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Academicism versus innovation: challenges for the Brazilian science and technology system

The excellent essay by Reinaldo Guimarães reminds us that despite the relative success of Brazil's graduate studies system and science policy in recent decades, there is still a serious gap between the country's academic output and its needs for scientific and technological knowledge, as well as for training researchers and professionals in order for the country to achieve social and economic development consistent with its wealth.

I begin by agreeing with the author's arguments, then add some aspects (or comments on aspects he has raised) in order to further contribute to the issue.

The first important point for understanding this gap is the persistence of a certain view of scientific practice, especially in graduate studies, whereby academic erudition speaks louder than pragmatic vision informed by the search for creative or innovative solutions to real problems. Although Brazilian science and graduate studies policymakers have adopted the American model for research universities in the last 30 years, in practice Brazilian universities are still far short of realizing this model. Most Brazilian university institutions still suffer from archaic organizational structures, absence of adequate research infrastructure, a teaching philosophy lagging at least a century behind, and lack of specialization, among other problems. Meanwhile several graduate studies programs have managed

to overcome the problems of the universities to which they belong, and excellent research programs can be found within otherwise lackluster institutions.

Even the country's legislation on public administration poses a daunting barrier to the modernization of university institutions, in order for them to organize based on academic merit, seeking greater effectiveness in tackling contemporary challenges. Investment and budget policies (of which faculty hiring and promotion policy is just one) are seriously constrained, denying the administrators any autonomy in academic matters.

The organizational format obviously also reveals a predominantly conservative stance among faculty, staff, and students, who resist proposals for change. Again, Brazilian graduate studies programs are often an exception to the rule, given the greater flexibility allowed in their format. However, there is a contradiction here that does not go unnoticed by those dedicated to reflecting on the Brazilian graduate studies model. On the one hand, for a long time Capes was involved in inducing changes in the programs' organization by placing greater emphasis on research activities and forcing a reduction in the number of credits granted for course offerings; on the other, the system is still overregulated, both in the approval of new courses and in the process of evaluating already accredited programs. In this context of institutional fragility, conservatism, and regulation, it is easier to practice "more of the same" than to pursue innovation.

Another issue that results to a certain extent from the problem discussed above is the resistance to the technological side of the science and technology dyad. Probably thanks to the Iberian cultural tradition of lack of social prestige assigned to manual labor and the overvaluing of intellectual work, academia views technology as less important or second-rate.

Two aspects of Brazil's recent educational policy reflect this issue: the resistance to implementation of professional master's programs and resistance by the Federal Institutes of Technological Education to embrace their role. Sixteen years after the ruling that regulated the professional master's modality in Brazil, only 15% of the programs in the National Graduate Studies System are offered under this format. In the entire first decade of the 21st century, 175 professional master's programs were created (an average of 17.5 programs per year). This growth has accelerated in the last four years, when 90 new courses a year were created. Even so, there are six academic fields without any graduate studies programs whatsoever under the professional

format (including applied research areas like demography and social work).

Although in some areas the evaluation of these programs already includes professional evaluators with non-academic institutional affiliations, what is most striking is that of the 567 programs in operation, 515 are offered by institutions of higher learning or research institutes. The professional master's format thus remains mostly anchored in the academic system. Only 20 such programs are offered by institutes of technological education and seven by technological laboratories. In health, of the 103 professional master's programs in operation, only seven are offered by health services and one by a State health department. Thus, the plan to extend graduate studies beyond academia has still not materialized in Brazil.

As for the Federal institutions of technological education, pressure from the administrators themselves has turned them into structures entirely similar to the universities through successive amendments to the ruling that created them. These institutions have even been the focus of intense debate by Capes, and there is no consensus on the accreditation of academic programs proposed by them. The number of academic programs currently accredited in these institutions exceeds the number of professional master's programs, a clear shift away from the institutions' explicit original mission of technological training.

An aggravating factor in this issue is the delay in regulating a professional doctorate program, which was recommended as a necessary modality in the ten-year national plan for graduate studies, but which has still not been submitted to the Capes decision-making levels. The lack of executive training at the doctoral level weakens the executive master's format and blocks attempts to limit the technological institutes to supply only executive training and prevent them from producing "more of the same" (i.e., academic training).

Finally, I wish to comment further on the central point in the argument presented by Reinaldo Guimarães concerning the inadequacy of demand, perpetuating supply side biases. In fact, the demand-side problems are even greater. For numerous historical, economic, and cultural reasons, the Brazilian industrial sector assigns little importance to domestic technological development, preferring to incorporate outdated technology from the more developed countries. Brazilian industry, benefitting indirectly from tariffs and taxes on foreign products, constantly lags behind technologically and does not appear sufficiently motivated to become more competitive. The services sector also fails to develop tech-

nology and innovation inside the country, and the same is true for government sectors.

Focusing the discussion now on the health sector, there is a notorious lack of competent state bureaucracy at different organizational levels in the SUS, capable of formulating medium and long-term strategic plans for executive training and technological and scientific output to respond to the health sector's main problems and bottlenecks.

Although the official discourse in recent years has emphasized innovation as one solution to Brazil's trade balance crisis, in practice the constant budget cuts in science and technology belie the good intentions expressed in the political discourse.

Brazilians are thus experiencing a beautiful paradox. We are seen as an extremely creative people, at least in relation to the country's countless cultural manifestations, but we are incapable of producing technological innovations to help raise the country's current level of development.