding to support innovation for the excluded, including grants targeted at basic research and funding devoted to the commercialization and diffusion of innovation. For example, at least 200 million RMB of government funding (which is the main funding sources) were granted to support the biology, medical and health engineering departments in Shenzhen Institute of Advanced Technology (SIAT) for the research on low-cost medical services in 2010. Meanwhile, the government is gradually transforming from being the sole funding provider towards a model that induces private sector investment in specific areas. For example, in 2010, while the agricultural technology commercialization fund received an investment of 493 million RMB from the central government and a matching fund of 89 million RMB from local government, it has also successfully attracted 2 836 million RMB of capital from banks and private enterprises.

Fiscal policy has also promoted the private sector’s entry into BoP markets. For instance, a policy called “selling home appliances to the countryside” was launched in 2007. The program offers 13 percent subsidy for rural residents to buy TV, refrigerator, cell phones and other home appliances. The central government contributes 80 percent of the amount of total subsidy and the provincial government contributes the rest. In 2010, 77.18 million sets of subsidized products
were sold in the countryside, with a total value of 173.23 billion RMB. Refrigerator and TV rank top and take up 61 percent of total sales value. Due to the subsidy program, products with features of inclusive innovation like low-cost solar heating equipment are now penetrating into the rural market and thus becoming accessible to BoP. In 2010, some 3,000 companies with 3 million employees were working on the solar industry, which resulted in a total turnover of solar thermal products of around 600 million RMB.

The Chinese government usually partners with local enterprises (mostly SOEs) in implementing inclusive innovation programs. The Information Network Platform for Rural Area (INPRA) program provides a successful example for cooperation between the government and the enterprises. The program was first initiated in 2004 by the Ministry of Industry and Information Technology (MII) and the Ministry of Agriculture (MOA), with the purpose of improving farmers’ access to information technology. The ministries formed a partnership with China Mobile and both actors were assigned tasks and responsibilities taking into account their competencies and resources advantages so as to create a clear rationale for their cooperation. By the end of 2008, the INPRA cover 97.35 percent of the rural areas and the users of INPRA exceeded 40.36 million. The business turned profitable in 2009, despite the large initial investment of 19.5 billion RMB. ②

The government also plays the role of coordinator to foster and facilitate the collaboration between firms and research labs of universities. A typical example is the rural science and technology commissioner project initiated by the MOST and MOA. Under the program, the government incentivizes experts, professors, researchers and PhDs to the countryside to commercialize their innovations, and build agricultural technology parks. In this way, the science and

---


technology commissioner mobilized by the government serves as intermediary between research institutes and enterprise, thus facilitating close linkage between research and production. The rural science and technology commissioner project started in Nanping City, Fujian Province in 1998 rapidly spread nationwide in early 2000s. By the end of 2011, there were about 170 000 science and technology commissioners nationwide who had benefited over 50 million rural households.  

The government also supports technology parks and business incubators to produce and commercialize innovations. Various agricultural science and technology parks have been established to promote the industrialization and commercialization of agricultural innovation. They are the showcase creation and synthesis of agricultural technology, transformation caused by technology achievements, and modern agricultural production. These parks combine technologies and capital, and spur agricultural production by attracting leading agricultural enterprises to organize farmers to engage in high-value production. For example, an Agricultural Technology Park was built in 2009 in Tianjin suburb with initial investment of 150 million RMB, coming from capitalizing on the real estate boom by the village. This Park aims to build a platform to attract leading agricultural enterprises to organize rural farmers to engage in high-value production of mushrooms. While the Park provides land and plants, the enterprises with modern agricultural technology are brought in to promote the industrialization and commercialization of agricultural innovation.

In addition, government procurement has been used to elicit a supply response to promote inclusive innovation. During the past years, the scope and scale of public service purchasing in China has dramatically expanded. As a result, some products related to inclusive innovation have been brought into the gov-

---

1. [http://www.most.gov.cn/ztd/zlqk/jtkqygzkhzqtcwzl/200911/t20091102_73947.htm](http://www.most.gov.cn/ztd/zlqk/jtkqygzkhzqtcwzl/200911/t20091102_73947.htm); presentation materials by Jia Jingdun, Director General of China Rural Technology Development Center.

2. Among others, the public service purchasing now cover breed and agricultural machinery, essential drugs and vaccines, textbooks, and cloud computing.
ernment procurement schemes. For instance, in provinces like Shanxi, Hubei and Shenzhen, the multi-functional diagnostic bed for village clinics that was invented by Shenzhen Institute of Advanced Technology has been introduced into the government procurement list for community health service equipments. The “first buy” scheme guarantees bulk purchase thus making it attractive for private sector to produce inclusive innovation products. In April 2009, Changshu municipal government contracted with Jiangsu Loongson Menglan Technology Company to purchase 10 000 sets of low cost Loongson computers for digital classroom of middle and primary school. Subsequently, under the funding supporting from MOST, MOF and MOA, Jiangsu provincial government plans to spend 350 million RMB to purchase 150 000 sets of computers, which would be used for multimedia teaching in local rural schools.

University and Research Institute Initiatives

In China, research institutes and universities have played important role to support inclusive innovation. As important performers of R&D and repositories of knowledge their strong research capabilities enable them to provide suitable technology required by inclusive innovation. For example, the Tsinghua Green Leap Research Center was founded in 2009 jointly with Cornell University, USA, to act as a node of international BoP network to promote research on BoP in China. The Chinese Academy of Sciences has listed the low-cost medical system as one of the strategic items in its ambitious plan of ‘Innovation 2020.’ Over 30 research institutes affiliated with the CAS have been involved in the study of medical equipment and health services, especially for Shenzhen Institute of Advanced Technology, Suzhou Institute of Biochemical Engineering and Technology, and

---

1 The Loongson computer, originally invented by the Institute of Computing Technology of the CAS, was praised as a “CPU for the poor” on its merits of low cost and low power consumption. The first batch of low-cost PC priced at 1 599 RMB (about US $ 250) in 2006, and the 12 inch laptop on trial costs only 2 000 RMB, based on low-cost Longson – 2E CPU that are invented by the Institute of Computing Technology.
Shanghai Advanced Research Institute who devoted themselves to the research on low-cost medical services (Box 6). Thanks to the indigenous medical chip developed by the SIAT, the prices of diagnosis and monitoring equipments installed in the rural clinics are down dramatically. For example, the multi-function diagnostic bed costs 35 000 RMB (US $ 5 500), while the imported examination equipment applied in the big hospitals can be as high as ten million RMB. However, the program is operated mostly by SOEs and these costs could be further reduced by active participation of the private sector.

At the same time, universities and research institutes also benefit from inclusive innovation. For example, SIAT has been granted over 80 patents in low-cost medical equipment, and has become an important actor in this industry. Participating in inclusive innovation gives SIAT a good reputation. The Natural Science Foundation Committee (NSFC) funded one project related to inclusive innovation since 2009, and the Ministry of Education, and the National Social Science Committee (SSFC) also began funding similar projects since 2009. Furthermore, the practice of inclusive innovation can provide diverse educational experience. For example, Credit Ease was selected as the case for Chinese MBA Case Competition in 2009 and 2010.

Furthermore, China has created a large public agricultural research system, including 1 237 agricultural R&D institutes and 888 agricultural universities or technology colleges. The agricultural research system covers a wide range of areas to develop new species of crop varieties that could enhance the productivity of small rural households (Box 7). For example, Super-hybridization rice and dwarfing-sterile wheat have been cultivated. The experiment on high yield breeding has given successful results and has been adopted by farmers. The adoption of advanced technologies has led to increased efficiency of production. For example, since disease-free sweet potatoes based on tissue cultivation technology were planted in 50 000 hectares in Shandong province, China, the production has increased 30 percent – 40 percent.
Box 7

Low – Cost “Marine Terminal” Suitable for Village Clinics

The “marine terminal” developed by Shenzhen Institute of Advanced Technology have two main components: a portable diagnostic bag and a multi-function diagnostic bed. The portable diagnostic bag is also called multi-parameter physical check-up bag; it is suitable for rural and pastoral regions where people are sparsely distributed. It can perform 7 – lead EKG test, conduct 11 types of urine analyses, measure blood pressure and blood oxygen, monitor breathing, temperature and pulse. The bag is also equipped with a blue-tooth module, which can be used to transfer data of the physical check-up to the multi-function diagnostic bed once the village doctor returns to the clinic.

Multi-function diagnostic bed suitable for village clinics. This equipment is suitable for relatively densely populated rural areas. It includes a multi-function diagnostic bed, a multi-parameter check-up instrument, a general diagnostics system and related medical software. It combines all basic diagnostic functions including blood analysis, urine analysis, 12 – lead EKG, non-invasive blood pressure and blood oxygen, monitoring, and general testing (sight, color blindness, internal medicine, surgery, ophthalmofundoscopy and otoscope). In addition, it is equipped with a doctor workstation software system and a resident health digital record system. The whole set of equipment can meet rural residents’ basic medical diagnostics needs and alleviate the serious equipment shortage in rural areas at a low cost of 35 000 RMB. With this system, farmers only need to pay about 30 RMB for a physical check-up, and a dozen tests can be done within 10 minutes. These beds are sold in over 20 provinces including Jilin, Shandong, Sichuan, Jiangsu, Guangdong, Shanghai, and have been listed in the “community health service enhancement” equipment procurement list by governments of Shaanxi, Hubei, and Shenzhen. Although new, the equipment is widely used over 1 000 villages, and over 30 million rural people benefit from it. There are still 500 000 villages to be covered by such equipments.

Xinjiang Low-cost Health Service Demonstration Project. Xinjiang is located at the northwestern corner of China, with a population of 21 million, of which 12 million live in rural areas, and many belong to minority ethnic groups with very poor health service. Targeting this problem, the Xinjiang Physics and Chemistry Institute of CAS works with SIAT, Xinjiang Northwest Star IT Company to provide grassroots clinics with basic health service systems that are standardized,
low-cost, reliable, and easy to use and maintain. The project aims to demonstrate the system in over 50 village/community clinics and over 10 township hospitals before extending more widely all over Xinjiang. The project also includes components on the collection of health data and statistical analysis of health data at grassroots level using “cloud services” and centralized storage. These components constitute an “Internet of things” in the health sector, which, on the basis of traditional medical equipment and information system, brings health care intelligence, intelligent data acquisition, and data storage into health and medical service. The project helps apply available technology to practical use, serving the economic and social development of Xinjiang.

Diagnosis-by – Cell Phone. Compared with traditional medical technology, cell phone-based devices have many advantages such as mobility, wireless communication, internet service, multimedia, data storage, data management and calculation, sensor technology as well as good user experience, so they represent the future of the emerging bio-medical engineering systems. The joint medical technology group formed by researchers from the Technical Institute of Physics and Chemistry, CAS and Tsinghua University has made many laboratory discoveries that are nearly ready for commercialization. For example, cell phones can be used to perform long-term monitoring of patients, which is a very important issue for diseases that requiring close monitoring. Because of lack of proper devices, it has long been difficult to treat snoring. Now, as long as the patient has a sound sensor attached to his body, the sensor can record the intensity and scale of the snoring and transfer the data via his cell phone real-time or as scheduled. For sports medicine, a physical sensor attached to shoes can record the intensity and frequency of one’s exercise and can even reconstruct a person’s activities of the whole day.

Source: How far is low-cost health service from us, The Southern Daily, March 23 2011; www. cas. cn.

Another important role of the universities and research institutes is to partner with companies to promote the adoption of new inclusive technologies. The form of the partnership could be university spin-offs and university-industry technology alliances through joint research or technology license. The case of the former situation is Tsinghua Solar, which is a spin-off of Tsinghua University to promote the solar thermal technology of Tsinghua University to rural areas. And the case of the latter situation is illustrated by the partnership between SIAT and Shenzhen Kangya Technology Company. As important performers of R&D and re-
positories of knowledge, their strong research capabilities enable them to provide suitable technology required by inclusive innovation. However, these efforts remain ad-hoc and have not yet realized their full potential. These institutes could be prolific in developing solutions for inclusive innovation if they integrate the frontier technology with the specific demands of the excluded, and seek broader participation from the private sector.

**Private Sector Initiatives**

Despite the challenges of limited market information, missing knowledge and skills, inadequate market infrastructure and restricted access to financial services, many companies are promoting inclusive innovation in China. The solutions that make these innovations possible are diverse and several patterns and principles emerge from analyzing the Chinese cases that were interviewed and from numerous discussions with experts and with companies currently engaged in inclusive innovation. Examples from the case studies include businesses that provide services—such as health care, electric power generation and credit to the excluded; and businesses that deliver innovative and affordable products tailored to the requirement of the BoP, such as cell phone, solar thermal system and appliances, enhancing the livelihood of the excluded. The framework includes: (i) adapting technological innovation to provide affordable and acceptable products; (ii) reconfiguring value chain and leveraging local resources to build up local capabilities; (iii) finding creative ways to overcome infrastructure and other constraints; and (iv) combining capabilities and resources with other organizations to co-create inclusive innovation solution.

Adapting technological innovation to provide affordable and acceptable products. The Chinese companies are designing products for the BoP market rather than offering the same products as those in the mature markets of developed economies. They are leapfrogging technologies to create inclusive business models with strikingly lowered costs and successful product adaptations. For example, Medi-
aTek specializes in system-on-a-chip solutions for wireless communication, which lowers the technical barriers for manufacturing and cutting down the cost significantly. As a result, cell phones could be priced as low as US $20, and were widely adopted in both the BoP market in China and in other developing countries. MediaTek stands second after Qualcomm among all the worldwide semiconductor companies in the field of mobile phone chipsets. The electrical bike is manufactured by many local companies. In the electrical bike, a battery is used to replace the traditional engine of motorcycle, and the architecture is simplified, thus lowering the price to the point that is affordable for the BoP groups. Haier invented affordable washing machines that specifically cater to the needs of rural users, including additional functions that target at the need of washing vegetables and unfavorable infrastructure conditions (unstable voltage). The Tebian Electric Apparatus Co developed a small-scale photo-voltage system that could be carried by a camel during the day to generate and store electricity while using the camel to carry other goods; the stored solar energy could then be used to support home appliances at night. Similar products are provided by Trina Solar, another PV manufacturer in Jiangsu. And similar patterns are emerging in the wind turbine industry, where companies such as Goldwind provide small-scale off-grid wind turbine solutions for the farmers. Access to energy, in turn, allows for more efficient production methods and the ability to use other products and services, preparing the ground for more inclusive business models.

Reconfiguring the value chain and leverage the local resources to build up local capabilities. For example, the solar thermal companies and appliance companies in China changed the traditional supermarket-based distribution model in rural areas, and embedded deeply into the local networks to get the fine-grained information, making operations efficient and building trust among consumers. The diffusion of solar thermal system in China’s rural market is a good example of such circumstance. The Nanjing Jiukang Biological Science and Technology Development Company cultivated a new species of Neem with grafting technology which could live in a relatively high-latitude area, enabling it to be planted in almost half the
area of China. The company applies the “company + farmers” model to sourcing from local farmers. The Shunhua Duck Development Company uses a “company + associate + farms” model to rent lakes or reservoirs to build farms for duck raising.

**Finding creative ways to overcome infrastructure and other constraints.** The Global View firm provides cloud-computing-based online training solution to enable rural areas to set up a low-cost online training system, providing education and training for the excluded. Haier has addressed the problem of unstable voltage environment of the rural grid, by developing home appliance that can adapt to the electricity of wide range of voltages. The Himing solar company that provides solar thermal system went a long way around China to provide training in solar energy, to inspire the potential demand and generate brand awareness and at the same time enhancing trust in the brand. Credit Ease, a financial services company that provides person-to-person micro-credit through an internet-based system, introduced the micro-credit model from Grameen Bank that connects the BoP with money from urban areas using an internet-based platform. The company cooperates with local anti-poverty organizations to provide financial literacy programs to its credit clients or basic accounting and even business management skills to its small business borrowers.

**Combining capabilities and resources with other organizations to co-create inclusive innovation solutions.** To succeed in dealing with challenges of doing business with BoP and other excluded, different actors are forming partnerships to develop rights, products, services, and delivery mechanisms. Non-traditional partnerships are especially important to share cost, capabilities and knowledge, filling gaps of the existing system. While companies take the lead in designing and executing inclusive innovation, the other actors are often an integral part of the process. For example, GE partnered with local government to achieve the Health Imagination strategy. ①GE provides affordable customized solution for rural hospi-

---

① GE unveiled its plan of ‘Health Imagination’ in 2009 to develop innovative technologies with the intention of capitalizing on the growth of healthcare needs in emerging economies. The plan will invest US $300 million over 6 years to develop 100 affordable medical devices, 50 products with multi-functions and user-friendly interface will be promoted around the globe by lowering costs to 15 percent.
tals with localized supply chain, and the government helps GE to promote the products and provide training for rural doctors to operate the products provided by GE. Similar partnerships exist in Siemens’ SMART strategy. The partnership between Shenzhen Kangva Technology Company (Kangva) and Shenzhen Institute of Advanced Technology is another example. Kangva (a State Owned Enterprise – SOE) was set up in 2008, for manufacturing and marketing of a low-cost medical system developed by SIAT. SIAT is responsible for basic research and part of the application research, and Kangva is responsible for process innovation and commercialization. For commercialization, Kangva also cooperates with branches of CAS and local governments to promote the application of the products in rural clinics.

**Grassroots Innovation Initiatives**

In China, there are numerous innovations originated by people at the grassroots level, i.e., made by the poor and for the poor, covering a wide range of areas, including agriculture, healthcare, energy, transport, household utilities and public security. Grassroots innovators are informal innovators such as small farmers, students, mechanics, artisans, retired workers or entrepreneurs. Similar to innovation in the formal sector, grassroots innovations also include technological, and organizational innovations. Many of the grassroots innovators address the specific needs of the poor that are often ignored by the formal sector (see Box 8). In most cases, grassroots innovators are not business-oriented. They generally innovate for varied purposes, such as out of innate interest, to improve livelihood and production conditions, to help others, or to reuse waste materials. A large number of grassroots innovators are thus in the public domain and can be freely used by individuals or organizations.

---

1. Siemens initiated the so-called ‘SMART’ strategy representing the acronym of ‘Simple, Maintenance-friendly, Affordable, Reliable and Timely to market’ in 2006 to provide low-cost medical solution for rural areas.

2. For selected grassroots innovation initiatives, see China Innovates: Selected Chinese Innovation published in Honey Bee Newsletter (2009–2011).
Box 8

Grassroots Innovators for Addressing the Specific Needs of the Poor People

_Burglar Alarm._ In 2001, Zhao Tongxiang and his few electrician associates in Da Zhang village, Beichen District, Tianjin, made a burglar alarm for transformers. The burglar alarms sold on the market were so expensive that the village leaders asked them for help. They developed a simple burglar alarm device that cost only about 100 RMB, much cheaper than the similar products sold in the market. The local government organized on-the-spot meetings in Da Zhang to diffuse the innovation, and later on more than 20 villages in the district adopted it.

_Onion Field Pollination._ The excessive application of fertilizer and pesticide killed honey bees so farmers had to pollinate by hand. The “double-smell” Chinese onion, which smells of garlic and onion, remains in bloom for about one month. The artificial pollination period is therefore longer and requires more work. The farmers in Tianjin developed a technique that consisted of keeping rotting materials in the onion field to attract flies which pollinated similar to bees. The innovation was adopted due to its zero cost, and high efficiency.

_Hill-drop Planter._ In 1988, Lu Shengzhan, a village high school student in Hua county, Henan province, invented a hill-drop planter which could be used with tractors for sowing. The small tractors were widely used at the time, but the traditional seed-drills, which had been used in China for more than 2 000 years, could not be used with them. Lu observed how hard his parents worked on manual seeding and this motivated him to create the innovation.

_Source:_ Center for Innovation and Entrepreneurship, Tianjin University of Finance and Economics (TUFE), Tianjin, China.

Many grassroots innovations are incremental innovations that are based on modifications of existing products. They are brought about by innovators recombining existing technologies to match local conditions and solve specific problems. Some contemporary innovations are generated when different individuals or communities find different solutions for the same problem. Each one of them may be sub-optimal. But when pooled together, some of them may show synergistic effect and the formulations so developed may be completely new. A good example is the
invention of the rainfall collection system in the Loess Plateau which is based upon a modification and development of the traditional rainfall collection system. Many innovators use concepts or features well-known in one domain for solving a problem in a totally unrelated domain. Such applications often prove to be very useful for solving persistent problems or the current problems they are facing. For example, grassroots innovations around bicycles include a plough used for seeding, weeding, hoeing, and applying fertilizer; a power device to draw water from wells; power-aided bicycles to convert kinetic energy into electrical energy; a bicycle breathing machine (an impressive innovation that helped save a 15-year-old village girl’s life in Anyang, Henan Province).

There are also collaborative grassroots innovations in which many people come together to solve their own or somebody else’s problem. For instance, the ubiquitous farmers’ research associations in China aim at promoting collaborative innovations. Some grassroots innovators complement, and contribute to, formal research activities. Non-row corn harvesters developed by the rural farmer Guo Yufu, which can harvest corn with variable row spacing, have been sold in many provinces of China. The winter production technology, without additional heating, of greenhouse cucumbers invented in the early 1980s by two farmers in Liaoning Province, has been diffused throughout China. Wang Heng, a farmer in north China’s Shanxi Province, developed a waterproof cement-like material that could set within 6 seconds in water and was strong enough to withstand a water flow of 660 cubic meters per second. This was a breakthrough in underground waterproof projects and his products have been widely used in China and introduced to many other countries, such as Japan, Bangladesh, Republic of Korea and Morocco.

Government plays a role in promoting and scaling up grassroots innovators. For instance, both the MOA and MOST have their own budgets for programs

---

1. This grassroots innovation was developed in the early 1990s, by the farmers in Zhidan County, Shaanxi Province. The details of this are available in Dr. Bin Wu’s book (2003, Routledge); Sustainable Development in Rural China; Farmer innovation and self-organization in marginal areas, pp. 143 – 148.
2. In the past, the corn harvesters could only be used for the harvesting of the corn with fixed row spacing.
promoting and scaling up technological innovation, to which the grassroots innovators’ organizations, such as collectives, research associations, research institutes, companies and others, can apply either individually or jointly with the formal sector. While Guo and Wang set up companies to scale up their businesses, they applied for grants from the government science and technology (S&T) supporting programs and successfully got several rounds of financing for upgrading and scaling up their innovations. The diffusion of many grassroots innovation products also benefits from formal technology diffusion channels, as in the case of the diffusion of greenhouse technology, which was mostly provided by the public agricultural technology extension system. Some government initiatives have already been institutionalized. For instance, a particular category in the annual National S&T Award has been set up for grassroots innovators since 2004. The annual National Invention Exhibition is jointly organized by the China Association for S&T, cooperating with local government. Alongside this exhibition, awards at several levels are given to the innovators.

Some government programs support grassroots innovation by applying patents for the innovation, bridging grassroots innovators with government, enterprises or potential investors, to participate in grassroots innovators exhibitions and prizes. The media plays a very important role in grassroots innovators’ diffusion. For example, the Encyclopedia to Getting Rich, a program by CCTV which focuses on introducing the experience of successful rural entrepreneurs, has helped diffusion of many successful grassroots innovations. There is also some collaboration between domestic and international research institutes in diffusing grassroots innovation in China. For instance, Tianjin University of Finance and Economics (TUFEC), together with SRISTI (Society for Research and Initiative for Sustainable Technologies and Institutions, India), has taken measures to develop and adopt institutional mechanisms for scouting, documentation and dissemination of grassroots innovators, which would enhance the capacity of government and other stakeholders in exploiting grassroots innovators. It has also created an online platform for incubating grassroots innovators, which filed
more than 3,000 grassroots innovators case studies and about 100 grassroots innovators videos. In addition, the students at TUF project help grassroots innovators on marketing and applying for supports from government and other related organizations.

III. Key Issues and Challenges in Promoting Inclusive Innovation in China

The Institutional and Policy Framework

There are many inclusive innovation initiatives and programs in China, but no explicit inclusive innovation policies and strategies. The Chinese government has an explicit objective of promoting inclusive growth, but incorporation of inclusive innovation with an integrated approach remains a challenge. There are many initiatives, with participation of different agents, but in the absence of well-articulated goals, objectives and strategies on how to promote and operationalize inclusive innovation throughout China, the efforts of various actors remain fragmented. Several ministries, agencies and local governments have made a deliberate effort to foster the creation and dissemination relevant to the excluded, which are indirectly contributing to inclusive innovation. However few programs concern all the key elements required for inclusive innovation-the intended beneficiaries, quality, affordability, outreach and commercial sustainability. Some government policies play a role in supporting and stimulating inclusive innovation, but in general, absence of dedicated funding, fiscal incentives, public procurement and

---

2. For example, in 2010 a student team helped Wang Jinling, a laid-off worker who developed a new painting technique by adding the pigment of pearl color into the sand paintings, to make a profit of nearly 80,000 RMB. They also helped Wang get local government support and upgrade his business from a workshop of two to a formal enterprise of more than 30 employees.
other supporting instruments to provide specific incentives, inclusive innovation initiatives are unable to reach their full potential. Lack of efforts to leverage private sector and other sectors to engage in inclusive innovation, also mean increased burden on the government to push the initiatives. What is required is innovation (itself) in both doing as well as delivering inclusive innovation to the masses.

While some programs involve collaboration and coordination, others are fragmented and unstructured, causing a considerable degree of overlap and gaps in functions and responsibilities among various government agencies. For example, innovation in agriculture sector is the focus of government strategy and is championed by Science & Technology Department of the MOA, and rural department of MOST and promoted by multiply government agencies. At the same time, other and perhaps equally important elements, such as access to water, energy, education, medical services, are not fully addressed. Inclusive innovation requires a coordination mechanism among relevant government agencies, but the present government structure currently lacks an effective coordination mechanism and a high-level coordination body.

There is some collaboration between national bodies dealing with STI and poverty alleviation policies, but in general, the science, technology and innovation (STI) policies are isolated with poverty alleviation policies. China has no high-level national body to champion, formulate, support, and monitor implementation of inclusive innovation initiatives. Some mechanisms exist, including the State Council poverty alleviation leading group office for championing the process of formulating the poverty alleviation plan, with various ministries including MOST. However, the Ministry in charge of poverty alleviation does not emphasize mobilizing the power of STI to solve the problems faced by the poor, nor does it closely collaborate with ministries dealing with science, technology and innovation. The lack of a clear and integrated inclusive innovation strategy has significant implications for fiscal resource allocation. As the key provider of public services, government could directly benefit from pursuing a well-articulated inclusive innovation strategy, for inclusive innovation could be a powerful tool to significant-
ly reduce the burden on the fiscal budget and improve the supply of basic goods and services. Pursing an integrated and well-coordinated inclusive innovation strategy is also crucial for it to allow fiscal resources to be rationally allocated between sectors and target groups, according to national priorities and needs.

The Effectiveness of Government – Driven Policies and Programs

The government programs and policies mostly take a top-down approach, with limited involvement of other relevant stakeholders, especially the private sector, in their planning and design. As building a harmonious society has been placed on top of the agenda of the Chinese government, certain criteria and standards, including the intended beneficiaries, the quality and affordability of goods and services have been increasingly taken into account by the policy makers in program design. Some programs and initiatives have already produced immediate results in outreach and scale, and are contributing prominently to the inclusive growth agenda. But the priority areas and approaches are usually determined by government officials, without a solid understanding of the real need of BoPs and the viability of the business model. This could lead to problems, as illustrated in the case when a municipal government launched a project to provide affordable computers to rural farmers. The designers did not recognize that; rural farmers are reluctant to use the computer; many of the software programs are not compatible with the installed Linux operating system; and the additional installed agricultural and distance education software did not fully meet their needs.

Moreover, government tends to directly intervene in the provision of the products and services, instead of creating a supportive environment and spurring the active participation of private sector and other stakeholders. The current government-driven programs heavily rely on government financing and fiscal

¹ For instance, it is estimated that under the Spark Program, over 40 million rural households receive training and under the S&T commissioner project, there were about 170 000 science and technology commissioners nationwide which had benefited over 50 million rural households.
subsidies, as shown in the massive agricultural and rural ICT programs. Further, while the participation of the private sector is improving slowly, the public sector still plays a major role in the design and implementation of such programs. This approach denies the government benefiting from private sector resources including management skills, technology, finance, efficiency and risk-taking capabilities. This is not a long-lasting sustainable solution, as it brings a heavy burden on the government budget. Once fiscal revenue decreases, resulting from a slowdown in economic growth, the government will no longer be able to maintain ongoing projects which are not self-sustainable. There is considerable room to improve the efficient use of public resources to promote inclusive innovation in China.

Last but not least, performance monitoring and evaluation of public programs is quite weak. Especially for the government-dominant projects, systematic and independent monitoring and evaluation of outcomes and impact are still limited. The official statements tend to emphasize inputs—such as how much has been invested and how many subsidies been disbursed—rather than results on the ground and outcomes. Further, in many cases the intended beneficiaries of fiscal subsidies are not well-defined, and welfare improvement is not subject to continuous monitoring and evaluation. In the distribution of subsidies, policy makers are not required to make a clear cost-benefit analysis of the supported operations.

The Coverage and Sustainability of Private Sector Initiatives

Compared with the top-down initiatives dominated by governments, private sector-based inclusive innovation initiatives in China are often more efficient and effective. These programs are mostly driven by economic incentives which encourage private companies to pursue optimized utilization of resources. However, many inclusive innovations initiated by the private sector have limited outreach and demonstrate unclear potential of scalability. Although some of the inclusive innovation products have successfully tapped into some areas, the coverage of private-sector-based inclusive solutions is rather low. The scalability of many in-
clusive innovations is restricted due to the limited resources of the companies and the region-specific factors that affect the effectiveness of the business model. For example, the P2P (person-to-person) micro-credit provided by Credit Ease covers only a few villages in China, and the low-cost medical equipment provided by SIAT and Kangya covers only 1 000 villages out of some 500 000 villages in China. The scalability of the inclusive business model is unlikely to improve without the participation of other actors.

**Furthermore, the financial sustainability of some inclusive innovation businesses is still to be verified.** Some companies, such as MTK, demonstrate the commercial success and financial sustainability of their business model, but the economic sustainability of some others is unclear. For example, Jiukang designs a seemingly-good business model, but the profit-making potential of the business is still unclear, because the company got the license to produce pesticide only in 2010, and the large-scale commercialization of products has not yet started. A similar problem happened with the low-cost medical equipment provided by SIAT and Kangya. The 35 000 RMB low-cost diagnosis bed could only make a profit if the sales volume achieved 20 000 equipments per year. However the scale nowadays is much less than the threshold, which means SIAT has to invest more money for the commercialization of products in the future.

**The Orientation and Incentives for Universities and Public Research Institutes**

**There are limited number of universities and research institutes dedicated to inclusive innovation.** There are some universities and public R&D institutions whose missions are oriented to agriculture, energy and health, and some focus on technology problems of social groups with a state or regional scope. The solar thermal system by Tsinghua University and low-cost medical equipment by SIAT, offer some typical examples. Most R&D institutions in China are still focused on frontier innovation and less geared towards inclusive innovation, although in-
inclusive innovation could also be aligned with frontier innovation, as illustrated in the case of low-cost medical equipment by SIAT. There are also limited incentives for universities and public R&D institutes to engage in inclusive innovation. Although developing and diffusing practical technology has been incorporated into the evaluation system for professors in some agricultural research institutes, the current evaluation system of universities and research institutes still emphasizes publication in top journals, which promote ranking of the universities in the world education system. Therefore, professors and researchers focus more on frontier innovation where international publication is easy. Inclusive innovation, which has a more social impact, is not compatible with this evaluation system. As a result, professors and researchers have little motivation to engage in inclusive innovation.

Although some products and technologies related to inclusive innovation have been developed, the transfer, commercialization and deployment have been weak. For instance, it was 20 years after the invention of the key technology of the solar thermal system that the system started diffusing rapidly in rural China. The large-scale commercialization of low-cost medical equipment by SIAT has not started yet. There is still little involvement of private and other actors to find a sustainable business model to diffuse and commercialize inclusive innovation research. The end result is that the impressive investment in S&T resources has not yet been translated into inclusive innovation. The public support system for R&D and some aspects of the institutional arrangements of the National Innovation System do not yet sufficiently encourage the deepening of R&D efforts for inclusive innovation and their translation into innovative outcomes. The top-down philosophy is still dominant, and real needs of the excluded are not fully considered in inclusive innovation research. In the existing programs, the roles and responsibilities are by and large still on the research teams, rather than aligned with the strategic objectives of the institutes. The involvement of low-cost medical system research into the “Innovation 2020” of the CAS in 2010 provides a good example of strategic integration of inclusive innovation into the strategic objectives of research institutes. However such strategic activities are rare among other research institutes and universities.
Regulatory and Institutional Barriers

There are many regulatory constraints which hinder the development and deployment of inclusive innovation products and services in China. Recognizing the importance of developing market-based solutions for innovation, much effort has been devoted to address the innovation climate bottlenecks and to facilitate private sector engagement in innovation relevant to the poor. However the environment is still not fully conducive. For example, (i) many regulations constrain the private sector to engage in inclusive innovation. Companies like Alibaba and Credit Ease cannot win support from the banking watchdog for data sharing on credit information; (ii) the private sector is outweighed by its state-owned counterparts in entry access and competition policy. The Person Handset System (PHS), first called ‘cellular data for the poor’ by the Japanese, was introduced by UTStarcom in the mid-1990s and soon widely spread in the following ten years, leveraged by its extreme low costs. The data path occupied by PHS was announced to be converted to TD-SCDMA by the MIIT in 2007, and the PHS has been forced to exit the market; (iii) some low-cost innovations are considered of bad quality, and the government tries to hinder such innovation rather than to guide their development into quality BoP products. Shanzhai cell phones and electric bicycle are the typical cases facing such dilemma; and (iv) innovators, particularly grassroots innovators, are unable to capitalize on their IP due to limited awareness of the importance of IP, and legal procedures to get a patent. Also, many grassroots and other innovators are not able to pay for the patent costs and recurring fees for maintaining the patent.

Government Support for Grassroots Innovation

The government support with dedicated funding and programs focused on grassroots innovators are limited, while many government S&T programs and policies aim at facilitating research by grassroots innovators. Some
organizations are engaged in promoting and diffusing grassroots innovators development, but overall, incentives, policies and institutions are not adequate. For example, the S&T training provided to farmers improves their scientific understanding and creative ability and improves their living conditions by the application of S&T advances into their agricultural production. Although it is not common, some farmers’ research institutes and companies have been granted government S&T projects. For example, although MOA and MOST have their own budgets for technology upgrading and extension programs, to which the grassroots innovators’ organizations, such as collectives, research associations, research institutes, companies and others, can apply, the grassroots innovators have to compete with scientists from the formal sector in project applications, disregarding the fact that farmers, as a disadvantaged group, are relatively less able to compete. Although there have been numerous grassroots innovation activities, many valuable innovations tend to be isolated from each other. It is well known that the poor in one area, especially in the poorest areas, suffer from the same problems and could benefit from the solutions that emerge in other places. But currently, most of the grassroots innovations are applied on a limited scale, and diffuse only spontaneously and informally.

**International Collaboration in Inclusive Innovation**

**China is actively participating in some global public innovation activities, but overall, the collaboration among Chinese and global STI institutions remains limited.** At present, there are several examples of international cooperation to develop innovation targeted at the needs of the poor, including the Bill & Melinda Gates Foundation, which is granting funds to the China Pharmaceutical Group to invent a low-cost Poliovirus vaccine. Some foreign-aid projects are also contributing to the global agenda for inclusive innovation. The low-cost and high-quality drug produced by the Fosun Pharma and delivered to African countries is a typical example. Nevertheless, most bilateral and multi-national cooperation in
China still focuses on frontier innovation, and international collaboration on inclusive innovation remains sketchy.

**Early Stage Capital for Inclusive Innovation**

Although the supply of risk capital has been rising in China, the patient capital for smaller innovative firms which are trying to scale up is still scarce. The growth in venture capital (VC) investment in China has been rapid in recent years, and thus China has surpassed many OECD countries when compared on a percentage of GDP basis. However, most investments by VC funds are still focused in firms at the growth and expansion stage, with only 40.9 percent of all new deals and 27.6 percent of investment amount for growth stage firms in 2011. While there is little constraint to capital supply in China, allocation efficiency and increase in supply of patient capital to support inclusive innovation firms in need of risk capital and new entrants attempting to commercialize promising ideas is quite weak.

**Early stage capital for areas related to BoP is even more limited.** VC investment in China is increasingly focusing on some high-tech industries, especially on new emerging strategy industries. Information technology was the leading industry recipient of VC investment in China, and clean technologies, telecommunication, electricity and optoelectronic device, machine building also have a sizeable part of the VC investment portfolio. However those industries that are more likely to target at BoP customers, including agriculture, health and education, receive little risk capital. The Chinese government is actively involved in promoting

---

1. The VC investment in China represented 0.171 percent of GDP in 2011. Meanwhile, the average level for the top 5 OECD countries is only 0.110 in 2008 and 0.042 in 2009.
3. Including (a) information technology; (b) advanced materials, e.g., nanotechnology; (c) high-end manufacturing clean technology and energy-saving; (d) bio-technology/Life sciences as applied to health, agriculture and alternative energy; (e) new energy.
4. See the Domestic VC investment amount by industry in 2011 by Zero2ipo research center 2012.01 (www.zdhchina.com).
state-sponsored VC funds. Since 1998, some 31 Guidance Funds have been established with a total amount of RMB 31.9 billion (US $4.7 billion). ¹The government guideline fund usually has specific tasks of promoting the creation of early-stage funding for SMEs in specific technologies, identified by the government as being strategic to the countries. ²However, most of such funds are dominated by the public sector, and do not provide much support to enterprises developing innovative solutions for the BoP.


² At the central level, the Ministry of Finance (MOF) and Ministry of Science and Technology (MOST) established a guideline fund in July 2007 for promoting VC investments in small and medium-sized technology enterprises. In October 2009, the China Venture Capital Funds for Emerging Industries (VCFEI) were introduced to provide capital at the start-up to middle stages of high-technology company creation and development.
Chapter 3

Inclusive Innovation: The International Experience

Like China, many countries are engaged in inclusive innovation. Their experiences demonstrate a wide breadth of types of inclusive innovations and of the innovative processes, technologies, agents, and policies responsible for their development and deployment.

I. National Government Initiatives

Many governments such as Brazil, India, South Africa, Thailand, Vietnam, Mexico, and Uganda, have initiated programs promoting inclusive innovation\(^1\). Their efforts describe an essential and facilitative role for national governments in an inclusive innovation agenda. Together, these countries, in total, have catalyzed inclusive innovation by financing or coordinating financing for research and technology development with particularly high impact on human em-

\(^1\) The status of inclusive innovation in China is discussed in Chapter 2.
powerment; leveraged their role as a market participant in the provision of public goods; forged partnerships across sectors and globally; promoted information exchanges between the BoP and industry; strengthened networks of talent that produce inclusive innovations; and eased regulatory burdens while also advancing intellectual property regimes—with due attention to open-source alternatives, which allow inclusive innovations to be commercialized and sustainably produced by private sector driven markets.

Current approaches to inclusive innovation range from ad-hoc efforts by individual ministries, sub-national governments, and RTIs, to more mature, focused and synchronized national programs. Ad-hoc policies limit themselves to solving discrete national problems. For example, the Ministry of Health in Uganda mandated that government health care centers use the K1 auto-disposable syringe, which limits the retransmission of blood-borne disease by nature of its being non-reusable. The mandate complements Uganda’s efforts at HIV prevention, and also demonstrates the effectiveness of directives as a policy instrument aimed at promoting greater adoption and dissemination of certain BoP innovations. Countries with a strong enabling environment and existing large-scale initiatives aimed at poverty reduction, improving STI infrastructure, and SME development, would benefit from a more comprehensive implementation of inclusive innovation.

More comprehensive approaches vary in their maturity and scope. In 2005, South Africa’s Department of Science and Technology instituted a program on “Science and Technology for Social Impacts,” to advance the poverty-reduction mission of the country’s 2002 National Research and Development Strategy, which called for the provision of greater access to “innovations that accelerate development and provide new and more effective solutions than those utilised previously.” Currently, the program funds inclusive initiatives through South Africa’s National Research Foundation, in partnership with South Africa’s numerous public research councils, primarily focused on creating sustainable livelihoods for farmers by le-

---

veraging the country’s biodiversity and indigenous knowledge with technology to de-
velop plant-based pharmaceuticals.

Like South Africa, Thailand’s public research councils are engaged in a
series of discrete pro-poor initiatives—which are expected to be complemented
by a more comprehensive approach as the National Science Technology and
Innovation Policy Office makes inclusive innovation a key component of its
decade-long National Science Technology and Innovation Policy and Plan
(2012–2021). By emphasizing the extension of science, technology, and engi-
eering knowledge to address well-being of those at the BoP, Thailand seeks to
balance between competitiveness-oriented and social-well-being-oriented objectives
in its national innovation policy. In the meantime, Thailand has existing initiatives
(but limited in scope and impact) which enable inclusive innovation, primarily
through the Thailand Institute of Scientific and Technological Research (TISTR),
a public R&D council. The Village Fund and People’s Bank, Thailand’s rural fi-
nancing initiatives, support TISTR efforts seeking to adapt technology for rural
use. Similarly, TISTR’s “Royal Highland Project” seeks to enhance the productiv-
ity of rural women by developing energy-saving fertilizers and facilitating transfers
of technology for mushroom cultivation. And Thailand has long since initiated
(with considerable disruption due to periods of political instability) a “One Vil-
lage, One Product” concept (called “One Tambon, One Product”), which
provides assistance (technology, management, and financing) for villages to
create products based on indigenous and traditional knowledge and connect them to
markets at home and abroad.

Similarly, in Vietnam, the Deputy Prime Minister, the Minister of
Science and Technology, leaders from major R&D organizations, universi-
ties, and the private sector are committed to cementing inclusive innovation
as part of the country’s STI reform agenda, and the Government of Viet-
nam has requested the World Bank’s assistance in strengthening Vietnam’s
capacity to pursue inclusive innovation. The World Bank is supporting these ef-
forts through several initiatives, which include (i) the creation of a policy pa-
per, (ii) support to adopt, upgrade, and develop inclusive technologies; and (iii) efforts to strengthen the technological capabilities of small and medium enterprises (SMEs). The Vietnamese authorities are concerned with widening disparities especially between urban and rural areas, and the fact that many ethnic minorities have not benefited from its economic success, and view inclusive innovation as a means to not only address these disparities but also to enhance enterprise competitiveness and private sector development and achieve middle income status.

At the other end of the spectrum is India’s national inclusive innovation program—a multipronged and coordinated effort aimed at comprehensively fostering inclusive innovation. Given its robust technological base, vibrant private sector, enormous size of the BoP, and daunting challenges of inequality, it is unsurprising that India has taken concrete steps to formalize and institutionalize the mission of inclusive innovation. Though imperfect and with ample room for improvement, a comprehensive approach stands to produce a larger volume of innovations and systematically connect the BoP to the existing innovation ecosystem. The Prime Minister of India released the new Science, Technology and Innovation Policy on January 3 2013, where inclusive innovation agenda finds a specific emphasis. ①

The program builds from efforts to strengthen India’s overall innovation ecosystem: the Indian Government set up a National Innovation Council (NInC) with the objectives of creating an innovative India② and facilitating the setting up of State Innovation Councils in each State. As of end 2012, 19 states have constituted State Innovation Councils and central ministries have set up 19 Sectoral Innovation Councils to contribute to developing the innovation roadmap for the decade. The NInC has already launched (or plan to launch) a series of initiatives aimed at promoting creativity and nurture innovations, such as:

---

① www.dst.gov.in.
② http://innovationcouncil.gov.in/.
• Establishment of India Grand Challenge Awards.
• Creation of a separate scholarship stream for Inclusive Innovation
• Setting up an Innovation Centre in each District Institute of Education and Training to enhance teacher training and enable them to become facilitators of creativity and innovative thinking.
• Creation of a National Innovation Promotion Service to replace/add to National Service Scheme in Colleges to use college students to identify local innovations.
• Establishment of 20 Design Innovation Centres co-located in the Institutes of National Importance.
• Establishment of Innovation Clusters in various sectors and universities across the country, where innovation would be seeded through Cluster Innovation Centres.
• Creation of a joint EU – India prize for inclusive innovation.

The Council then addresses inclusive innovation as a separate prong alongside frontier innovation, to connect the national innovation ecosystem to serve BoP needs. In November 2011, the NInC launched the India Inclusive Innovation Fund. The Fund (with a goal of US $1 billion in size) , to be a public-private partnership, seeks to promote enterprises engaged in developing inclusive solutions and will combine commercial and social returns. To maximize its impact, this Fund will be seeking potential investees from various sources, including both public and private sectors in India and abroad. The Fund will solicit interested enterprise through open broadcast; the outreach publicity activity surrounding its launch and initial operations is expected to attract a high level of demand from innovative enterprises. It will tap Angel and venture capital networks with established investments in early and mid-stage SMEs, using institutionalised social-venture interest communities to provide an important source of potential investees. Given the developmental focus of the Fund, community organisations (such as non-profits and NGOs) are expected to prove a rich source of entrepreneurs and enterprises, given appropriate mentoring and incubation support.
To support grassroots innovators, whose needs-driven creativity and indigenous knowledge can spur inclusive products while also creating income-generating opportunities, India’s Department of Science and Technology, established the National Innovation Foundation (NIF) a decade ago. The main goal of NIF is to provide institutional support in scouting, spawning, sustaining and scaling up grassroots and green innovations and helping their transition to self-supporting activities. In 2010, NIF became a grant-in-aid organisation of the Department of Science and Technology, Government of India. NIF has also partnered with other NGOs, research councils, industry associations as well as micro finance organizations, thereby harnessing the infrastructural, financial and intellectual resources of these organizations. The core functions of the National Innovation Foundation include the following:

- screen, document and verify the claims about these innovations through various networks of scientific and other institutional initiatives;
- formalize research into traditional knowledge;
- share the innovations permitted by the knowledge providers to be put in public domain;
- help in prior art search so that innovators can maintain their competitive edge; and
- provide assistance to grassroots innovators to enter into licensing arrangements with entrepreneurs for transferring technologies.

The NIF provides technical as well as limited financial support to the potential innovations for various incubation activities. But NIF’s operations and resource base is small thus limiting its activities and impact. Serious challenges remain in the screening process, and in fostering further development of good ideas to the point at which they can be commercialized. Nonetheless, NIF has been able to build up a database of more than 160 000 ideas, innovations and traditional knowledge practices from over 545 districts of the country, filed 500 patents (including seven

1 http://www.dst.gov.in/
in USA and a PCT application) of which thirty five patents have been granted in India and four in USA, and, through its Micro Venture Innovation Fund, it has provided risk capital to over 175 projects, which are at different stages of incubation.

Indian research performing councils, like the Council of Scientific and Industrial Research (CSIR), Indian Council of Medical Research (ICMR), and Indian Council of Agricultural Research (ICAR), are making inclusive innovation a central component in their 12th Five Year Plan. An initiative, called CSIR – 800, tasks CSIR to develop and deploy inclusive innovations for the 800 million Indians whose income levels are less than US $2 per day. These Councils operate research institutes and financially support research at universities and network projects involving scientists from each other’s institutes as well as from industrial research centers and the private sector. Under this Program, efforts have been made to associate concerned national laboratories or other specialist S&T institutions with each major Program so as to build-in expert input, utilize national S&T infrastructure and link it up with grassroots S&T interventions/initiatives. One example is the collaboration between the ICMR and the NIF, which aims to achieve synergy between India’s premier apex institution for medical research and informal, non-codified and non-classical health-related indigenous knowledge. The collaboration focuses on drug development from grassroots traditional knowledge-based practices that incorporate either use of new medicinal plants not reported in any Indian codified literature or new use of already mentioned medicinal plants or in the case of multi-herb formulations, one of the ingredients should satisfy either of the above two conditions. ICMR works towards validating the safety and efficacy of the practices that are claimed to have therapeutic value by grassroots healers. This partnership between the formal R&D and the informal R&D sectors of India is a novel experiment in the field of applying science and technology for social and rural development.

1 www.csir.res.in
2 http://icmr.nic.in/
3 http://www.icar.org.in/
The Indian Government has also leveraged its role as a market participant in providing goods to foster inclusive innovation, as illustrated by the case of Aakash: A Low Cost (US $35) Computer Tablet from India. On July 22 2010, India unveiled a computer tablet,\(^1\) the “Aakash,” with a goal to be “good enough” to serve educational needs at the cheapest price possible. The device was developed as part of the country’s aim to link 25 000 colleges and 400 universities in an e-learning program. Projected as a “US $35 laptop”, the device will be procured by the Government of India and distributed to university students-initially at US $50 until further orders are received and projected eventually to achieve the target US $35 price.\(^2\) The tablets are also proposed to be distributed in millions in schools by the Government of India at half the price. In addition to support from public R&D organizations and universities to facilitate development at the early stages, the government mandate and procurement policy served to focus attention on a BoP need which, if solved, would have high social impact, and of course drastically reduced the risk of development and guaranteed significant outreach. Indeed, Aakash components are ultimately produced by private firms through competitive bidding processes.

II. Research and Technology Institutes (RTIs)

Research and Technology Institutes (RTIs) – both in developing countries and developed countries-have served as well-springs of pro-BoP innovation. There is an increasing awareness and recognition of the role of science, technology and innovation (STI) in the pursuit of alleviating poverty in developing countries. The Millennium Development Goals (MDGs) have brought focus

---

\(^1\) http://www.gizmag.com/refrigerator-rural-india-chotukool/13680/.

\(^2\) In 2000, the CSIR launched a grand challenge program-the ‘New Millennium Indian Technology Leadership Initiative’ – focusing on addressing the needs of a broad cross-section on Indian society. For example, the grand challenge of moving from US $2 000 laptop to US $200 laptop (realized through the launch of ‘DSK Mobilis’, originally created through the ‘Mobitis’) eventually led to Aakash (US $39 laptop) in 2011. In this case, the journey of US $2 000 to US $200 to US $35 laptop took place through a national grand challenge initiative.
and a compelling, output-driven framework for policies leveraging STI for poverty eradication and human empowerment. As discussed above, public research councils and laboratories in some developing countries have focused on both exploring frontiers of knowledge as well as serving the needs of the BoP. Their output, to date, includes, among other products, adapting plant and other bio-material for pharmaceutical and cosmetic use (India, South Africa), improving agricultural output for rural women (Thailand), and developing large, floating fishing cages to dramatically decrease costs of entry and increase productivity for trout farmers (South Africa). Other regional institutes, in partnership with universities, public labs, private firms, and local governments, have assembled to address regional problems: For example, The Water Institute of Southern Africa supports research into water and sanitation solutions in Southern Africa through grants, awards, issue-research and publications. Moreover, these public institutes have formed global alliances to launch initiatives aimed at solving common problems (Box 9).

**Box 9**

**The Global Research Alliance**

The Global Research Alliance (GRA), a virtual alliance, is a network of nine of the world’s most prestigious knowledge-intensive technology and innovation organizations with a goal of creating "A Global Knowledge Pool for Global Good". It has a capacity to undertake projects with a magnitude and complexity that transcend the capabilities of any single organization. It includes organizations of the Northern and Southern hemisphere with more than 60 000 scientists and engineers. The Alliance partners perform basic and applied research, technology transfer and commercialization, and specialize in the implementation of innovative commercially and socially viable solutions. GRA has within its ranks highly innovative members who amongst other breakthroughs have developed: MP3 player, Xerox copying technology, carbon fiber composite wings for light combat aircraft, space satellite, drought resistant millet, mesh networking for rural internet provision, the World’s first ‘flu drug, low cost HIV and tuberculosis drugs, an open-source drug discovery platform, etc.
Value Proposition of the GRA

- The core competences and fields of focus of each of the constituent members of the GRA cover a wide range of topics, from agriculture to life sciences, engineering, environment and aerospace. The Alliance partners perform basic and applied research, and specialize in the implementation of innovative solutions for a wide array of customers.

- The Alliance has developed collaborative initiatives in many areas such as:

- Water and Environment, such as the development of science based water scenarios for Africa;

- Climate Change, such as development of innovative adaptation strategies for climate change;

- ICT, such as the development of innovative mesh networks for internet access in rural areas;

- Health, such as a development of a portable clinical epidemiological laboratory; and

- Energy such as the investigation of energy as a catalyst for rural development.

- In these collaborative areas the range of skills, resources, experience, scientific excellence and credibility that the GRA and its constituent members bring to the table are virtually unrivalled.

- Through the abilities and track record of its members, the GRA has a proven ability to undertake large, highly complex projects that range from developing technologically innovative projects, to implementing commercially and socially viable solutions.

- GRA teams have the ability to synergies the innovative, cutting-edge science and technology skills of its members into a holistic approach to global challenges.

- The GRA and its constituent members count amongst their stakeholders’ governments, non-government organizations and private corporations all around the world.

In developing countries, support for inclusive innovation also relies heavily on mixed structures and the existence of complex web of interlinking between different actors of the national innovation system. The responsibility of planning, funding and directing research is generally not assigned to a particular council/agency. This finally results into self-assembling networks, which come together depending upon the needs of the scientists or the markets depending upon who initiates the dialogue. Although the drivers of such efforts vary from country to
country, the objectives of such policies essentially find common grounds in job creation, upliftment of disadvantaged population, growth and development, education and health for all and enhancing the quality of life of the commons. There also appears to be increased focus on special groups such as women and children. The Low Cost Tea Bag Water Purifier is an example of a high-tech inclusive product created by mixed structures.

Eugene Cloete, Dean of the Faculty of Science at the Stellenbosch University and Chair of Stellenbosch University’s Water Institute, developed a decentralized point-of-use technology that reverses the action of the common tea bag to purify water on an individual basis. Instead of infusing water with flavor, the sachet sucks up toxic contamination when fitted into the neck of a water bottle, using ultra-thin nano scale fibers to filter out contaminants, and active carbon granules to kill bacteria. The filter requires no infrastructure and thus helps communities that have no watercleaning facilities to use it to purify dirty water. Each bag costs around three South African cents (just under half a US cent). It is affordable, clean, environmentally friendly, and can be used anywhere—and has been successfully commercialized (the “Life Straw,” US $20), for use in outdoor expeditions in developed countries, and, with support by NGOs, for distribution among the poor and disaster areas. Lack of access to safe drinking water contributes to the staggering burden of diarrheal diseases worldwide, particularly affecting the young, the immuno-compromised and the poor. Nearly one in five child deaths—about 1.5 million each year—is due to diarrhea. In fact diarrhea kills more young children than AIDS, malaria and measles combined. Drinking contaminated water also leads to reduced personal productive time, with widespread economic effects. It is not enough to treat water at the point-of-source; it must also be made safe at the point-of-consumption. However, large scale sustainable deployment of such products remains a challenge.

In developed countries, leading universities and research centers have established dedicated labs and departments focused explicitly on inclusive innovation. D–Lab\(^1\), for instance, is a program at the Massachusetts Institute of Technology (MIT) in the US seeking to improve the quality of life of low-income households world-wide through the creation and implementation of low cost technologies. D–Lab’s portfolio of technologies also serves as an educational vehicle that allows students to gain an optimistic and practical understanding of their roles in alleviating poverty. D–Lab’s output to date has been very promising, and includes a stove run on rurally-ubiquitous pine needles and a portable, pedal-powered washing machine. MIT has also sponsored an innovation competition, allocating grant money to projects aimed at serving BoP needs (Box 10). These efforts, while laudable, still have remained at the laboratory level and large-scale deployment continues to be a challenge.

**Box 10**

**MIT IDEAS Global Challenge**

MIT IDEAS Global Challenge, a program of the Public Service Center, is an annual invention and entrepreneurship competition that awards up to US $10 000 per team for innovative service projects that positively impact underserved communities. Through IDEAS (“Innovation, Development, Enterprise, Action, and Service”), teams of MIT students and their collaborators work with a community partner to design and implement innovative projects that improve the quality of life in BoP communities around the world. Since its founding in 2001, IDEAS has awarded roughly US $500 000 to more than 90 teams exploring myriad off-grid water, electricity, and sanitation solutions; technology applications for secluded retailers; low-cost medical devices and prosthetics; medical diagnostics and solutions to behavioral problems limiting the effectiveness of treatment regimes; SMS-based tools for field research; among others.


\(^1\) [http://d-lab.mit.edu/](http://d-lab.mit.edu/)
Some university initiatives focus on specific sectors, such as ultra-low cost health solutions. Another MIT initiative, the Innovations in International Health Program, focuses explicitly on ultra-low cost health solutions. The program has already developed a low-cost, solar-powered autoclave that offers rural health facilities which cannot rely on electricity the ability to sterilize instruments onsite; an ultra-low cost method of promoting compliance with TB treatment regimes (the “X Out TB”); and a do-it-yourself medical device creation kit designed to unleash frontline innovation by on-the-ground medical professionals in developing countries.

Other initiatives in developed country research institutions deploy talent in design, a profession and area of study which has proven to be exceptionally socially-conscious and focused on all aspects of the innovation process, from identification of BoP problems, through production of solutions, delivery, scale, and post-hoc impact studies. For instance, Stanford University’s Hasso Plattner Institute of Design, a research alliance with the University of Potsdam, Germany, integrates business and management training with traditional engineering and product design education. Alongside its research into solutions for high-income consumers, the Design Institute has launched impressive inclusive innovations such as the “Embrace” blanket, which functions as an ultra-low cost infant incubator (Box 11), and solar-powered LED lighting. Similarly, D–Rev, a non-profit research organization in San Francisco, USA, applies principles of design to tackle the needs of those making less than US $4 a day, in partnership with business schools, aid organizations, foundations, and private firms. Its projects include ultra-low cost jaundice treatments, prosthetic knees, solar solutions, and pasteurization solutions.

---

② http: //embraceglobal.org/.
Box 11

The “Embrace,” Infant Incubator from the Stanford Institute for Design

During the ‘Entrepreneurial Design for Extreme Affordability’ class in 2007 at the Hasso Plattner Institute of Design\(^1\) in Stanford University, USA the concept of creating a low cost incubator for infants emerged. Each year, 20 million premature and low-birth-weight babies are born. In developing countries, mortality for these infants is particularly high because of a lack of access to incubators due to two reasons. First, the new incubators are very expensive, costing about US $ 20 000. Even if access is provided through donations, their operation requires training. The Embrace team, comprising of graduate students, began their studies in Kathmandu, the capital of Nepal. They realized that in order to save the maximum number of lives, their design would have to function in a rural environment. It would have to work without electricity and be transportable, sanitizable, culturally appropriate, and most importantly, also it had to be very inexpensive.

To achieve these objectives, the team thought outside existing paradigm of incubators and developed a solution that costs only US $ 25\(^2\); i.e., about a thousand times cheaper than the conventional incubator. They used principles of material science and developed an ultra-low cost incubator which looks like a sleeping bag which is wrapped around a premature infant, and a pouch of phase-change material (PCM) keeps the baby’s body at exactly at the right temperature. This temperature can be maintained for up to four hours. After four hours, the PCM pouch could be recharged by submerging it in boiling water for a few minutes.

In the Netherlands, universities, R&D organizations, business schools and enterprises have partnered to support the BoP Innovation Centre (BoP Inc)\(^3\), a Dutch non-profit entity supporting solutions in food systems, energy, water and sanitation. Founded with the support of TNO (Netherlands Organization for Applied Scientific Research, a GRA member), in partnership with Wageningen University and Research Centre; SNV – a non-profit and international

---

development organization; and The Innovation Co – Creation Lab (ICCL), a joint-venture between top business schools and a number of global companies, the group strengthens the inclusive innovation enabling environment in developed countries. It provides incubator support (space, connections to funding, field experience), disseminates knowledge (publishes reports, and hosts events), and conducts studies on discrete BoP issues which might be addressed through technology.

Even in the absence of formalized institutes and dedicated centres, researchers in elite universities, are taking personal initiatives in conducting research on BoP solutions. For example, Harvard Professor George Whitesides—the world’s most-cited scientist-has developed low-cost paper based diagnostics (costing under one US dollar) for the poor with the prospect of improving them with cutting-edge technology. He has established a non-profit ‘Diagnosis for All’ to promote deployment of this technology all over the world. It was that awareness that prompted MIT Innovations in International Health’s X out TB, an initiative of MIT’s Innovations in International Health program. ¹

III. Private Sector Firms

For the private sector, inclusive innovation is emerging as perhaps the biggest business opportunity of the coming decade. ² New models are emerging where the private sector is not only doing well and doing good, but doing well by doing good. This is in stark contrast to the old worldview in which catering to the needs of the BoP was seen through the prism of philanthropy. The perception that inclusive innovation is part of corporate social responsibility is changing. That BoP markets remain under-developed and under-satisfied is increasingly seen as evidence of a lucrative potential—and not as a reason to ignore them in favor of higher priced market segments.

¹ http: //iiih. mit. edu//work. htm.
Indeed, most of the growth in consumer spending is expected to come from people in emerging markets, who have a much lower spending capacity than traditional middle-class consumers in developed countries, leading firms to first pursue inclusive products and then pivot higher up the curve to serve the emerging middle class—and even consumers in advanced economies. By 2030, the size of the emerging middle-class—those earning US $4 to US $20 a day—will triple to around 49 percent, or 725 million people, and may exceed for the first time the number of those earning under US $4 a day. That explosion of consumer demand—spread across a range of low-and middle-income segments—can allow businesses to experiment with different scaling strategies. Indeed, inclusive innovation by firms in STI—proficient developing countries which are able to satisfy the performance requirements of the markets of the advanced world can pose a particular threat of competition to the local private sectors of developed countries—a fact not lost on multinationals loathe to be shut out of the market. Hence General Electric’s decision to “disrupt itself”¹ (Box 12).

Box 12

**General Electric’s Value Portable Ultrasound Machine**

BoP innovation may not necessarily come out of altruistic motivations or by companies focused exclusively on the BoP. They can arise from multinational businesses with enormous R&D prowess keen to penetrate the BoP market with a profit motivation. Also such innovations are not necessarily low-tech, they can be very sophisticated. This point is well illustrated by General Electric’s Low Cost Portable Ultrasound Machine². Though GE Healthcare had a significant share of the market in the ultrasound segment in affluent parts of the world it did not enjoy such success in developing countries. GE Healthcare’s China team provided some interesting insights. Since most of the population in China relies on low-tech hospitals in rural areas for primary care, it was important to have an ultrasound machine that was not just low cost but also high performance, and portable. Hence, a radical departure involving a disruptive innovation was required.

---


From this challenge was born the compact ultrasound machine that is the growth engine of GE’s ultrasound business in China today. The compact ultrasound was built from scratch, although it drew heavily from an existing R&D effort from product-development center in Israel. A revolutionary new architecture— one that shifted most of the muscle inside an ultrasound machine from the hardware to the software was created. The software-centric design made it easy to adjust the machine—for example, to improve the interfaces—after observing how doctors worked with it. The GE team also set out to learn how less sophisticated and rural doctors reacted to the machines, in order to increase its adoption. Based on this analysis of customer needs, GE designed simpler keyboards, and created built-in presets for certain tasks. It adopted a marketing strategy that emphasized training, offered online guides, and tracked customer satisfaction. In 2002, GE introduced its first compact ultrasound machine for US $30 000. After several iterations, GE finally created a model in 2007 that sold for as low as US $15 000, less than 15 percent of the cost of GE’s high-end ultrasound machines. Despite its somewhat lower performance, it has been a hit in rural clinics, where doctors use it for simple applications.

Though primarily meant for the developing world, it generated a demand in the developed world for applications where portability is critical or space is constrained. Six years after their first launch, compact ultrasounds were a US $278 million global product line for GE, gaining even greater traction during the recession of 2007–2009. In 2011, GE established its first global Customer Innovation Center in Chengdu, in China’s western regions. The Center focuses on primary care products for the healthcare systems of emerging markets, and brings product development teams closer to the customers they serve by creating an open, customer-centric innovation ecosystem. The GE experience is now being emulated by other private sector players in high-income countries. For example, Siemens in India is working on 42 products designed for emerging markets. These include a solar powered X-ray machine and a fetal heart monitor. Some of the private sector companies in developed countries are preparing for the imminent arrival of reverse innovation.

Examples of private sector successes in inclusive innovation worldwide mirror in process those accomplished in China. They use technological innovation, adapt existing technology or apply recombinant innovation, deploy business

---

process innovation, bypass or overcome the constraints in infrastructure, financing, and information exchange which isolate BoP markets, and are often the result of partnerships with universities, public labs, NGOs, governments, and unique partnerships—i.e., through open-source and crowd-sourced development—with other private sector players, facilitated by collaborative IP arrangements.

**Technological Innovation**

Universities are not the only agents using cutting-edge research to develop inclusive products—private firms are doing it on their own as well. As illustrated in Box 12, GE has already produced high-tech, high-quality, and ultra-low-cost health care solutions for developing countries. Various affiliates of the Tata Group are similarly using high-end research for low-cost markets. The Nano car offers one example of creating a vehicle for the masses, and using that technology to serve higher-end market segments. Through Tata’s Research, Development and Design Centre, Tata Chemicals has produced an ultra-low-cost water purification system, the Tata Swatch. Like the Life Straw, the Swatch uses nano-filters to point-of-use filtration, but its filters are not for individual use.

**Box 13**

**Recombinant Innovation**

Firms are also taking existing technology and designing it for the BoP segment. AEDC – the Low Cost Zinc – Air Fuel Cells for Rural Electrification—is one such example. Fuel cell technology has been around for about 100 years. Papsdorf, a German mechanical engineer, undertook this challenge of designing fuel cells in a way that is affordable, reliable and usable in rural areas. Convinced of the potential of zinc-air fuel cell technology for rural electrification while working for a Canadian automotive components firm, Mr. Papsdorf founded Alternative Energy Development Corporation (AEDC) in South Africa in the year 2000. He designed an inexpensive plastic

---

1. [www.changemakers.com](http://www.changemakers.com)
housing to hold the fuel cell made up of a plastic bag that contains the zinc anode and electrolyte liquid. His patented design can be assembled in about two minutes, produces uninterrupted power for up to 240 hours, and when the anodes no longer function, they can be replaced in the field without special tools within 15 minutes. These fuel cells produce energy that can be used for lighting homes, for operating normal household devices such as refrigerators and sewing machines. AEDC has electrified entire villages rather than single dwellings. In addition, in each village it generally trains two technicians to ensure the sustainability of the project, as the technicians handle the anode exchanges when the power of the fuel cell is depleted. AEDC Fuel cells have no moving parts, create energy 24 hours a day, have no carbon footprint and when the energy source is depleted, the zinc oxide residue left behind by the zinc anodes can be recycled or used as fertilizer in vegetable gardens. Since, the fuel cells replace the use of candles or the burning of paraffin or kerosene they reduce the health hazards of inhaling the fumes as well as accidental fires. The 12 – volt zinc-air fuel cell can power and light a home for 31 days before a replacement of anodes is required. The costs can be competitive with those of candles and paraffin.

Box 14

**Business Process Innovation: Reconfiguring the Value Chain and Leveraging Local Resources to Build-up Local Capabilities**

CEMEX, a Mexican building materials company, started its “Patrimonio Hoy” microfinance program in 1998, which continues to support more than 300,000 low-income families by financing materials purchases, providing technical advice and overseeing the entire process of low-cost housing construction from start to finish. The catalyst was a standard business motivation: CEMEX noted that low income customers had more stable rates of (often necessity-driven and inelastic) demand, rather than on unstable high-earning customers. Moreover, the market was largely untapped—a dearth of financial, technical, and social (marketing) intermediaries kept it underserved by sophisticated providers like CEMEX. Thus, to reach BoP consumers, the company deputized enterprising women in target communities to develop a distribution, marketing, and financing network, and created a complete housing solution—rather than just raw materials. The local agents (called “socios”) are responsible for monitoring progress and continuity
of the program in their location, and recruitment of other program participants, and benefit from distribution margins and commissions. To assist program participants, CEMEX also fixes prices of volatile materials during the 70–week program—a particularly useful term for poorly-capitalized and-diversified BoP consumers. Thus, CEMEX revamped essential business process decisions to allow it to serve the BoP market; it entered into completely new lines of business, made different decisions on in-or outsourcing, and developed local resources from scratch. The successful program is expanding coverage to reach more low-income people in Mexico, Colombia, Costa Rica, Nicaragua, and the Dominican Republic, and hopes to reach over 750,000 families during the next five years.

Box 15

The Telecom Industry Revolution in India

The telecom industry revolution in India, specifically in wireless communication, is another example of providing ultra-low-cost services by fundamentally altering industry standard business models. By shifting fixed costs to operating costs, and making the customer pay per use instead of by subscription, Indian telcos achieved an exponential reduction in costs relative to many overseas competitors. At the outset, Bharti Airtel decided to risk pursuing a model based on high volume and low-margins. It thus shifted the focus from Average Revenue Per User (ARPU) to contribution per minute and from vertical integration to outsourcing, and operationalized these concepts in a systematic fashion. It outsourced all functions—including critical, but costly, parts of the supply chain—but six, and focused on clever contractual arrangements which allowed the company to incentivize quality while still profiting from growth. It also cooperated with competitors on necessary passive infrastructure which conferred no competitive advantage. For distribution, Bharti Airtel rapidly piggy-backed on existing small Indian retailers, and established an ecosystem of application developers with low costs of entry to allow phones to be used. Airtel has become one of the most benchmarked firms in the telecom industry and many telecom firms are now trying to imitate the Airtel innovation. Indeed, the Indian telecom industry now adds around 20

---

million subscribers per month, the cost of a minute of a cell phone time is less than one US cent, the lowest in the world, and the cost of one text message has dropped down to as little as two by thousandth of a US dollar, and a mobile handset is available for as little as US $ 20.

Existing models of service delivery of can also be reconceived to increase affordability and access to the BoP. Aravind Eye Care, a low cost Cataract Surgery provider, and Narayana Hrudyalaya (Box 16), a low cost Heart Surgery provider, are two examples of such delivery process innovation in medicine. Started by G. Venkataswamy with a mission to eliminate ‘needless blindness,’ Aravind Eye Care has managed to bring down the cost of cataract surgery to US $ 30 – 100 times lower than the US $ 3 000 cost in the USA. Instead of increasing the number of surgeons, Aravind Eye Care increased output per surgeon drawing from principles of fast-food chain McDonalds, i.e., delivery of products of fixed quality in diverse regions through an assembly line operation manned with a highly trained staff. Manpower costs were dramatically reduced through creative means; Aravind Eye Care hired paramedical staff with lower educational qualifications than those in other institutes, hired them from rural and backward areas and yet gave them far more responsibility than the other institutions did. Aravind Eye Care also addressed the problem of outreach; it developed a dual delivery method which seeks out and brings in patients to the hospital through a highly-optimized logistical system, and also brings health care to the patients by organizing outreach camps and conducting surgeries for thousands of patients. The Center avoided the high cost of imported ophthalmic supplies by establishing its own manufacturing unit, which managed to bring down the cost of lenses from US $ 100 to US $ 2. The end result; a comparison of the data on some post-surgery parameters shows that Aravind Eye Care outperforms Royal College of Ophthalmic Surgeies in UK; the outfit performs 300 000 surgeries per year, and, by partnering with hundreds of hospitals, is now spreading its model to other countries.

---

1 http://www.aravind.org/.
Box 16

**Narayana Hrudayalaya Low Cost Heart Surgery**

Dr. Shetty, India’s most celebrated heart surgeon, was determined to make the huge heart surgery industry more efficient by applying Henry Ford’s management principles. Motivated by the idea that higher volumes lead to lower costs, he created Narayana Hrudayalaya – Low Cost Heart Surgery Centre in Bangalore, India. It combines economies of scale and specialization to radically reduce the cost of heart surgery gave rise to Narayana Hrudayalaya Hospital\(^1\) in Bangalore. The hospital has 1 000 beds (against an average of 160 beds in American heart hospitals). Dr. Shetty and his team of 40 odd cardiologists perform about 600 operations a week. The sheer number of patients allows surgeons to acquire world class expertise in particular operations, and the generous backup facilities allow them to concentrate on their specialty rather than wasting their time on administration. The hospital charges vary but they can be as little as US $1 200 for open-heart surgery, compared with US $20 000 – 100 000 in America, but its success rates are as good as in the best American hospitals.

The health care group has created a health insurance scheme, working with various local self-help groups that cover 2.5 million people for a premium of about 11 US cents a month each. About a third of the hospital’s patients are now enrolled in the scheme. A sliding scale of fees is used for operations so that richer customers subsidize poorer ones. The entire enterprise is profitable given how many poor people it treats. Dr. Shetty’s family owned hospital group reports a 7.7 percent profit after taxes, compared with an average of 6.9 percent in American private hospitals\(^2\). Dr. Shetty has established video and internet links with hospitals in India, Africa and Malaysia so that his surgeons can give expert advice to less experienced colleagues. He also sends clinics on wheel to nearby rural hospitals to test for heart disease.

Decentralized ‘Inclusive’ Textile Manufacturing in India is another example of how private firms have achieved radical cost reductions by leveraging local resources. In contravention to trends, textile manufacturers decentralized cotton to yarn production so that the field to fabric chain can be entirely vil-

---

lage-based. This decentralized textile manufacturing innovation aims to stem migration from rural areas to urban cities, where huge textile mills are located, and create jobs in villages themselves.

**Box 17**

**Decentralized Textile Manufacturing:**

**The Fractal Foundation**

The Fractal Foundation in India\(^1\) has opened up the opportunity to reorganize the value-chain in the form of vertically-integrated clusters by enabling decentralized spinning through its line of “micro-spinning” machines, referred to as “the first ever desktop, in a world of mainframes” by an industry observer. These machines enable production at a scale that is 100 times smaller than the industry norm. Each ‘unit’ of decentralized textile production involves the entire chain from cotton lint to marketable cloth. Such a unit can provide livelihood to about 70 persons and generate an annual turnover of about US $ 200 000.

The innovation offers a return of textile production to the community so that cotton yarn production, the dye house, the weaver and the garment-making unit are all localized. The new process is energy-saving, eco-sensitive, socially responsible and produces good clothes. The revolutionary carding machine separates cotton fibers, cleans them and organizes them into a uniform endless sliver—at the rate of a million fibers every four-seconds. The draw-frame blends multiple carded slivers into one, with enhanced uniformity, and fiber parallelism. The drawn slivers are thinned-down to the thickness of a pencil-lead and wound precisely around bobbins, to render them amenable to subsequent spinning. The first pre-spinning machinery was installed on the field in 2002 in Chirala, Andhra Pradesh, India. The machines are operated by local rural youth, with high school education or with vocational qualifications.

The contrasts of decentralized textile manufacturing with conventional methods are stark. In the conventional Textile and Clothing industry, large scale is used for gaining a competitive advantage. As an example the vertical integration in a conventional industry involves 16 000 workers from cotton to cloth, producing around 3 000 tons per year. The integration involves around 4 000

\(^1\) www.fractal.in.
farms, with 30 gimp _____ 10 000 looms. In a vertically integrated decentralized cluster based on the new process, the cotton to cloth process is done by 240 workers, with an output of 40 tons per year. It involves 40 farms, one ginning unit, with 4 units of micro-spinning, 1 dying unit with the final waving being done in 130 looms. The new process combines the best of both processes and creates a reasonably priced fabric which is exported to Italy, France, Norway, the UK and the US, and is also affordable for the local villagers who create it.

**Bypassing Constraints**

The “Chotu Kool” – an ultra low cost refrigerator developed by firms Godrej and Boyce in conjunction with BoP women-bypasses the need for constant grid-electricity through highly efficient battery-operation. India hosts the world’s largest population deprived of electricity—some 92 percent of this population lives in rural India, with 380 million people or 71.7 million households. Chotu Kool meets the challenge of providing effective refrigeration to these households. The portable, top-opening unit weighs only 7.8 kg, uses high-end insulation to stay cool for hours without power, and consumes half the energy used by regular refrigerators—and costs only US $ 69. To achieve its efficiency, the Chotu Kool does not use a compressor. Instead, it runs on a cooling chip and a fan similar to that is used in computers—and like computers, it can run on batteries. The impact is substantial: it reduces food costs, improves quality of life, and can potentially be used to store and transport vaccines and medicines to remote and underserved areas. The Chotu Kool is also exemplary for ensuring that the product had significant outreach. Since Chotu Kool was co-designed with village women it has had increased acceptability. In a true “More from Less for More” (MLM) spirit, the unit has only 20 parts as opposed to more than 200 parts in a normal refrigerator, making it easily serviceable. It also tapped into existing microfinance networks in India for distribution and financing, and marketing is performed entirely by vil-
lagers on commission.

The Life Straw, a water filter designed for per person use, provides potable water without electrical power, batteries or replacement parts, running water or a piped-in water supply. The Life Straw is a plastic tube 31 centimeters long and 30 millimeters in diameter, and costs around US $5.50 plus shipping. Water that is drawn up through the straw first passes through hollow fibers that filter water particles down to 15 microns across, using only physical filtration methods and no chemicals. The entire process is powered by suction, similar to using a conventional drinking straw. Life Straw filters a maximum of 1 000 liters of water, enough for one person for one year. It removes 99.9999 percent of waterborne bacteria, 99.99 percent of viruses, and 99.9 percent of parasites. It has an easy-to-clean pre-filter and purification cartridge and all the raw materials are US Food and Drug Administration compliant or equivalent. While Life Straw is mostly used by hikers in the developed world, and its widespread adoption of remains limited due to its cost, Life Straw has been used with NGO support during humanitarian crises such as the 2010 Haiti earthquake, 2010 Pakistan floods, and 2011 Thailand floods.

The massive scale adoption of mobile services due to extremely low costs has greatly facilitated commercial transactions by overcoming infrastructure constraints. Innovations in general purpose technologies such as ICT have enormous multiplier effects as they have applications in numerous fields, and bring enormous efficiency to economic interactions while reducing information asymmetry. Communication, for example, helps fishermen not only get weather updates and fish concentration areas; it also helps them get accurate pricing information. Mobile communication has also spurred interesting models of delivery of health services and deepened social engagement.

---

IV. Foundations and International Development Institutions

Global Foundation such as Bill & Melinda Gates Foundation, Global Clinton Initiative, Welcome Trust, and others, are involved in funding inclusive innovation partnerships among different players. Each of them support different domains and use different methodologies. These initiatives have drawn interest from the most advanced institutions, from Harvard to Yale to Oxford and Peking University. The ‘grand challenges initiative’¹ posed by Bill & Melinda Gates Foundation is one of the most innovative initiatives in recent times, which is giving a much needed boost to inclusive innovation. It is a five year US $100 million initiative to encourage bold and unconventional research on novel global health solutions. It challenges the best minds around the world with a chance to win US $100 000 grants to further their research. Presently it is in the eighth round.

The Global Responsibility License (GRL) strikes the right balance between the commercial exploitation of intellectual property (IP) and unlocking knowledge to help the world’s poorest people. GRL is a project of the Young Global Leaders Group of the World Economic Forum working in concert with commercial companies, research organizations and IP development organizations such as Public Intellectual Property Rights for Agriculture (PIPRA). It addresses the challenge that only a few companies, universities, government agencies, and non-profits have the expertise and resources to broker successful deals that make a difference to the poor in developing countries. This is one the key causes of the failure to sufficiently leverage global capacity to design, develop, and deploy technologies that will improve the lives of the BoP. GRL is a practical solution that addresses this gap by promoting better use of technology to impact global poverty and making it easier for patent holders to temporarily release their patents for humanitarian purposes. GRL

¹ www.grandchallenges.org
makes it easier for patent holders to make a significant contribution to aiding vulnerable populations in the poorest countries because it is a modular license, created specifically for the use of IP for development purposes. Corporations retain ownership of any research they have undertaken while giving NGOs the opportunity to improve the quality of life for the poorest. GRL thus unlocks IP to benefit the one billion poorest people in the world without requiring companies, universities and other IP holders to give up their rights to exploit their IP for other commercial uses.

Launched as a part of the G20 leaders’ summit in Cannes on November 3 – 4, 2011, the “G20 Challenge on Inclusive Innovation”① seeks to recognize business with innovative, scalable and commercially viable ways of working with and for the BoP. This is naturally a response to the fact that for the private sector, inclusive innovation products and services are emerging as perhaps the biggest business opportunity of the coming decade. The G20 Challenge defined inclusive business as a private sector approach to providing goods, services, and livelihoods on a commercially viable basis, either at scale or scalable, to people at the base of the pyramid by making them part of the value chain of companies’ core business as suppliers, distributors, retailers, or customers. The most innovative models use creativity and smart business thinking. The main features of innovation include building the capacity of the BoP, financing the BoP, adapting products for the BoP and distributing goods and services to the BoP. The 15 winners of the G20 Challenge combine these innovation features. The G20 Challenge winners are homegrown and financially sustainable companies in various sectors, including agriculture, affordable housing, health, education, water utilities, supply chain finance and retail.

V. Partnerships and Collaborative IP

Successful inclusive innovations have relied on collaboration between various agents. Many of the products discussed above were the result of partnerships across

sectors. For example, the pine needle stove developed by MIT’s D-Lab was spurred by a challenge posed by an Indian NGO, Avani. With its superior knowledge of the BoP experience, Avani identified the BoP need, and helped coordinate development of the solution. South Africa’s tea-bag water purifier only achieved widespread use through commercialization as the Life Straw, and even that product had to be leveraged with NGO support to make it truly accessible to BoP consumers, which has focused distribution of the product on disaster-relief efforts. The Aakash tablet was collaboration between the Indian government, which established the mandate; Indian universities & RTIs, which helped develop the product; private firms, which innovated in response to the mandate and early research to reduce component costs and ultimately take over production. Similarly, Patrimonio Hoy has relied on support from the Inter-American Development Bank for credit guarantees. Other examples of inclusive innovations built through such partnerships are described in the Box 18.

**Box 18**

**Inclusive Innovation Examples**

*MEDIKits.* Medical Education Design Invention Kits (MEDIKits) are do-it-yourself medical device kits designed to unleash creativity in medical professionals in developing countries. Inspired by “evidence of innovative solutions in healthcare frontlines”—such as nurse-created accessories for neonatal intensive care units and homegrown suture and implant alternatives—this initiative of MIT’s Innovations in International Health (IIH, USA) program functions as a barrier-breaking “meta-innovation”: by offering the right tools to lead users, these kits facilitate necessity-driven, ground-level innovation, and bypass the inertia of healthcare infrastructure investments.

*Spiral Pine Needle Stove.* In response to a challenge posed by India’s Avani NGO, the Spring 2010 D-Lab Design class at MIT (USA) designed a stove capable of burning pine needles—a renewable energy source far less scarce than the wood fuel upon which many people in India rely. Featuing spiral chamber geometry and other innovations to accommodate the unique

---

2. http://www.youtube.com/watch?v=ntmX8aFuKOY.
difficulties of pine needle combustion, the stove can boil 5 liters of water in 15 – 22 minutes using roughly a pound of pine needles, and has a current prototype cost of US $20 – $25.

_Bici – Lavadora._ The Bici – Lavadora (a MIT D – Lab project), is a portable, pedal-powered washing machine. With an estimated prototype price of US $127, this innovation stands to vastly increase the productivity of wash women, and bring some of the benefits of an appliance often taken for granted elsewhere in the world at low-cost and without reliance on electricity.

_Safe Surgery Sterilizer._ More effective than chemical sterilants and boiling water, this low-cost, solar-powered autoclave offers rural health facilities the ability to sterilize instruments onsite. Another initiative of the Innovations in International Health program at MIT (USA), the innovation stands to lower surgical infections in areas without electricity or where electricity outages are frequent.

_Phototherapy for Jaundiced Newborns._ In collaboration with Stanford University (USA) and the National College Inventors and Innovators (USA), D – Rev Design Revolution (USA) developed a brilliance phototherapy treatment for newborn babies with severe jaundice. At a cost 25 times lower than comparable Western devices, the innovation stands to empower clinics to treat the over 20 million children in the developing world who suffer from jaundice each year.

_Freeplay Lifeline Radio (South Africa)._ The Lifeline Radio was designed and robustly constructed to operate in the harshest conditions and climates. It is rugged, colorful and easy to use and runs on either self-charge or solar power. It receives excellent AM/FM/SW reception. It plays non-stop for 24 hours and has been extensively researched and field-tested to determine its functionality, styling and ease of use for people who need sustainable access to listening. The Lifeline radio enables sustainable access to information and educational content. It has been used to provide information that is vital to improved health, safety, education, agricultural productivity, disaster mitigation and governance. The Lifeline radio is the first radio that has been designed specifically for use by women and children.

_Low Cost Clean Light for the Poor (Canada)._ In 1998, Dave Irvine – Halliday, a professor of electrical engineering at the University of Calgary in Alberta, Canada began developing his own

---

white LEDs or WLEDs, based on a design pioneered by Nichia Corp. in Japan. Field tests in Nepal in 1999 were done and three Nepalese villages were illuminated with WLEDs. Three years later, he founded the Light up the World (LUTW) Foundation to bring LED technology to the poor on a global scale. The non-profit group has helped to distribute low-power, white LEDs at low cost to more than 26,000 homes in 51 nations worldwide, illuminating the worlds of more than 300,000 people. There are numerous advantages to LEDs; they can be run on very small batteries; users don’t have to be connected to a central electrical grid; they can deliver up to 100 times more light to illuminate an area than kerosene lanterns; and they can shine continuously for up to 50,000 hours compared with only 1,000 hours for traditional incandescent light bulbs. LEDs also use close to 80 percent less energy than incandescent light bulbs. The goal of supplying LED-driven light is help the poor increase their work productivity; give them more time to study at night; and reduce the widespread health problems and fire hazards caused by the use of kerosene lamps. In 2003, LUTW expanded their operations to India, Pakistan, the Philippines, Mexico and Ecuador. In 2004, a project in Ghana marked their first foray into Africa. LUTW’s response to the 2004 Tsunami in Sri Lanka was its largest operation, providing light to more than 2,000 temporary shelters. In 2008, its focus was on Papua, New Guinea, Ecuador, Peru, and Tibet. In 2009, it partnered with Cause Canada to bring solar powered reading lights to Honduras and its 2010 projects include Haiti, Guatemala and Costa Rica. LUTW supplies non-profit and humanitarian organizations with the lighting system components at subsidized prices. Typical home-based system costs as little as US $75 excluding shipping. Often, these can be financed by recipients with loans from micro-credit organizations. In contrast, many people in the countries served by LUTW spend up to US $200 a year on fuel to keep their homes lit at night with polluting (and unsafe) kerosene-based lamps. The solar-powered system pays for itself in as little as two years when compared to using kerosene, though the battery needs to be replaced in two to three years.

The Milk to Market Initiative. It is important to create a network of all the stakeholders so that the inclusive innovation based solutions can be deployed in the field. The Milk to Market initiative, which pertains to a low cost milk pasteurization innovation, is a good case in point. To solve the problem of spoliation and contamination plaguing milk storage, D-Rev Design

---

Revolution (USA), in partnership with the International Livestock Research Institute (Kenya), Niparaja (Mexico), the Bill & Melinda Gates Foundation (USA), University of Arizona (USA), Meridian Design Group (USA) and Heifer International (USA), is developing three promising, low-cost innovations designed to help small-scale African dairy farmers bring more of their milk to market. These include two novel methods of pasteurization-low temperature pasteurization using little more than a simple kitchen thermometer and farmer’s stove, and cold pasteurization using UV-C ionizing radiation-as well as a low-cost method of making chlorine bleach to more effectively clean milk storage and transport containers.

Collaborative Intellectual Property (IP) has also created networks of talent resolved to address BoP problems. Novel concepts such as ‘open source’ leverage resources from all around the world and all sectors to make solutions amenable to customization for BoP needs. Frontline SMS open source text messaging software created by Ken Banks in the UK – transforms basic tools that most NGOs already have (computers and mobile phones) into a communications hub useful for fieldwork and surveys. It allows text messages to be sent to large groups, whose members can respond individually. Frontline SMS has spawned a number of other initiatives for use in specific fields such as health, finance, education, law and media. Perhaps its biggest impact has been in the medical field by an organization called Medic Mobile, which used Frontline SMS to empower a hospital in Malawi to care for a dispersed community of 250,000 people with only 2 doctors on staff. By equipping a network of 500 volunteer community health workers with cell phones and the Frontline SMS program, the hospital has greatly improved patient communication and care, while saving transportation time and costs by allowing patients to send health updates via text instead of forcing them to travel long distances to physically deliver information. Today, Frontline SMS is used in 70 different countries by more than 10,000 social-change organizations. It has enabled many communications-based projects such as disaster relief coordination in Haiti, a rural health-care network in India and a network for field communication used by a humanitarian organization in Afghanistan. The software remains free, and because the source code is open, developers are free to create their own features. Its current
version supports on-screen language support for English, Arabic, Azerbaijani, Bengali, German, Spanish, Finnish, French, Hindi, Indonesian, Khmer, Portuguese, Russian, Swahili and Chinese.

**Inspired by successful innovation through an open source model in software development, open source principles are now being used in other fields such as drug discovery.** In the software industry, well-known examples such as the Linux operating system and Apache web server have demonstrated that open source methods can create market leaders. This success led many to speculate if open source can be applied to other industries with similar success. The pharmaceuticals industry is often seen as the prime candidate for possible transfer and adaptation of open source principles of collaboration and open IP. The World Health Organization’s Consultative Expert Working Group for Research and Development Financing and Coordination is currently evaluating open source drug discovery platforms—and several open source drug discovery projects already underway. The Synaptic Leap—a network of online research communities that connect and enable open source biomedical research-hosts a project to develop a new synthesis of the schistosomiasis drug, praziquantel. The CSIR India also has a formal Open Source Drug Discovery (OSDD)\(^1\) initiative (Box 19), and an initiative called BiOS\(^2\) (‘Biological Innovation for Open Society’), which fosters decentralized, cooperative innovation in the application of biological technologies, through the merging of intellectual property informatics and analysis; innovation system structural reform; cooperative open access technology development activities. “Crowd-sourcing” innovation also has promise; Innocentive, Nine Sigma, and Foldit, are examples of organizations broadcasting an open call to solve problems, which are heeded by an undefined large group of people carrying on tasks usually performed by employees.

---

\(^1\) [http://www.osdd.net/](http://www.osdd.net/).

\(^2\) [http://www.bios.net/daisy/bios/home.html](http://www.bios.net/daisy/bios/home.html).
Box 19

**CSIR India – Open Source Drug Discovery Program**

The goal of the CSIR India’s Open Source Drug Discovery initiative is to enable open, collaborative scientific research that will make possible the discovery and development of drugs at a far cheaper cost than traditional pharmaceutical innovation. Its models are inspired by the success of the open collaborative processes that resulted in the speedy sequencing of the human genome and the Linux computer operating system—models deviating heavily from the closed-door environment, where confidentiality and intellectual property protection are paramount given the huge rewards that a successful drug launch can provide, which characterize traditional pharmaceutical research.

OSDD has created a scientific community of more than 4,500 participants from 135 countries. OSDD’s initial thrust is on producing more effective drugs to combat infectious diseases common in the developing world, specifically tuberculosis, which kills 1.7 million people annually, according to the World Health Organization (WHO). In some areas of the world, one in four people cannot be treated with existing TB drug regime, according to WHO.

OSDD has achieved a remarkable initial success; in 2010, it brought together hundreds of scientists by designing a “connect to decode” conference to provide the first ever detailed mapping of mycobacterium tuberculosis (MTB). While the MTB gene was sequenced more than a decade ago, until this conference, only about a quarter of the nearly 4,000 genes had been annotated. In the true spirit of OSDD, it has made the TB gene map available in the public domain for drug makers. The current OSDD model is going to be used primarily to develop extremely affordable drugs required by resource poor people all around the world. However, OSDD has demonstrated the power of galvanizing the collective imagination and creativity of “anyone, anytime, anywhere.”

**Patent pools offer another collaborative mechanism for creating inclusive products.** Patents are known to be a major impediment in lowering costs. However, when the market has very limited purchasing power, as is in the case of developing countries, patents are not necessarily effective in stimulating R&D and bringing new products to the market. A patent pool allows a number of patents held by different entities to be made available to others for production or further devel-
opment. The patent holders receive royalties by the users. Patent pools are part of World Health Organization’s recently adopted Global Strategy on Public Health, Innovation and Intellectual Property to help increase access to medicines. Several such initiatives are underway. For instance, Knowledge Ecology International\(^1\) is trying to create a patent pool for medicines in low and middle income countries. In February 2009, Glaxo Smith Kline announced a patent pool initiative, with the intention of many drug patents for tropical diseases into a free pool.

VI. Lessons and Challenges from Global Inclusive Innovation Efforts

The inclusive innovation process must harness all innovative processes: high-tech, low-tech, business models, process efficiency, and delivery models; and technologies can have uses not just for the BoP in developing nations but also for regular populations in the developed and developing nations. This means traditional frontier innovation agents, and ecosystem linkages in the frontier innovation ecosystem, must be re-evaluated, re-tooled, or even created from scratch. Indeed, the challenge is tougher: an inclusive innovation ecosystem must be global in scope but also reach targeted localities as well, cutting across differences in geographic location, access to financing, education, socioeconomic status, culture, and way of life. By supporting the initiatives of elite institutes and formalizing the international exchange, the fragmented efforts can be consolidated to yield superior results. With appropriate facilitation, the direction of trade and technology can run in any direction: north to south, south to north, or south to south.

Sustainable adoption and outreach remains a considerable challenge for inclusive innovation efforts: just as inclusive ideas are under-developed, they are also under-commercialized. Innovations such as Life Straw and Free

\(^1\) http://www. keionline. org/.
Play lifeline radio can have uses for several needs and are not restricted to sections of population or specific geography. Such existing technologies that have shown enormous promise but are still not widely adopted by the BoP due to cost reasons can be suitable candidates for inclusive innovation. Also, as discussed earlier, there are numerous inventions either at prototype stage or with limited commercial success at the BoP level. Scouting for such innovations and exploring ways by which such innovations can be made cost efficient would be a more efficient route to achieving desired objectives as opposed to initiating new product research on the concerned topic. The problem is not simply that the technology is not as promising as it seemed during the research stage; some, like the Life Straw, have been commercialized, but only as luxuries for high-income consumers. This suggests that firms are struggling to overcome the numerous barriers to entering BoP markets.

Indeed, solutions created with a holistic view of the ecosystem in which the innovation resides-and confront the BoP as both consumer of innovation and a participant in it-are more likely to be widely adopted. Typical financing, marketing, delivery, and design perspectives may fail, and firms which developed the capacity to overcome those challenges of BoP markets have succeeded. Deep and nuanced understanding of the needs of the BoP defines and clarifies the goals of the product, and avoids problems by the Nano Car, and the “One Laptop for All initiative” – both of which significantly missed goals in serving their target markets because consumers simply did not take to them. Moreover, firms must intermediate between themselves and their market-and that means forming relationships with consumers and deploying them as a resource. CEMEX localized financing, marketing, and distribution of cement and other materials to support the BoP. In the case of the Chotu Kool, the entire sales and delivery channels are drawn from the community leading to not just greater adoption due to factors such as trust, but also producing income generating opportunities within those communities. Challenges, however, remain. For inclusive innovation businesses, such as start-ups, such investment in gathering critical information and exploring new markets could be cost prohibitive-and even sophisticated firms struggle to do it. Alleviating the cost
burden and help in information gathering and dissemination can be beneficial.

Like frontier innovation, successful inclusive innovations have relied on a handful of champions of the ‘More from Less for More’ (MLM) approach to doing business. Visionary leaders in industry, such as GE’s Jeffrey Immelt, and Tata Group’s Ratan Tata, individual researchers such as Professor George Whitesides, leaders of public institutions, and pioneering public officials have brought inclusive innovation from concept to reality (Box 20). This is not surprising, given the risk, disruption, awareness, inherent in the MLM approach. Even well-formed innovation ecosystems, like Silicon Valley, place immense emphasis on high-value individuals, and maximize their contagion effect through angel, incubation, venture, and cross-sector networks. The same can be done with inclusive innovators.

Box 20

Leadership Matters

Successful leaders in inclusive innovations share several traits. First, they have a deep commitment to inclusive growth. Companies often identify markets by asking: “Given our cost structure, which segments can we serve?” Successful inclusive innovation leaders always asked: “Given that we need to cater to the unserved, what should our cost structure be?” Second, these leaders complemented their business vision with a human dimension. Thus the leaders like G. Venkataswamy of Aravind Eye Care were passionate about eliminating ‘needless blindness.’ Third, they established ambitious goals and clear time frames for achieving them: Ratan Tata set a target of a US $2 000 car, and Dhirubhai Ambani setting a target of a phone call at the cost of a post card, to name a few examples. Fourth, successful inclusive innovation leaders have forced project teams to work within self-imposed boundaries that stem from a deep understanding of consumers. This has resulted in a novel, outside-in view of innovation-and even changed the language inside their organizations, which now call “consumers” as people, “suppliers” as partners, and “employees” as innovators. All of these traits have resulted in an affirmative answer to the fundamental question any firm can ask about its business: “If we change the way we operate to reduce costs and focus less on operating margins, can we earn an even higher return on capital? If we reduce prices enough and make our products available to the poor, will there not be explosive growth as they quickly find uses for and buy our offerings?”
Great success stories can spur other innovations both domestically and abroad raising critical issues related to intellectual property protection. The quintessential problem of balancing protections and fostering competition must be struck, but the cost to innovation-particularly inclusive innovation-must be made explicit. Moreover, collaborative IP, motivated by a combination of social responsibility and profit, must be fully examined as an alternative for at least certain products in certain markets.

Several key lessons can be drawn from global inclusive innovation efforts such as:

- Inclusive innovation is a very useful policy instrument to improve social inclusion and harmony, but it is not a ‘silver bullet’. It is one important tool in the basket of many tools available to policy makers, but it is by no means the solution to all social problems. Therefore, Governments need to consider deployment of all possible tools including inclusive innovation in designing strategies to deal with the social inclusion and harmony.

- Given that the concept of inclusive innovation is relatively new, currently, there are no real best practices, or a country that has demonstrated the significant impact of a set of coherent and inter-linked policies to foster inclusive innovation. India is well head in this regard, but even India’s efforts are work-in-progress. Therefore, we lack clear evidence on how to make inclusive innovation happen from a systemic or policy stand point.

- The inclusive innovation process must harness all innovative processes; high-tech, low-tech, business models, process efficiency, and delivery models; and technologies can have uses not just for the BoP in developing nations but also for regular populations in the developed and developing nations.

- Sustainable adoption and outreach remains a considerable challenge for inclusive innovation efforts: just as inclusive ideas are underdeveloped, they are also under-commercialized. There are numerous inventions either at the prototype stage or with limited commercial success at the BoP level.

- Solutions created with a holistic view of the ecosystem in which the innova-
tion resides-and involve the BoP as both consumer of innovation and a participant in it-are more likely to be widely adopted.

- Like frontier innovation, successful inclusive innovations have relied on a handful of champions of the ‘More from Less for More’ (MLM) approach to doing business. Visionary industry leaders, such as GE’s Jeffrey Immelt, and Tata Group’s Ratan Tata, individual researchers such as MIT Professor George Whitesides, and leaders of public institutions have brought inclusive innovation from concept to reality.
Chapter 4

Policy Options for Promoting Inclusive Innovation in China

I. Key Goals of Public Policy Intervention

As discussed earlier, the Chinese government has placed building a harmonious society and reducing disparities in income and access to services on top of its agenda. In September 2010, President Hu Jintao proposed an inclusive growth strategy aimed at reducing poverty, narrowing rural and urban income gap and promoting equal access to basic social services for urban and rural poor and migrant workers. The 12th Five – Year Plan (2011 ~ 2015) enshrines the goal of “sharing benefits of development by all Chinese people”. In this context, inclusive innovation is of high relevance for the Chinese authorities but the concept is new to the Chinese government, from both conceptual and policy perspective. So far, China has emphasized frontier innovation, yet has recognized the importance of inclusive innovation in addressing increasing disparity between the rich and poor.
Five elements of inclusive innovation-affordable access, high quality, low cost, sustainable business model, and extensive outreach-are fundamental. As noted in previous Chapters, there are many examples of policy initiatives and promising products in the domain of inclusive innovation, unfortunately, such developments are highly inadequate, especially in relation to the huge unmet needs of the BoP. Further, many such products are either at prototype (e.g. Embrace infant incubator) stage or small scale production (e.g. Jaipur foot). Only a few have achieved large scale sustainable production. Examples of new product technologies, the end result of innovation needs to be seen in terms of large-scale adoption/diffusion and market impact. In that respect, commercialization and bringing inclusive inventions to market remains a major challenge. Obviously, in situations where the invention is part of a market expansion strategy of a private firm, there is a strong incentive to address the diffusion question-success stories such as telecom in India, GE’s portable ultrasound, Godrej Chotukool. These illustrate market dynamics-a private firm responding to a market opportunity. However, as mentioned earlier, there are domains of inclusive innovation where there might not be a strong private sector player for either creating new innovations (especially, low cost and high quality) or bringing the innovations to market. In these situations, the challenges of developing enough new products or commercialization and diffusion are non-trivial, and require appropriate policy support and interventions.

Given that the concept of inclusive innovation is relatively new, currently, we do not really have best practices, or a country that has demonstrated the significant impact of a set of coherent and inter-linked policies to foster inclusive innovation. While countries have been implementing initiatives (including inclusive innovation) to deal with the social inclusion, most countries do not have explicit inclusive innovation strategy. India is well head in this regard, including setting up a high level National Innovation Council, formulating an explicit inclusive innovation strategy, setting up a dedicated Fund, and promoting clusters, etc. But even in this case, India’s efforts are work-in-progress. Therefore, we lack clear evidence on how to make inclusive innovation happen from a
systemic or policy stand point. The issues faced by grassroots innovators (innovators who lack formal training or education but who come up with ingenious solutions to their own problems) are different from those of the enterprise innovators.

'Inclusive Innovation' should not be looked as a ‘silver bullet’, but as a useful policy instrument which can make a difference in social inclusion and cohesion. Inclusive innovation is one important tool in the basket of many options available to policy makers and should be deployed along with other instruments to maximize impact in dealing with the issue of social inclusion and harmony. Such tools include, but not limited to: a supportive business environment, physical and ICT infrastructure (especially rural), sound FDI regime, protection of intellectual property rights, governance systems, strong institutions, participatory approach, direct subsidies, sound education system, labor mobility, market based competitive economic environment, including vibrant private sector, etc. For example, reform of the household registration (hukou) system holds the potential to unleash enormous welfare improvement for hundreds of millions of the rural poor in China, which cannot be matched by any other means including inclusive innovation. The same goes true for rural infrastructure, such as a paved road connecting a poor village to the main road.

As discussed in Chapter 2, China has the basic building blocks that are prerequisites for becoming an inclusive innovation powerhouse:

- A well-developed national innovation system, with solid indigenous knowledge and technology capacity;
- A strong institutions and entrepreneurial culture;
- A thriving class of business persons and professionals;
- A growing private sector with strong manufacturing capacity and reverse innovation capabilities;
- Strong and widely-covered physical and ICT infrastructure; and
- An enormous BoP market with huge potential purchasing power.

However, China’s current inclusive innovation ecosystem faces significant challenges. In China, many efforts are being made in the domain of inclusive
innovation, but there is no explicit national strategy and implementation plan. While China has a large number of public support programs many of them suffer from important deficiencies such as: most government programs and policies are ad-hoc and inadequately structured, uncoordinated, and inefficiently operated; private sector efforts are limited in scope due to a lack of incentives, barriers to BoP markets, implicit bias against the private sector, regulatory burdens, and a lack of early-stage financing; universities and research institutions remain insufficiently focused on inclusive innovation and their output seldom leads to usable and widely adopted products; grassroots innovation is not well-supported and remains sporadic and limited in scope and impact; international collaboration on innovation is insufficiently oriented towards inclusive innovation; and the linkages between all of these actors are weak and in some cases non-existent. This situation raises many questions whether in China, the numerous Government inclusive innovation-related initiatives in their current state are operating efficiently, have a wide outreach, adequately leverage the capabilities and comparative advantages of all stakeholders, sustainably producing pro-BoP products, and deliver best possible outcomes and impact for the target population, at a least burden to public budgetary resources.

**Sound public policy can help address many of these challenges and create a well-functioning innovation infrastructure that raises inclusive innovation outputs on a sustainable basis.** Experience in China and globally demonstrates that output of inclusive innovations relies heavily on a vibrant inclusive innovation ecosystem. Policies that harmonize efforts, facilitate partnerships across sectors, institutions and borders, and coordinate financing, can result in a superior generation, exchange and transfer of pro-BoP knowledge, and take innovations from conception to deployment and widespread adoption. The policy instruments should be based on the principles of achieving wider impact, greater outreach, and deeper involvement of all stakeholders. To leverage the managerial and organizational efficiency, manufacturing capabilities, market knowledge, technical and industrial expertise and risk taking capability of the private sector, public
policy should have provisions to encourage businesses to adopt commercially sustainable business models for inclusive innovation. The policy framework should also incorporate independent and regular monitoring and evaluation mechanisms and aim to achieve maximum efficiency, sustainable production to deliver results minimize burden on government resources. What is required is innovation (itself) in both doing as well as delivering inclusive innovation to Chinese society.

II. Elements of Public Policy to Promote Inclusive Innovation

Given the above, China could consider certain policy tools that it may find suitable for Chinese conditions. The Government may design, adopt, experiment and adjust various options based on its own institutional systems, experience and outcomes. Potential options for the public policy interventions include the following:

- An integrated national inclusive innovation policy and required institutional systems.
- A facile regulatory system and supportive public procurement policy.
- A dedicated fund to support inclusive innovation including private risk capital for pro-B0P solutions.
- Incentives to leverage strengths and comparative advantages of all stakeholders, especially the private sector.
- Mandates for public research system to channel the very best technical and scientific expertise towards inclusive innovation.
- Dedicated support to grassroots innovators to deepen and expand their innovation capacity.
- Collaboration with national, regional and global STI organizations to leverage global talent, technology and resources.
- Grand Challenge and recognition for game changing inclusive innovations
to target specific goals-encouraging risk taking, experimentation and recognizing failures.

- Independent and regular monitoring and assessment of policies and programs to maximize efficiency and impact, and benefit from lessons learned.

**Integrated national inclusive innovation policy and institutional systems**

An integrated national inclusive innovation policy with required institutional systems is essential to spur inclusive innovation in China nationwide. There are many inclusive innovation initiatives and programs in China with laudable goals and technology prowess. However, the present policy and institutional structure faces the challenge of effective co-ordination mechanism. For the entire inclusive innovation ecosystem to fire on all cylinders, an integrated national policy and co-ordination among various government levels, agencies and programs is required. Such role could be assigned to a suitable high level body with the responsibility to create a robust framework for pursuing inclusive innovation in China, and facilitate collaboration between different stakeholders, ministries and programs. This body should have power and resources to design as well as execute policy and monitor implementation. In addition to formulating a roadmap for inclusive innovation, this agency should come up with an action plan that encourages innovation in public service delivery and synchronizes all policies and programs of central, regional and local governments aimed at inclusive innovation. This agency could help creation of clear goals for each of the stakeholders. Specific targets can help mobilize efforts of the stakeholders towards precise objectives. Similar arrangements could be considered at the provincial, district, as well as sectoral levels. For policy interventions to influence every innovation stage-from conception to deployment of the innovation-this agency should have the ability to seek views and advice from all stakeholders in inclusive innovation, such as industry leaders, eminent researchers, economists, ministries, financiers, international experts,
An Inclusive Innovation Academy—a think tank to undertake policy, analytical, advisory and advocacy role by connecting various stakeholders (e.g., public officials, R&D institutions, enterprises, NGOs, global organizations, foundations) could play an important role to advance the inclusive innovation agenda in China. Given the prolific inclusive innovation initiatives in China by businesses, NGOs and different government agencies, a think tank could help provide institutionalized mechanism to learn from experiences and experiments in China and world-wide. This could help address the problem of information symmetry among various stakeholders. It could also help deepen the culture of inclusive innovation and orient China’s rich human capital towards the same. The think tank will research lessons learned about the efficacy of various policies and programs that different countries have undertaken. Also, case studies of successful inclusive innovation initiatives by both businesses and governments world-wide will help refine the toolkit of policies and strategies and the understanding of what works best and under what circumstances. The Academy would also disseminate the literature produced by its efforts thus engendering an interest in inclusive innovation among practitioners, policymakers, amateurs and the general public. To galvanize information related to innovations and innovators in a single repository as well as act as a platform for idea exchange, a portal for inclusive innovation could be considered.

**Facile regulatory system and supportive public procurement policy**

Easing of regulatory requirements for inclusive businesses/initiatives will be essential to expedite starting and growing inclusive businesses. While China has made significant reforms and as indicated by its improved position on global ranking on the ease of doing business, inclusive innovation businesses face many regulatory constraints. In order to address these constraints, agencies could establish guidelines to expedite clearance and processing of legal require-
ments. Streamlined and expedited bankruptcy rules for this class of businesses could enable efficient and speedy allocation of resources to their optimal use. Creation of specific regulatory framework also sends a strong signal about the strong commitment of the government towards inclusive innovation. Further, a simpler IPR system oriented specifically towards BoP innovations may be useful. Such a regime will strike the right balance between encouraging innovation by protecting the intellectual property of the inventor and advancing the knowledge frontier. Inclusive innovators face special problems in protecting their inventions due to several factors including high cost, lack of knowledge of the formal IP protection process. Therefore, reducing the cost of IPR application and maintenance is particularly important, for many small and grassroots innovators are often unable to pay recurring fees for maintaining the patent. Efforts at educating the innovators about IP and supporting the innovators in filing, prosecuting, and maintaining their IP should also be considered. The IPR framework could have provisions for creative mechanisms such as Global Responsibility License (GRL) which protect IP while benefitting the BoP.

Dedicated fund to support inclusive innovation

A dedicated Inclusive Innovation Fund will help provide required resources to support research, technology development, sustainable production and distribution of inclusive solutions. This Fund, set up in a public-private partnership mode, can help address the lack of national level dedicated resources problem. Using grants, soft and hard loans, patient capital and venture capital, such a fund could support all stages of inclusive innovation required to meet Grand Challenges and devise BoP solutions, and alleviate funding challenges at all stages of inclusive innovation—especially when a lack of funding delays bringing a known product to market. The fund could also accelerate the process of moving from conception to deployment. To de-risk investee enterprises, help them develop the ability to deliver social impact and financial returns, the Fund should
create a network of incubators and mentors to support and guide innovators and entrepreneurs. Emergence of successful inclusive innovation initiatives and businesses can serve as ‘models’ which can spark the imagination of the people and generate deeper interest in inclusive innovation as an attractive business opportunity.

The Government will need to coordinate and provide financing, particularly early-stage financing and financing to scale-up proven products. The segment of the innovative process where significant risk threatens to sink viable projects is longer in inclusive innovation because of the challenges of distribution, newness of markets, and adoption of products by BoP members. Thus, public support for financing may need to be present at later stages than in typical high-tech innovation. Indeed, several examples exist of promising, inclusive products that cost little to make and serve vital functions, but have yet to be marketed to the resource-poor. Instead, they remain in a proof of concept stage, or get deployed for use as lifestyle items by more affluent consumers. In this context, Government may consider to reorient some existing government funding schemes to support inclusive innovation, by redefining their scope, targets and activities. Further, as provider of essential goods and services—both through social welfare programs and in their traditional role as suppliers of public goods—government could consider limited direct support for innovations in areas like water provision, sanitation, electricity production and transmission, transportation, etc. Using instruments such as grand challenges, sponsored research, and procurement guarantees, governments can lend demand-side support to innovators, decreasing the risk and uncertainty of projects.

Further, communities of practice (e.g. angel networks and venture capital organizations) focused on inclusive innovation should help making risk capital more accessible for inclusive innovation initiatives. While China has made major strides in expanding the private equity and venture capital markets in general, viable private capital for inclusive innovation is in its nascent stage. Establishing and supporting unique funding mechanisms, including public-private partnerships and business angel networks, with special focus on equity fi-
nancing can stimulate and supplement the flow of private equity capital. Establishing such communities of practice can help in capturing the lessons from various initiatives thus providing a rich source of knowledge that can help refine future funding efforts and help one community in a specific region or sector learn from another community. The government guideline fund that has specific tasks of promoting the creation and early-stage funding for SMEs in specific technologies could provide support to enterprises developing innovative solutions for the BoP. Programs directed at providing livelihood opportunities for BoP could result in the direct production of viable inclusive innovations, while also building capacity in these institutions for inclusive innovation, and promoting linkages with industry and BoP members that facilitate transfers of promising inclusive technologies.

**Leveraging strengths of all stakeholders, especially the private sector**

The Government will need to incentivize different stakeholders to develop and deploy affordable inclusive solutions to benefit the BoP population. Incentive regime should focus on leveraging the strengths and comparative advantages of all stakeholders, in particular the private sector. For example, innovation clusters can lead to solidifying BoP innovation as an attractive business opportunity and can drive inclusive innovation and social development. China has a thriving professional class and solid industrial and business capabilities. However a flourishing inclusive innovation ecosystem requires greater cross-pollination of ideas between different agents. The collaborative spirit in such hubs where research, business, risk capital and creativity come together to turn ideas into products, processes and services is often cited as one of the key reasons for the success of Silicon Valley. Creating hot spots or clusters of innovation leads to increased participation and collaboration between relevant parties and can increase outreach and scalability of inclusive innovation initiatives. Apart from conducting cutting-edge, multidisciplinary research such a hub creates crossroads between researchers, bus-
inesses entrepreneurs, financiers, and mentors. It also creates a critical mass of firms to experiment with concepts such as patent pools. There is increased interest among the private sector across the world in the BoP market. In order to improve the participation of the private sector the clusters could generate successful ‘role models’ businesses fueling the drive toward inclusive innovation. Such clusters could be a crucible for experimentation by firms and collaboration efforts. Industrial economists have attributed dedicated economic zones devoted to specific sectors such as ICT as one of the important reasons for success of the sector.

**Orienting public universities and research institutes towards inclusive innovation**

A right blend of incentive structures for researchers and institutions would encourage them to marshal their intellectual capital and creativity of students towards inclusive innovation and lead to greater production and commercialization of inventions. To create an entire culture of research on inclusive innovation, piecemeal efforts by motivated researchers and departments would not suffice. While many research organizations have taken pioneering efforts toward conducting research on inclusive innovation, by and large the research community in China focuses mostly on formal conventional research paradigms. To orient RTIs and the research community towards inclusive innovation however, newer mechanisms of prizes, rewards and incentives are needed to meet the nascent and unique area of inclusive innovation. Policy options could include mandates to major Chinese RTIs, matching grants, competitive funding mechanisms, and incubation facilities focused on inclusive innovation. Similarly, targeted early stage financing mechanisms for RTI start-ups and allowing researchers share equity in spin-offs could foster greater commercialization and technology transfer. RTIs evaluation and promotion criteria for researchers also need to adjust to encourage focus on inclusive innovation.

*Inclusive solutions require a full understanding of the end-user’s technical, eco-
nomic and social needs, which may be quite site-specific. For non-community members, understanding needs, especially in socio-cultural terms, requires immersion in the community coupled with well-developed informal information gathering and analytical skills, which even accomplished scientists do not normally possess. The Chinese Government can thus intervene to help Research Councils strengthen their research prioritization and technology intermediary function; it can, for example, support studies for needs assessments of the BoP, which RTIs can use as input for research planning process.

Box 21

Instruments to Foster University and RTI Participation in Inclusive Innovation

- The Chinese Government could formalize the incentive structure for RTIs aimed at delivering inclusive solutions. The funding of the Science Councils could be linked to the delivery of outputs and outcomes for the benefit of the BoP.

- The Governing and Executive bodies of the RTIs should have representatives of socio-economic ministries and other stakeholders including NGOs representing the end-users in order to give inputs on inclusive innovation programs that will meet the needs of the resource poor people.

- A methodology could be developed, which can be applied at the project proposal stage to help researchers specify how they anticipate their work to impact positively on inclusion. While, it is difficult to predict the impact of research on inclusion, it should be possible to identify and screen out proposals clearly unrelated to inclusion.

- The performance measurement system could take into account indicators that best capture the benefits to society. Science Councils are expected to produce a mix of outputs. These can be labeled as private goods, public goods, social goods and strategic goods.

- Value system could be changed in RTIs so that there is a greater recognition to people who produce breakthrough results in inclusive innovation. Promotion and monetary reward systems should recognize scientists and engineers who run the last mile to take the BoP products of their research to masses through productive/service sectors.
• Capability building is also required to encourage science-pull from the BoP. One of the important functions the RTIs may be asked to perform is to build the technological capabilities of the BoP. Together with poor people new technological options may be subjected to field-testing to see whether they are affordable, accessible and appropriate.

• The Government can also help each Science Council to identify and monitor on an annual basis key performance indicators relevant to the Council consistent with China’s goal of achieving a harmonious society.

Inclusive Innovation Centers could be important tools to carry out BoP – related research and new technology development, as well as upgrading and adaption of existing innovations from both domestic and global domains. Such centers would be dedicated to inclusive innovation, helping to sharpen focus on the specific topic of inclusive innovation. The creative energies of such a center would be devoted to inclusive innovation thus helping produce not just inclusive innovation solutions, but also document and disseminate insights from research efforts into inclusive innovation. In the interest of time and cost, certain facilities in the existing institutions could be designated as Inclusive Innovation Centers as opposed to creating new entities. To attract and retain outstanding scholars focused on research on inclusive innovation, research chairs could be established. To steer the best and brightest students and researchers towards inclusive innovation and create new generation of thought leaders on the topic, incentives such as prizes, scholarships could be considered.

R&D is not always the most important step in the innovation cycle. Much inclusive innovation is the result of recombining existing technologies and business process innovation. The biggest failure for innovation in general and inclusive innovation in particular, generally comes in the steps between the initial prototype of the innovation and its further development, scale-up, commercialization and widespread adoption—even if the prototype is promising. Coordination across sectors and access to financing can help overcome those hurdles; for example, the right firm—perhaps with experience in the line of business or with a solid BoP distribution network in a com-
pletely different line of business may be uniquely situated to commercialize a promising product created by an NGO or RTI; or a local Chinese actor—a government entity, private firm, or RTI—might find use for a prototype developed by a researcher overseas, that would otherwise remain under-deployed.

Support for Grassroots Innovation

The Government could enhance policies, incentives and institutions to promote grassroots innovations and to identify promising grassroots innovations and scale them up. While China has some policies, programs and institutions aimed at grassroots innovators, greater focus and coordination of policies can systematically increase the chances that such innovations are discovered and successfully deployed—directly addressing the problem of sporadic diffusion and limited scale that characterizes the current state of grassroots innovation in China. Funding, technical assistance, and tweaking existing programs like MOA and MOST to assist grassroots innovators to seize the opportunities such programs create for them rather than to simply allow them compete at a handicap with formal innovation sector players, can foster grassroots innovators. Creating repositories of traditional knowledge—appropriately protected by IP—will encourage grassroots entrepreneurship and facilitate the process of using that knowledge for innovation by other agents.

Many existing innovation facilities provided by the government, including the testing equipment and other research facilities, in several universities and research institutes, could be made more accessible for grassroots innovators. Many organizations in China are engaged in promoting and diffusing grassroots innovation development. However, although there have been a lot of activities on grassroots innovation, many valuable innovations possessed by the resource-poor tend to be isolated from each other. Greater access to engineering, design, testing and scientific and tools would increase the chance of success of grassroots initiatives. Targeted funding coupled with technical assistance could help more
grassroots innovation to scale up. Initiatives to enhance collaboration between grassroots innovators and other members of the innovation ecosystem should be explored: “start-up weekends,” a short, but intense, collaborative and hands-on experience where aspiring entrepreneurs can determine if their ideas are viable, offers one method of doing that. Further, Government might consider establishing a central agency responsible for outreach to grassroots innovators soliciting, documenting, and sorting through submitted innovations; arranging experts assistance to take promising ideas to a proof of concept phase; facilitating patent and licensing arrangements and coordinating technology transfers to interested parties.

**Collaboration with national, regional and global STI organizations**

Policies should help increasing collaboration and synergies between disciplines and institutions in China as inclusive innovation projects cut across disciplines. While China has a thriving innovation base, interactions between and within institutions on the topic of inclusive innovation remain limited. Moreover, breakthrough solutions often come from thinking about a BoP solution outside the existing conventional solution paradigm. Hence the importance of interdisciplinary research. Special incentives, mandates, and funding options should be considered to increase the number of joint inclusive innovation projects between departments within an institution and among RTIs. To channel national and international talent towards a common goal of meeting inclusive innovation challenges, RTIs should be provided incentives to experiment with novel concepts such as crowd sourcing, which can greatly decrease the costs of standard innovative processes.

*Many of the innovations produced just stay at the prototype stage. Therefore it is necessary for policy makers to look at how to improve the broader innovation ecosys-

---

 注: ① http://startupweekend.org/.
tem and to encourage greater collaboration among agents with complementary comparative advantage.

China could also benefit from deeper collaboration with international RTIs and networking between research councils of different countries to share best practices and collaborate on solving common problems of the BoP. While China has large and sophisticated scientific human capital, it can leverage global talent and technologies to capitalize on a greater pool of ideas. New networks could be formed to bring together scientists and engineers from around the world. For instance, the Global Research Alliance (GRA) brings together nine R&D institutional networks and 60 000 scientists from nine countries, rich and poor, to work on problems of poverty, of water, energy, health, and others. This network brings diversity and scientific credibility together to tackle the most pressing problems\(^1\). Many elite universities in the developed world are conducting research on inclusive innovation. Greater collaboration should be fostered to harness the rich knowledge of, and create synergies with, Chinese institutes of excellence. Exchange programs, field visits, and joint research with organizations involved in inclusive innovation can deepen and expand the knowledge base of Chinese institutions on inclusive innovation. Additionally prototypes created in international universities that have yet to fully commercialize should be examined by local ones which are better able to explore deployment. Since BoP solutions can emerge from frontier technologies and not just conventional technologies, such collaboration can open up greater set of possibilities to the Chinese researchers.

**Grand Challenges, Competitions and Prizes**

China could initiate Grand Challenges nationally to address its unique BoP related challenges. Programs such as the ‘Grand Challenges Initiative’ posed by the Bill & Melinda Gates Foundation, and competitive funding mecha-
nisms specifically focused on the problems of the BoP can coordinate resources to address the great intellectual challenges of BoP innovation. Such challenges can energize the community and harness their talent towards achieving a specific goal related to BoP innovation, and bring focus to particularly salient BoP needs. While international challenges are typically tied to the MDGs, the Chinese grand challenges could be aimed at challenges that are unique to China or could complement the MDGs. China can also use grand challenges to promote innovation that lowers costs and increases quality of publicly-provided goods and services, as India did with the Aakash tablet.

To reward outstanding projects in particular themes judged most important to the BoP, competitions and prizes could be considered. Prizes are increasingly being appreciated as a unique and powerful tool to produce change as they can bring many potential partners (e.g., private investors, innovators, R&D institutions, etc.) together, including many sophisticated ones that place considerable value on the reputational benefit of a well-recognized and acclaimed pro-BoP victory. Prizes not only provide recognition but also increase competition, which often leads to better innovations. Most importantly, prizes serve to channel efforts of the participants to a specific goal. To engender a culture of risk taking, prizes should celebrate successes as well as smart, novel, and high-effort initiatives that have failed.

India’s iconic Tata Group has instituted a surprising competition: A prize for the best failed idea! To spark innovation and keep the company from avoiding risks, the prize is intended to communicate how important trying and failing can be. “Failure is a Gold Mine!” proclaimed the former chairman who conceived this novel idea.  

\[\text{http://www.mckinseyquarterly.com/Nonprofit/Philanthropy/Using_prizes_to_spur_innovation_2396?gp=1.}\]  
\[\text{http://blogs.hbr.org/hbr/mcgrath/2011/04/failure-is-a-gold-mine-for-ind.html.}\]
Box 22

**Inclusive Innovation: Public Policy/Practice Differentiator**

The governments all around the world have tried to help create ‘National Innovation Ecosystem’. However, creation of a ‘National Inclusive Innovation Ecosystem’ calls for some important (and even bold!) departures from such current practices.

*Incentivizing scientists and institutions.* Promoting science led innovation implies incentivizing the scientists to have a commercial outlook by going beyond just creating ‘new knowledge’ to creating ‘monetisable knowledge’. Incentivisation of this is done by rewarding scientists on the basis of standard systems. For example, the number of patents filed (and those commercialized) and then offering them a share. For inclusive innovation, scientists will have to be given special charters to work on cutting edge science that leads to inclusion, a mandate of creating ‘affordable access’. New matrices for judging institutional performance are needed for this purpose.

*Early stage public support.* Inclusive innovation invariably leads to new products and creates new markets. For the normal products delivered through the standard innovation mode, not much government support or intervention is needed. However, for promoting the early seeding and growth of inclusive innovation products, it will be necessary to have a strong public procurement/subsidy support in the early phases. Without such support, the kill rate of inclusive innovation products/services will be otherwise high. In the normal innovation systems, venture capital funds have been created, which support firms at the growth and expansion stage. However, ‘inclusive innovation’ requires significant patient capital, and a far stronger contribution by the Government can only make that possible.

*Supporting grassroots innovation.* Substantial contribution to inclusive innovation will come through grassroots innovation (which is innovation ‘by’ the people). In the case of the Government policies and support for normal innovation the path of discovery to development to delivery in the market place is well defined. In the case of grassroots innovation, new structures are needed. For instance, just as ‘microfinance’ model helped financial inclusion, ‘micro-venture capital’ will help bridging the gap between the grassroots inventor and the market. The government will have to support such ventures, since the private sector will have a limited interest in creating such funds.
Sustained Government interest with subtle balance of responsibilities with the private sector. For example, the history of programs such as SPARK in China, which was designed to take the fruits of science and technology to the rural poor illustrate the point for such a need. The SPARK program received high level of Government support in the 80’s and 90’s. However, in the last decade or so, most of the capital has come from banks and private enterprises. In the final delivery of the products and services to the end consumers, Government should entrust this role to the private sector by ensuring that business based on ‘inclusive innovation’ or ‘inclusive business’ remains sustainable.

Supportive regulatory systems. ‘Technological innovation’ plays the key role in the normal mode of innovation. In ‘inclusive innovation’, non-technological innovations, such as business model, system delivery innovations, etc., play a key role. These innovations need to be backed up by strong policy level innovations. For promoting truly inclusive innovations, the governments will have to be more ‘relaxed’ and less ‘restrictive’.


III. Improving Design, Monitoring and Evaluation

All public policies and support programs should incorporate mechanism to enable effective participation of relevant stakeholders during their design stage. Some programs and initiatives in China have already produced immediate results in outreach and scale, and are contributing prominently to the inclusive innovation agenda. However, a deeper understanding of the needs of the BoP and greater upward communication will increase the viability and impact of inclusive innovation programs and initiatives. The BoP can provide valuable inputs in the innovation process and solutions that are created with deep understanding of the entire

---

1 For instance, it is estimated that under the Spark Program, over 40 million rural households receive training and under the S&T Commissioner Project, there were about 170 000 S&T Commissioners nationwide, benefiting over 50 million rural households.
BoP ecosystem are more likely to be successful.

To improve the impact of government expenditure, criteria and standards (such as impact on intended beneficiaries, the quality and affordability of goods and services provided, scope of outreach) should be taken into account by the Chinese policy makers in program design and assessing program efficacy. Creating specific metrics on impact focuses efforts on those with the greatest societal returns and those which promote established national goals and challenges. For instance, off-grid solutions that are also carbon negative or carbon neutral not only help improve economic productivity of the BoP by bringing them electricity source, they also help alleviate climate change.

Systematic and independent monitoring and evaluation of outcome and impact should be adopted for all policies and programs. Emphasis should be placed on results and outcomes than on inputs—such as how much has been invested and how many subsidies been disbursed. Metrics for evaluation and monitoring should clearly outline targets and outcomes, outputs and impacts, indicators, and the cost of conducting the monitoring and evaluation. The multiplier effects of inclusive innovations should be considered while specifying metrics. Metrics should take a holistic view of the impact of policy on all inclusive innovation characteristics such as outreach, cost, sustainability etc.

Incorporating the concept of social audit would provide impetus for inclusive innovation. Currently the accounting auditors of the respective government ministries and agencies perform financial oversight function but there is a need to conduct an economic and social audit of the Councils. The Governments should explore, evolve and espouse the quality, relevance and importance aspects of such indicators. It may be worthwhile to publicize select performance indicators for different councils so that public is informed about their functioning and a comparison can be done. Creating such indicators and publicizing them could help create an impetus for achieving certain targets.
中国包容性创新
与可持续发展战略

China’s Inclusive Innovation For Sustainable Inclusive Growth