



EDITORIAL

How to be disruptive in a developing country like Brazil?

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It is essential to understand that health and tech have complementary pathways. New doctors need to be aware that the medical field will change faster than we can even imagine. New careers are up to be born in the next few years, challenging the traditional student to be transformed into a multi-task professional, where they will help to cozy the interface between health and tech. Working in teams with different backgrounds is a huge opportunity to be an outlier.

When told retrospectively, stories of innovation and self-discovery can look like orderly journeys from A to B, but they were certainly not. Experimentation in a multidisciplinary way was part of the formula for those who not only captured the moment but kept on doing great jobs. Creativity researcher Dean Keith Simonton has shown that the more multidisciplinary work eminent creators produced, the more duds they churned out, as mentioned by David Epstein in the marvelous book "Range"¹. Making mistakes is part of the game and there is nothing inherently wrong with specialization. However, to push boundaries, we must challenge our ideas with the support of experts from various fields.

Nowadays, we are not limited to working in multidisciplinary teams considering only backgrounds in the health field. For example, the Institute of Medical Engineering and Science (IMES MIT) is an institution that

joins efforts from engineering (Massachusetts Institute of Technology) and medical background (Harvard University), where they have been working in collaboration for more than three decades, showing that it is a plausible reality. Workshops such as IDEA2 Transformative mentorship and connections for medical technology innovators (Institute for Medical Engineering and Science at MIT) have shown that interaction between physicians and engineers is fundamental for innovation in health tech.

Although there is a whole new generation of undergrad students highly interested in health tech and innovation even before starting at university, we need to be aware that Brazilians face some competitive disadvantages that must be understood.

Some of these disadvantages are instrumental, such as language barriers and a lack of laboratories for research. At first glance, they seem surmountable with continued investment. However, Brazil's atavistic and autophagic economic development model does not adequately encourage interaction between research centers, universities, and the private sector - the so-called "triple helix"².

Unlike Western Europe and North America, capital formation in Brazil has historically increased the concentration of income, worsened the situation of

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underemployment, and perpetuated an economy with low added value, that is, heavily dependent on commodities³. Consequently, the smaller margin for tax incentives, the managerial deficiencies, and the ethical deviations of specific agents induce the State to cut investments in areas that yield less electoral appeal, among them scientific and technological development.

Brazil invests around 1.2% of its GDP in Research and Development, while South Korea invests just over 4%. The percentage alone does not explain the problem, as around 80% of all countries invest less than 1% of GDP in R&D. In addition, even without receiving investments in the ideal proportion, the resilience of Brazilian researchers has prevented the number of scientific works from decreasing, according to the UNESCO Science Report, released in 2021⁴.

The drama is in the perspective view and the added value. Between 2014 and 2018 alone, the Ministry of Science and Technology budget was cut by 50%⁵. The central government continued to show that it prefers to preserve investments in areas that generate immediate effects.

In 2020, the National Fund for Scientific and Technological Development budget was limited by 87.7%⁶, while the funding for salaries of military personnel on active duty rose by 6.3%⁷. In other words, budget reallocations make perfect sense to face contingencies, such as a pandemic, but it is necessary to maintain coherence and reasonableness. After all, in a final analysis, a health emergency can only be overcome with the power of science, not with belligerence and disinformation.

The consequence of this myopia in allocating resources is already reflected in several indicators. The Bloomberg Innovation Index 2021 ranking presented Brazil in the uncomfortable 46th position overall among 60 countries, with the sub-item “generating added value” occupying the shameful penultimate position⁸.

When we look at the number of patents or technology imports in the trade balance, only 13% of the products manufactured in Brazil are high-tech. Brazil participates very little in the area of goods products involving technology, and this is a reflection that the participation of the transformation industry in the GDP of Brazil today is at the lowest level of the last 50 years, around 11-12%, with reached more than 20% three decades ago⁵.

Private sector-led research and innovation support initiatives tend to advance more quickly due to greater freedom in allocating resources. However, in the end, they also end up suffering from the same atavistic problem. The lack of lasting and reliable public policies does not allow these innovations to gain scale and generate national interest results, improve the lives of the most vulnerable, and generate sustainable wealth to be distributed with social justice.

By the way, among several indicators mentioned above, none compares to the selfishness stamped in Brazil's historical position in the world ranking of the Gini coefficient, consecrated as the best measure of income concentration of a nation. Our country remains among the ten most unequal countries globally, demonstrating another strabismus that affects most analysts, whether due to bias or ignorance: measuring the greatness of a

nation using GDP as a reference is intellectual dishonesty⁹.

Here is the first declaration of principles that should be embraced by everyone who intends to walk on the roads of innovation: the benefit generated by new technologies must be as democratic and plural as possible. Otherwise, it becomes another lever of income concentration and power.

The difficulties reported so far should not cause discouragement. On the contrary, they should accentuate the pride and admiration for those who continue to produce solutions for the benefit of life even without minimum working conditions. Those that keep generating results like flowers that insist on growing on the asphalt and whose beauty is even more highlighted in the face of the infertility of the environment ground.

Medical-scientific entrepreneurship goes far beyond a simple trend. It is a pillar of sustainability for professionals working in health care to deliver the necessary dose of humanism in their care, supported by new tools developed with ethics and consistent investments. In this way, it could be possible to balance the service capacity with the growing demand already overloading many sectors and professionals in an almost unsustainable way.

Data from 2020 show Brazil with 2.4 physicians per thousand inhabitants, the same rate as Japan, Mexico, and Poland and very close to Chile (2.5), the United States (2.6), Canada (2.7), and the United Kingdom (2.8), although below the average of the Organization for Economic Co-operation and Development (OECD) countries, which is 3.4 per thousand inhabitants¹⁰.

Even before the pandemic, when analyzing medical work in Brazil, the increased number of hours worked per week negatively impacted their quality of life and the quality of services and care, according to data from 2014 to 2019. The percentage of physicians working in four or more jobs rose from 24% to 44% in five years. Approximately 32% worked more than 60 hours a week in 2014 and 46% in 2019¹⁰.

In short, technology is a critical factor in changing this game and improving the lives of both health care professionals, patients and their families. Human beings are the center of everything, and technology is an increasingly crucial ally.

What were the unexpected issues discussed at the most significant global health conference?

The HIMSS Global Health Conference & Exhibition connects professionals to reimagining health and wellness for individuals, not only patients. A conference like this joins many people interested in the highest level of technology, what is expected. However, some other concepts were also discussed this year. In the 2022 event, you could see some speakers talking about the importance of starting prevention programs at elementary school (“Future of health care: what’s next and how do we get there?”); humanized machine learning and clinical empathy (“Closing the empathy gap through data missing”); how to protect even more the personal data (“Health care’s role in

transformation”). They also talked about compassionate care as evidence-based medicine (“How compassion is integral to both patients and clinicians”). It is known that compassionate behaviors can be taught, learned, and measured, and compassionate connections only take 40 seconds! The “Compassionomics” concept is related to studying the scientific effects of compassion on patients, patient care, and those who care for patients. Thinking about how to learn about compassion, a suggestion is to be involved in Extension Projects, where you can apply your acknowledgments to benefit communities and, ultimately, society.

These topics above show that we are possibly getting into a track looking for a patient-centered medicine that brings the technology as a partner, not as everything.

If we could give you one piece of advice: look at the beauty of the human being and talk to each patient as you talk to someone you care for. In the age of post-digital technologies, compassion is the future of medicine, mainly considering that compassion can be an antidote to burnout. A good start is looking your patients in the eyes.

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