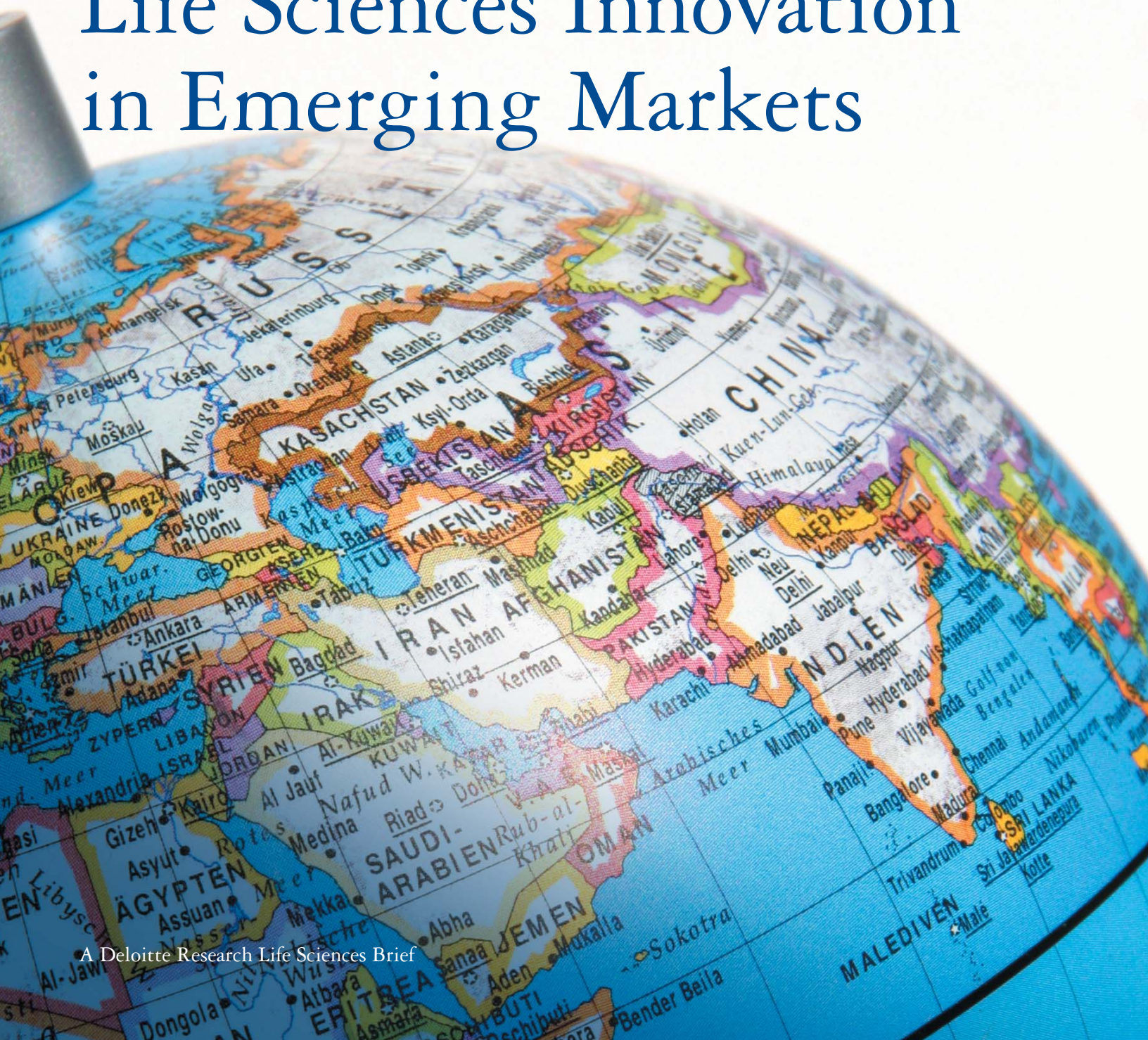




Promoting and Protecting Life Sciences Innovation in Emerging Markets



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Introduction

Innovation plays an essential role in addressing the health care needs of populations around the world. As the incidence of chronic diseases such as diabetes continues to climb, and communicable diseases such as malaria, tuberculosis, and HIV/AIDS remain prevalent in many parts of the world, governments, payers, and health care providers must wrestle with how to provide and pay for adequate prevention and treatment. The imperative to pursue the development of effective and affordable innovations is bound to become even stronger than it is today.

Meeting the challenge will be no easy task. Developing innovative drugs, devices, and diagnostics is becoming more difficult and costly. Recent estimates suggest that the total capitalized cost of bringing a new drug to market can reach upwards of \$1.3 billion over a period of 10-15 years.^{1,2} Furthermore, as medicine becomes more

targeted, fewer blockbuster products will be developed and many life sciences companies will look to expand their product portfolios.

Emerging Market Opportunities

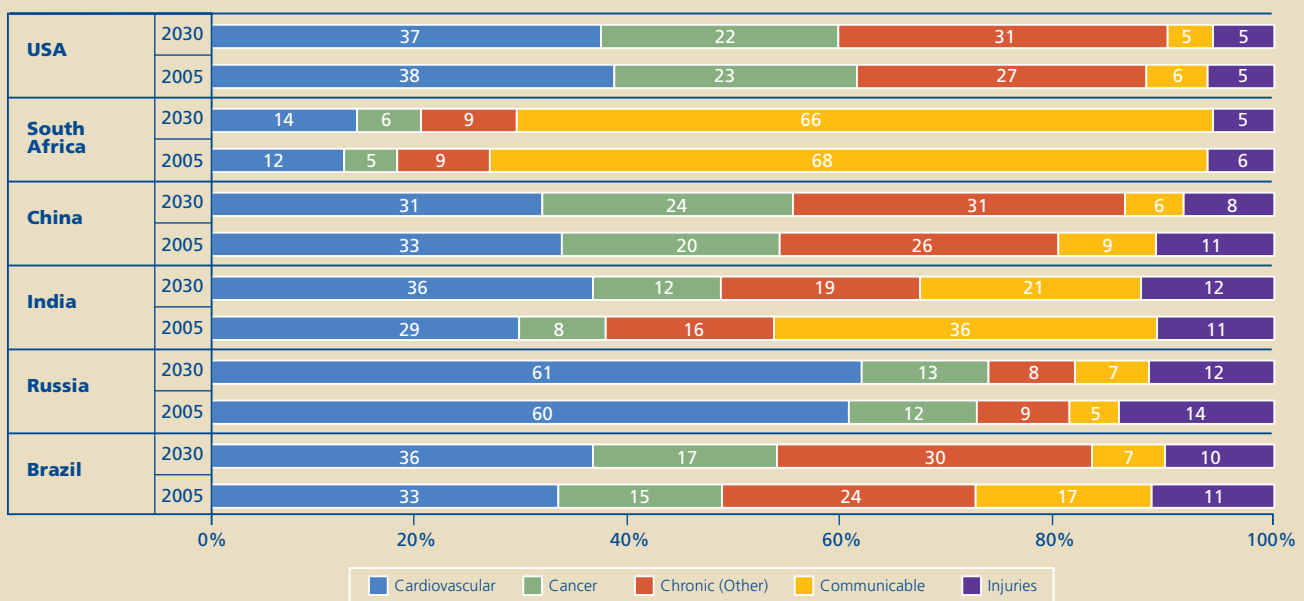
Seeking ways to increase innovation capacity and reduce development time and cost, life sciences firms are turning to emerging markets* as a source of research, development, and production capabilities.³ At the same time, emerging market countries are striving to become significant players in world trade.

Many of these countries offer highly skilled talent and strong research, testing, and manufacturing capabilities. India, for instance, has over 7 million science and engineering graduates and more than 100 FDA-approved manufacturing plants.^{4,5} Savings as high as 40% may be achieved through lower salaries and other resource and infrastructure costs, as well as through faster patient recruitment for clinical trials.⁶ In addition to these advantages, companies located in emerging markets are likely to have significant knowledge regarding potential differences in consumer preferences, as well as the ability to navigate the regulations that apply within their country.

Emerging market countries also represent a growing source of consumers. In spite of comprising only about 20 percent of all economies, emerging market countries represent approximately 80 percent of the global population.⁷ Addressing communicable diseases such as malaria, tuberculosis, and HIV/AIDS remains a critical priority in many of these countries, and chronic diseases such as diabetes are on the rise as populations grow older and lifestyles change (Figure 1). These health care needs, coupled with rising income levels, present new opportunities for business growth in emerging markets.⁸

Recognizing that emerging markets present tremendous opportunities for business growth, both large multi-national corporations and local enterprises are working to develop and tailor drugs, devices, and diagnostics to better meet the needs of these populations. Novartis' fixed-dose combination therapy for malaria (Coartem), developed in partnership with firms in China,⁹ and Ranbaxy's once-a-day formulation of an antibiotic (Ciproflaxacin), for which Bayer now holds the global marketing rights,¹⁰ are just two examples.

Figure 1. Projected Shifts in Major Causes of Death



Source: Deloitte Research analysis of WHO data, <http://www.who.int/globalatlas/dataQuery/default.asp>

*Emerging market countries are typically defined as those with low to middle per capita income that are working to open their economy through economic development and reform and experiencing strong economic growth. Emerging market countries include large resource-rich countries such as China, India, Russia, and Brazil, as well as smaller countries such as Mexico, Romania, Hungary, Thailand, South Korea, Argentina, Nigeria, and South Africa, among others. Lists of emerging market countries can vary depending on the specific criteria that are used. Source: Reem Heikal, "What is an emerging market economy?" accessed October 17, 2007 <<http://www.investopedia.com/articles/03/073003.asp>>.

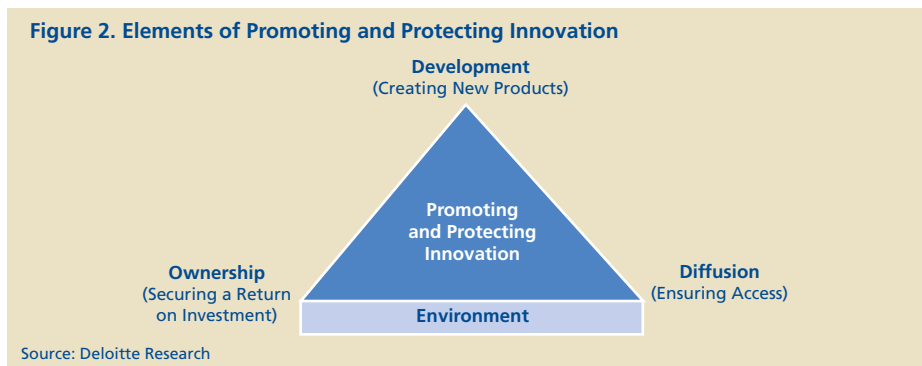
Business opportunities for life sciences firms in both developed and emerging markets have never been better. Emerging markets offer a tremendous source of potential buyers, as well as capabilities, in the global market. Given the importance of innovation in meeting the growing health care needs of populations throughout the world, how can innovation be promoted and protected within and for emerging markets?

Challenges & Risks

In addition to the challenges that affect innovation across all markets, such as funding for R&D, regulatory approval, and reimbursement,¹¹ emerging markets often face additional challenges. The sustainability of economic growth, as well as business opportunities, may be threatened by political, regulatory, legal, and judicial systems that are not fully determined or stabilized. Policies and regulations guiding trade, manufacturing standards, and product approval are not always established, consistently followed, or well-coordinated. In regions where laws, incentives, and enforcement efforts are weak or disregarded, intellectual property rights may not be consistently recognized or upheld, and practices such as counterfeiting and illegal trade may go largely unchecked. Basic infrastructure needed to support the mobilization of talent and other resources also may not be fully in place.

Perhaps most significantly, the importance of recognizing and responding to cultural differences cannot be underestimated – consumers are likely to vary in their health care needs and product preferences, health care providers are likely to vary in their approaches to prevention and treatment, local businesses are likely to vary in their customary modes of operation, and governments are likely to vary with respect to their priorities and policy-making processes.

Addressing these challenges requires understanding the components and conditions that are necessary for innovation, the tradeoffs inherent in these, and the possible levers for action that could be taken to strengthen the promotion and protection of innovation both within and for emerging markets.



Components and Conditions Necessary for Innovation

Promoting and protecting innovation involves more than granting and enforcing intellectual property rights – an array of factors related to the development, ownership, and diffusion of innovative products must be considered (Figure 2). Ideas, resources, processes, and infrastructure, for example, are essential components. Additionally, many market- and environment-related conditions can foster or hinder the promotion and protection of innovation. These would include, for example, the laws and regulations that govern activities related to development, ownership, and diffusion, but also more fundamental conditions such as economic and political stability. These components and conditions are highlighted below within the Development – Ownership – Diffusion framework.

Development. Development refers to all of the activities and influential factors that come into play in the creation of new innovations. These activities span the full research and development (R&D) chain, from the earliest stages of basic research to late stage clinical testing, as well as the production processes that are needed to manufacture the products.

Assessing the status of development efforts requires evaluating resource levels and capabilities. How strong are local R&D capabilities within emerging markets? What level of investment is being made? How can talent be mobilized effectively? How effective are partnerships and other collaborative arrangements between firms in developed and emerging markets and between firms in different emerging

markets? What are the outputs of these efforts? Where research, testing, and manufacturing operations are located can impact development. What are the cost implications of different locations? What impact do corporate tax structures have? What efforts are needed to shore up value chain security to ensure product quality, maximize value, and safeguard against counterfeit products that jeopardize the safety of consumer?

The focus and scope of development activities are also important considerations in assessing where development stands. Are innovation efforts targeting the needs of emerging markets? Are innovation efforts addressing gaps in the spectrum of needs from prevention to treatment to cure?

Ownership. Ownership reflects the factors that have an impact on securing a return on investment in innovation. Central to ownership is the recognition and enforcement of intellectual property rights. Patents and data exclusivity laws allow owners to capture and protect the value of their innovations for a period of time, but are purposively limited in duration to enable others to build upon the innovation.

Other conditions have a critical impact, as well, such as whether companies manage their intellectual property assets effectively, whether the business environment is conducive to fair trade, how pricing and reimbursement are determined, and whether compromises in ownership and price must be made with governments to meet public health objectives. Laws governing trade set the conditions under which products can be sold, distributed, imported, and exported. Some governments invoke compulsory licensing and parallel importing to increase access to lower-

priced products, but these practices can have a significant impact on the return an innovator is able to capture and reinvest. Moreover, purchasers – including governments, health plans, and other entities – establish and adjust their pricing and reimbursement policies, further affecting the return the innovator receives. Recently, there has been a call for increased transparency regarding the cost-effectiveness of new products to support more accurate assessments of the value of innovations.

Diffusion. Diffusion refers to all of the activities involved in the distribution and adoption of innovations. Major components of diffusion include the product regulations that dictate whether, when, and how an innovation can be introduced to a market, the channels and chains that are used to distribute the product, the policies that are used to negotiate prices and determine reimbursement levels, the health care system that is used to deliver the product, and the different financing mechanisms such as health insurance that are used to pay for the product. The speed with which innovations are brought to market depends to some degree on how well various policies are coordinated within and across the government departments or ministries that govern, regulate, and support science, economic development, trade, and health. Cooperation among governments, industry, and organizations pursuing global health initiatives can be just as critical for diffusion, as well.

Whether a new product is adopted often hinges on assessments of its effectiveness and affordability. A purchaser's willingness to pay – whether that purchaser is a government, insurance provider, or individual – will be swayed by their understanding of the benefits and costs associated with the innovation, the resources that are available to them (e.g., income and insurance), and their spending priorities. Patient awareness of innovations, product preferences, and adherence to treatment recommendations are also fundamentally important to adoption. Once an innovation is in the market, monitoring the outcomes of its use among patients can provide valuable information about its safety and effectiveness and point to potential areas for product improvement.

Tradeoffs

Many of the components and conditions necessary for innovation are interrelated both within and across the categories of development, ownership, and diffusion, giving rise to important tradeoffs. Some examples include:

Development – Ownership.

Ownership can bring financial rewards that provide a strong incentive to invest further in the development of new products. If threats to ownership exist in emerging markets, then firms may have little incentive to locate their development efforts in those countries, or target their development efforts on products that are of particular need in emerging markets. Moreover, if developing a particular kind of product (e.g., a vaccine for HIV/AIDS) proves to be especially challenging and costly, firms are likely to choose other targets for development unless a reward commensurate with the effort is certain or partners are available to share the risk.

Development – Diffusion.

Purchasers in emerging markets cannot always afford the price that may be necessary to cover development costs. Often, there is a resulting tradeoff between aligning development targets to meet the health care needs in emerging markets and receiving a return on investment that is adequate for covering development costs and supporting new investments, which is likely to be lower than what might have been attainable through the pursuit of other targets.

The relative levels of government spending on research and development versus programs to deliver and finance health care may also reflect a tradeoff between development and diffusion. Given that resources are limited, governments must make tough choices on how to divide public funds between programs that support further innovation, programs that create access to existing innovations, and programs that address other important public interests.

Another tradeoff between development and diffusion arises in the product approval process. Regulatory processes must be stringent enough to ensure product safety and effectiveness, but if requirements are

Measuring Value

Most would agree that medical innovations are valuable for preventing, treating, and curing illnesses and injuries. But measuring the total benefits and costs associated with an innovation can be quite challenging. Benefits may be immediate (pain relief) or long term (reduced morbidity and mortality), tangible (reduced spending on other health services) or intangible (increased functionality and productivity). Costs might include direct costs such as the expenses incurred by the supplier in researching, developing, and producing the innovation, as well as any expenses incurred by the provider in delivering the innovation to the patient. Indirect costs, such as the loss of productive work hours and negative effects on a patient's family, may also be considered.

While precise measurement of the value of an innovation remains elusive, analytic approaches are evolving and evidence of the value of life sciences innovations is accumulating. Numerous studies have measured the impact of new medicines, pointing to gains in life expectancy,¹³ reduced mortality rates^{14, 15, 16, 17} and risk of death,¹⁸ increased survival rates,¹⁹ reduced emergency room visits and hospitalizations,^{20, 21} reduced disability,²² improved quality of life,²³ and other positive health-related outcomes. Some research attempts to place a monetary value on the benefits of a particular therapy, finding for instance that each additional dollar spent produces health gains valued at a certain amount.²⁴ Other studies measure the value of an innovation in terms of the money that is saved due, for example, to reduced medical costs²⁵ or improved employee productivity.²⁶ Still others seek to compare the cost-effectiveness of one therapy or therapeutic approach to another.^{27, 28}

Most published studies assessing the value of particular life science innovations are set in developed markets, while studies set in emerging markets have largely focused on measuring the success of prevention and treatment efforts.^{29, 30} The small number of published studies assessing the cost-effectiveness of a specific innovation in an emerging market setting have focused on therapies for communicable diseases that are prevalent in these regions such as malaria,³¹ or on programmatic approaches to prevention and treatment.³² There seem to be relatively few published studies that examine the cost-effectiveness of innovations for chronic diseases in emerging markets, but this is likely to change as prevalence rates rise and emerging markets become even more integral to the world market. Whether the findings from value assessment studies in developed markets would be similar in emerging markets is an open question, given that differences in genetic factors, patient behavior, and economic and political situations can impact both the effectiveness of an innovation as well as how costs and benefits are viewed. It seems likely, however, that products with value in developed markets would also show value in emerging markets.

Figure 3. Examples of Levers for Action

Development	Ownership	Diffusion
<ul style="list-style-type: none"> • Ideas • Talent resources • R&D spending/financing • R&D scope/focus • Integration with traditional approaches to medicine/locally produced ingredients • Research capabilities • Clinical testing capabilities • Production capabilities • Counterfeit products • Value chain security • Partnerships, collaborations, alliances, and networks • Technology transfer • Geographic clustering • Government incentives for incubators 	<ul style="list-style-type: none"> • Patent protection • Data exclusivity laws • Compulsory licensing • Trade agreements • Parallel importing • Pricing and reimbursement policies • IP management • Employee incentives • Corporate taxes 	<ul style="list-style-type: none"> • Product approval regulations • Product distribution channels • Policy coordination within and across government departments/ministries • Post-market product monitoring/surveillance • Health insurance coverage • Health care infrastructure • Health care spending level/focus • Patient product awareness/adherence to treatment recommendations • Global health initiatives
Environment		
<ul style="list-style-type: none"> • Disease patterns • Demographic trends 	<ul style="list-style-type: none"> • Economic development, stability, growth • Political stability, priorities 	<ul style="list-style-type: none"> • Cultural norms • Natural disasters

Source: Deloitte Research

too onerous and the approval outcomes are unpredictable, companies may choose to seek market entry elsewhere. Many countries require additional clinical testing to be conducted within their own borders before a product can be registered, but this can be burdensome to companies who have already tested their products in other markets.¹²

Ownership – Diffusion. Realizing the maximum value of an innovation, and capturing that value through ownership, rests on the success of product distribution and adoption. For emerging markets, a tradeoff between affordability and sustainability often exists, as companies seek reimbursement at a level high enough to recoup development and distribution costs, yet low enough to be affordable to consumer markets and consequently maximize product adoption and distribution. Practices such as compulsory licensing and parallel importing arise because payers are seeking more affordable prices, but product owners then capture a smaller return on their investment and innovations are exploited by some at the expense of others.

Business sustainability and product accessibility are the major motivating forces underlying the tradeoffs between development, ownership, and diffusion. To survive as a business, life sciences firms must earn enough of a return to cover their costs and invest in new product development. To meet the growing health care needs of their

populations, governments and other stakeholders are striving to provide access to safe and effective medicines and medical devices. How then to create more affordable products for these vast new markets, yet cover the rising costs of R&D? Continuing to build upon the capabilities and resources in emerging markets will become an increasingly important part of achieving a balance between accessibility and sustainability. Concerted action by governments, industry, and others may be necessary, however, to strengthen the promotion and protection of innovation in and for emerging markets.

Levers for Action

Each of the components and conditions related to development, ownership, and diffusion can be influenced to some degree by companies, governments, and other stakeholders. Thus, they can be viewed as possible levers for action to strengthen the promotion and protection of innovation in and for emerging markets (Figure 3).

It is important to recognize that the levers are interrelated – changes to one lever may have an impact on other levers within the same category, but also on levers in the other two categories. Moreover, the levers are influenced to varying degrees by environmental factors such as the pace of economic growth and changes in

political leadership. Coordinated action among multiple stakeholders may be necessary to induce positive change. A comparative assessment of emerging markets with respect to the full spectrum of components, conditions, and levers that affect the promotion and protection of innovation may be an important step for identifying strengths and opportunities for improvement. Such an assessment could form the basis for discussion among the many private and public entities that have an interest in sustaining innovation and supporting the diffusion of life sciences innovations in emerging markets and across the world.

Conclusion

Life sciences innovation will be increasingly important to emerging markets, not only to provide access to effective (and cost-effective) prevention and treatments for disease, but also to support continued economic growth for the countries themselves. Strengthening the promotion and protection of innovation is likely to require action on the part of multiple stakeholders, including industry and governments in both developed and emerging markets, non-government organizations, and others. Understanding how each lever influences innovation, and assessing where countries stand with respect to each, is a critical next step.

Endnotes

- 1 Joseph A. DiMasi and Henry G. Grabowski, "The cost of biopharmaceutical R&D: Is biotech different?" *Managerial and Decision Economics*, 28:4-5, June/August 2007, pp. 469-79.
- 2 Pharmaceutical Research and Manufacturers of America, *Pharmaceutical Industry Profile 2007* (Washington, DC: PhRMA, March 2007), p. 6.
- 3 Steve Usdin, "Doing business in India," *BioCentury: The Bernstein Report on Bio-Business*, 12:34, August 2, 2004, pp. A1-A24.
- 4 Knowledge@Wharton, "Human capital: Can India bridge the knowledge gaps needed for research?" accessed December 18, 2007 <<http://knowledge.wharton.upenn.edu/article.cfm?articleid=1274>>.
- 5 The Financial Express, Corporate Bureau, "India's FDA-approved plants outsmart China's," accessed December 18, 2007 <http://www.financialexpress.com/old/fe_full_story.php?content_id=149910>.
- 6 Steve Usdin, "Doing business in India," *BioCentury: The Bernstein Report on Bio-Business*, 12:34, August 2, 2004, pp. A1-A24.
- 7 Reem Heikal, "What is an emerging market economy?" accessed October 17, 2007 <<http://www.investopedia.com/articles/03/073003.asp>>.
- 8 Business Monitor International, Ltd, "Tapping the grey dollar: Opportunities in aging populations," *Emerging Markets Monitor*, 13:8, May 28, 2007, pp. 1-3.
- 9 Medical News Today, "Coartem most effective malaria treatment in areas of high resistance to conventional anti-malarials," accessed December 18, 2007 <<http://www.medicalnewstoday.com/articles/23629.php>>.
- 10 Advantage-India Consulting Pvt. Ltd., "Ranbaxy, Bayer set a new trend for Indian pharma industry," accessed December 18, 2007 <<http://www.thinkstrat.info/article.asp?task=1&id=9073>>.
- 11 Robert Go and Laura Eselius, *Innovation in the Life Sciences Industry: Igniting and Innovation Explosion*, January 2007, Deloitte Research, Deloitte Services, LP.
- 12 See, for example, Indian Society for Clinical Research, "Clinical trials regulations," accessed December 19, 2007 <<http://www.iscr.org/ClinicalTrialsRegulation.aspx>>.
- 13 Frank R. Lichtenberg, "The impact of new drug launches on longevity: Evidence from longitudinal, disease-level data from 52 Countries, 1982-2001," *National Bureau of Economic Research Working Paper No. 9754* (Cambridge, MA: NBER, June 2003).
- 14 CASCADE Collaboration, "Determinants of survival following HIV-1 seroconversion after introduction of HAART," *The Lancet*, 362, October 2003, pp. 1267-1274.
- 15 Frank R. Lichtenberg, "The expanding pharmaceutical arsenal in the war on cancer," *National Bureau of Economic Research Working Paper No. 10328* (Cambridge, MA: NBER, February 2004).
- 16 Paul E. Goss, James N. Ingle, Silvano Martino, et al., "A randomized trial of letrozole in postmenopausal women after five years of tamoxifen therapy for early-stage breast cancer," *The New England Journal of Medicine* 349:19, November 2003, pp. 1793-1802.
- 17 G. Kolata, "Gains on heart disease leave more survivors, and questions," *The New York Times*, January 19, 2003.
- 18 Jason M. Lappé, Joseph B. Muhlestein, Donald L. Lappé, et al., "Improvements in 1-year cardiovascular clinical outcomes associated with a hospital-based discharge medication program," *Annals of Internal Medicine*, 141, 2004, pp. 446-453.
- 19 Roger Stupp, Warren P. Mason, Martin J. van den Bent, et al., "Radiotherapy plus concomitant and adjuvant temozolomide for glioblastoma," *The New England Journal of Medicine*, 352:10, March 2005, pp. 987-996.
- 20 P.J. Munzenberger and R.Z. Vinuya, "Impact of an asthma program on the quality of life of children in an urban setting," *Pharmacotherapy*, 22:8, August 2002, 1055-1062.
- 21 Genia Long, David Cutler, Ernst R. Berndt, et al., "The impact of antihypertensive drugs on the number and risk of death, stroke, and myocardial infarction in the United States," *National Bureau of Economic Research Working Paper No. 12096* (Cambridge, MA: NBER, March 2006).
- 22 Richard D. Miller and Ted Frech, "The productivity of health care and pharmaceuticals: Quality of life, cause of death, and the role of obesity," *Departmental Working Paper 12-02* (Santa Barbara, CA: University of California, Santa Barbara, Department of Economics, July 24, 2002) accessed December 19, 2007 <<http://repositories.cdlib.org/ucsbecon/dwp/12-02>>.
- 23 Susan H. Hamilton, Dennis A. Revicki, Laura A. Genduso, et al., "Olanzapine versus placebo and haloperidol: Quality of life and efficacy results of the North American double-blind trial," *Neuropsychopharmacology*, 18:1, 1998, pp. 41-49.
- 24 National Center for Health Statistics, Centers for Disease Control, accessed December 18, 2007, <<http://www.cdc.gov/nchs>>.
- 25 Frank R. Lichtenberg, "Benefits and costs of newer drugs: An update," *National Bureau of Economic Research Working Paper No. 8996* (Cambridge, MA: NBER, June 2002).
- 26 Philip Fireman, "Treatment of allergic rhinitis: Effect on occupation productivity and work force costs," *Allergy and Asthma Proceedings*, 18:2, March-April 1997, pp. 63-67.
- 27 See, for example, J.B. Wong, G. Singh, and A. Kavanaugh, "Estimating the cost-effectiveness of 54 weeks of infliximab for rheumatoid arthritis," *American Journal of Medicine*, 113:5, October 2002, pp. 400-408.
- 28 S.J. Griffin, J.A. Barber, A. Manca, et al., "Cost effectiveness of clinically appropriate decisions on alternative treatments for angina pectoris: Prospective observational study," *BMJ*, March 2007, accessed September 30, 2007 <<http://www.bmj.com>>.
- 29 WHO Department of Immunization, *Vaccines and Biologicals Projection for Year 2006*, accessed October 4, 2007 <<http://www.gavialliance.org>>.
- 30 Center for Global Development, "Millions saved: Proven successes in global health," accessed October 4, 2007 <<http://www.cgdev.org>>.
- 31 Didier Ménard, Nohary Nina Harimanana Andrianin, Zakaherizo Ramiandrasoa, et al., "Randomized clinical trial of artemisinin versus non-artemisinin combination therapy for uncomplicated falciparum malaria in Madagascar." *Malaria Journal*, 6:65, May 2007, accessed October 4, 2007 <<http://www.malariajournal.com/content/6/1/65>>.
- 32 Elliot Marseille, Lalit Dandona, Nell Marshall, et al., "HIV prevention costs and program scale: Data from the PANCEA project in five low and middle-income countries," *BMC Health Services Research*, 7:108, July 2007, accessed October 4, 2007 <<http://www.biomedcentral.com/1472-6963/7/108>>.

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