



Brazil's Embrace of Biotechnology

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Jerry Haar

If there has been any positive collateral impact of the global pandemic, it has been the rapid evolution of biotechnology to effectively address global challenges in health care, science and agriculture—all aimed at improving the quality of life for people across the globe. COVID vaccines developed by Pfizer and Moderna are the clearest examples. And while industrialized nations dominate with their vast, sophisticated infrastructure of science and technology, several emerging markets have made biotechnology an important contributor to economic development. One such country is Brazil where the government's new industrial policy plans to invest \$60 billion in biotechnology, chip development and related field of science and technology.

The biotechnology sector in Brazil is quite active and diverse, with significant contributions in various fields such as health, agriculture, environment, and industrial biotechnology. However, the country faces some challenges in fully harnessing its potential in this sector.

In terms of achievements, Brazil has made substantial advances in developing new medications, genetically modified crops, and biofuels. For example, Brazilian researchers have developed a medicine called Vismodegib for treating advanced basal cell carcinoma and have been pioneers in producing ethanol from sugarcane. The country also focuses on the production of industrial enzymes and the establishment of biorefineries. Illustrative of the globalization of the biotechnology industry, late last month Bangalore-based Biocon announced a partnership with Brazil's Biomm to commercialize the diabetes drug Semaglutide (commonly used for weight loss under the trade names Ozempic, Rybelsus, and Wegovy).

Brazil's approach to biotechnology is characterized by a strong emphasis on sustainable agriculture, health and personalized medicine, advanced biofuels, and environmental conservation. The country is noted for using its vast biodiversity and biotechnological expertise to lead in the production of advanced biofuels and in efforts to conserve biodiversity through genetic engineering.

Despite these advances, Brazil scores relatively low in global biotechnology innovation rankings, placing 47th out of 54 countries studied. The country's scores are particularly low in categories like intellectual property protection, enterprise support, and education and workforce, which are crucial for fostering a robust biotech industry. These areas reflect underlying challenges such as the need for more effective policies, better infrastructure, and greater investment in research and development. In comparing private versus government R&D investment, Brazil ranks #35 among 42 countries; and as for researchers employed in in-company research, Brazil ranks near the last among 44 countries. (Only South Africa and Argentina do worse.)

Brazil is recognized for its strong partnerships between industry and government, which have been crucial in advancing the biotech sector. The country is seen as a master of collaboration, which has helped to bring in international industries and foster a climate of innovation. This collaborative approach is considered a key strategy for overcoming some of the country's challenges

If one were to pinpoint Brazil's greatest strengths in biotechnology, it would be the country's diverse applications in agriculture and health, its rich biodiversity and strategic partnerships and international collaboration. On the other hand, the greatest weaknesses facing the biotechnology sector in Brazil are the very ones facing all knowledge-intensive industries: regulatory and bureaucratic hurdles; inadequate funding and investment; intellectual Property (IP) challenges; and infrastructure and workforce.

Several multinational biotechnology companies have a significant presence in Brazil, leveraging the country's vast agricultural resources, biodiversity, and scientific talent. These companies are involved in various sectors of biotechnology, including agriculture, pharmaceuticals, and industrial biotechnology. Among the prominent firms are Monsanto (now part of Bayer), Novozymes, Syngenta, Amgen and DuPont.

Brazil has several leading biotechnology companies that have carved out competitive advantages through innovation, strategic partnerships, and a focus on meeting specific agricultural and healthcare needs. Among the most prominent are IdeeLab Biotechnology, a leading player in sustainable agriculture; Eurofarma, a biopharma manufacturer; Autem Therapeutics, an innovative cancer treatment company; and Decoy Smart Control which employs fungal treatment for pests.

These companies are attracted to Brazil due to its large market potential, skilled workforce, and rich natural resources, which are conducive to research and development in biotechnology. They contribute to the development of Brazil's biotech sector by bringing in international expertise, investing in local R&D and collaborating with Brazilian institutions and companies. In the global biotechnology landscape, Brazil competes with several countries that have strong biotech sectors including the US., China and India.

Overall, while Brazil's biotechnology industry is well-positioned in certain areas like agriculture and has a strong basis in biodiversity, it must address significant challenges related to regulation, funding, intellectual property, and infrastructure to fully capitalize on its potential.

In conclusion, while Brazil's biotech sector faces some hurdles, the overall outlook remains optimistic, driven by its natural resources, ongoing investments, and a growing focus on

innovation. Effective management of regulatory, financial, and educational challenges will be key to maximizing the sector's potential. Much will depend too on the government following through with significant funding for Brazil's National Innovation System to support R&D, tech transfer and commercialization, as well as for the Brazilian Agricultural Research Corporation (Embrapa). The outlook for Brazil's biotechnology sector is generally positive, with significant growth expected in various sub-sectors, although some challenges need addressing to fully realize this potential.

Jerry Haar is a visiting scholar the University of Oxford and a professor of international business at Florida International University. He is also a fellow of the Woodrow Wilson International Center for Scholars in Washington, DC, and the Council on Competitiveness.