FOREWORD

INNOVATING FOR A HEALTHY NATION

Private healthcare service providers are also investing in innovative products and the latest technology. At the same time, the Confederation of Indian Industry (CII) has been creating awareness to improve the quality of healthcare processes. The CII is actively involved in the development and dissemination of healthcare standards and practices.

These efforts are lifting India's Global Innovation Index (GII) rank, which improved to 66 in 2016, 60 in 2017, and 57 in 2018. Honorable Prime Minister Narendra Modi has envisioned India as one of the top 25 globally innovative nations—which has led to a series of enabling policies and practices for the country.

Healthcare is a sector of critical importance in India, encompassing an array of areas including hospitals, medicines, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance, and medical equipment. The sector holds enormous opportunity for public and private stakeholders to develop innovative processes that democratize healthcare and increase affordability.

Last year, the Government of India introduced breakthrough initiatives for improving coverage of immunization and reducing mortality and morbidity for all citizens, particularly the deprived and vulnerable sections of society. Since India's innovative healthcare delivery initiatives must function across a wide spectrum of geographical, agro-climatic, socio-economic, and cultural diversity, the initiatives are adaptable and easy to replicate in India or any other country.

The theme of this year's Global Innovation Index, Creating Healthy Lives—The Future of Medical Innovation, is quite relevant as technology advances in the healthcare sector. The applications of artificial intelligence, robotics, remote diagnosis, genomics, big data, mobile health, stem cell research, regenerative medicine, biomarkers, and nano-technology will pave the way for healthy living.

CII is happy to be a 12-year partner in the GII, supporting its goal to capture the multi-dimensional facets of innovation across countries and assisting in tailoring GII policies to promote long-term growth, improved productivity, and job creation. I wholeheartedly thank the GII team for their passionate stewardship and in-depth research in bringing out the 2019 report.

Chandrajit Banerjee
Director General
Confederation of Indian Industry

HEALTH IN THE AGE OF EXPERIENCE

Healthcare is at the core of the *Industry Renaissance* that is emerging worldwide with new ways of inventing, learning, producing, trading, and treating. We must no longer think of industry as a set of means of production, but instead as a vision of the world and a process of value creation that embraces all sectors in the economy and society. Today, we see new categories of innovators creating new categories of solutions for new categories of customers, citizens, and patients.

As we enter the age of the experience economy—in which value is in the usage rather than the product—innovation is driven by consumer and patient experience. Today, society seeks personalized health and tailored patient experiences while ensuring optimum industrial security. Improving global health requires a holistic approach that includes cities, food, and education. It also implies a shift from reactive medicine to predictive and preventive approaches.

To achieve this multiscale purpose, we must connect people, ideas, data, and solutions. Healthcare today calls for a fresh and collaborative approach to innovation, which cuts across scientific disciplines and breaks down silos to allow education, research, big firms, retailers, and patients to collaborate in real time.

Collaborative experience platforms are the infrastructure of this change. They provide a continuum of transformational disciplines to imagine, create, produce, and operate experiences from end to end. This is one of the primary functions of Dassault Systèmes' **3D**EXPERIENCE platform. In addition to cross-disciplinary collaboration, the platform empowers teams to conduct in silico 3D experiments, produce multiscale and multidisciplinary digital models, simulate healthcare scenarios, and turn big data into smart data. It connects biology, material sciences, multiscale and multiphysics simulation with model data and communities. This translates into continuous improvements in industrial processes, enhanced and customized treatments, and the development of new services from the lab to the hospital and beyond. For example, a city platform like *Virtual Singapore* is useful not only in city management but also in healthcare management. In parallel, 3D printing is already changing how prosthetics are designed. In the not too distant future, we will be able to create the virtual twin of the human body—not just any body, but each individual's own body. We will also see more data brokers marketing health data to private firms, insurance companies, and others.

The time has come for the healthcare sector—governments, businesses, researchers, and patients—to leverage the tremendous power of the virtual world. Virtual environments are pushing the bounds of possibility to transform research, science, the pharmaceutical industry, and medicine. These virtual environments will also empower the workforce of the future with knowledge and know-how, while eliminating the gap between experimentation and learning—both globally and locally. Virtual worlds are revolutionizing our relationship with knowledge, just as the printing press did in the 15th century. The new book is the virtual experience.

Bernard Charlès
Vice-Chairman and Chief Executive Officer
Dassault Systèmes

INNOVATION IN HEALTH AND MEDICINE: NEW POSSIBILITIES FOR BRAZIL

Brazil could be a significant player in the international market for health care. A majority of the population—approximately 210 million people—is covered by the public health system. The country spends over 9% of its GDP on health and, with an aging population, this percentage is expected to increase. In addition to science and technology policies, the country has developed health policies, such as the National Policy for Innovation in Health, which encourages using public procurement to foster innovation in the sector. Brazil is currently pursuing innovation in several areas, including biopharmaceuticals and the use of digital technologies to improve health care.

Today, innovating in health means a great deal more than just developing new medicines. It means creating equipment capable of assisting in the diagnosis of diseases, developing medical devices for health monitoring and treatment, and conceiving customized treatments and protocols for each patient. Innovation goes beyond technological innovation—taking multiple forms that improve medicines, vaccines, and medical devices and that consider prevention, treatment, and the broader healthcare delivery and organization.

This broad view of innovation in health and medicine drives the National Confederation of Industry–Brazil (CNI), Social Service of Industry (SESI), National Service for Industrial Training (SENAI), Euvaldo Lodi Institute (IEL), Brazilian Micro and Small Business Support Service (SEBRAE), and the Entrepreneurial Mobilization for Innovation (MEI). MEI is comprised of Brazilian business leaders, including leaders of industries that serve the health and medicine sector, who have been promoting innovation as the center of strong business strategy and aiming to increase the strength and efficiency of innovation policies in Brazil. CNI, SESI, SENAI, IEL, SEBRAE, and MEI are confident that the emergence of intelligent, interconnected devices, sensors, and mobile trackers are essential for the country to develop telemedicine, which is one of the emerging technologies in this field. Artificial intelligence (AI) is another promising technology in health that is gaining momentum due to the expansion of information processing capacity and data availability. AI can be used, among other things, to reduce medical errors. In countries like Brazil, where it is difficult for doctors to reach all regions of the country, telemedicine and AI could prove helpful in advancing medical care.

CNI, SESI, SENAI, IEL, and SEBRAE strive to stimulate research and innovation and to promote the competitiveness of the Brazilian industry and economy. From academic studies to working in collaboration with legislative and executive branches in Brazil to advocate broad and well-informed innovation policies, CNI, SESI, SENAI, IEL, and SEBRAE have made important contributions to building a dynamic ecosystem for innovation in health and medicine in Brazil. The Global Innovation Index (GII) has played an influential role in this effort by sharing data and insights that guide countries on how to build a more innovative economy.

Robson Braga de Andrade
President; CNI; Director, SESI; President;
SENAI's National Council

Carlos Melles
President, SEBRAE