



An exploratory assessment of the gaps for health innovation in Brazil: challenges and a proposed research agenda

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Received 26 July 2015; accepted 26 October 2016

Scientific Editor: Felipe Borini

Abstract

Policies and health actions generate benefits that extrapolate the specificity of its purpose of providing welfare for the population, given its recognized impact in generating technological innovations, employment and income. However, such progress levels are unevenly distributed in countries, so that certain diseases and allocative and ethical questions associated with the development of new mechanisms for diagnosis, of treatment and cure did not find satisfactory answers yet. In Brazil, such a scenario has not been shown different, demanding a wider discussion encompassing the country's economic and social conditions. Contrasting the analytical and empirical results observed in policies and actions toward the Health Economic-Industrial Complex (CEIS) to establish the barriers as well as structural and economic opportunities for the promotion of health innovations in Brazil, this work raises a number of critical considerations in view of identifying and systematizing gaps in health innovation in the country, thereby proposing a positive comprehensive research agenda on the topic.

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Keywords: Health economic-industrial complex; Health innovation systems; Science, technology and innovation in health; Health policies; Brazil; Research agenda

Introduction

In the last decade, Brazil developed some guidelines aiming at strengthening the national system for the promotion of Science, Technology and Innovation (S,T&I) in health. As a highlight, we mention the advent of the Sectoral Funds in 1999; of the Industrial, Technological and Foreign Trade Policy (PITCE) in 2003; the Productive Development Plan (PDP) in 2008; the Greater Brazil Plan (PBM) in 2011; the National Strategy for Science, Technology and Innovation (ENCTI) of the Ministry of

Science, Technology and Innovation (MCTI) from 2012 to 2015 and, more recently, from 2016 to 2019. In addition to these policy actions, few others are being established as a way to strengthen innovation and technology development in the health segment, such as the creation of the Executive Group of the Health Industrial Complex (GECIS) in 2007, the CT-Health Fund and the National S,T&I Policy for Health in 2004 and the Program for the Development of the Health Industrial Complex (PROCIS) in 2012. In this work we mention the names of the programs in English but maintain their original Brazilian Portuguese acronyms.

In Brazil, persist a lack of coherent and functional health policies that include a more effective participation of universities and firms in the creation and transformation processes of knowledge into internationally competitive innovations. This aspect obfuscates the gains achieved so far (Viana & Elias, 2007). This point is still featured in the document of the “ENCTI from 2016

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Peer Review under the responsibility of Departamento de Administração, Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo – FEA/USP.

<http://dx.doi.org/10.1016/j.rai.2017.03.001>

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to 2019” of the MCTI (Ministry of Science, Technology and Innovation, 2015), which shows the high Brazilian dependence on foreign technologies and innovations in health care. This is a clear justification for highlighting the need for a research agenda in the area of health innovations in Brazil.

These aspects influence the Brazilian development agenda, giving rise to concerns on what increases the vulnerability of the national health system, bringing to light the need to deepen the scientific knowledge based on the subject. Despite the institutional gains achieved when comparing the current situation with that of two decades ago (Marques, 1999), a challenge that persists remains overcoming the fragile national production structure, with an emphasis on both health products and the medical supplies sides (Gadelha, Vargas, Maldonado, & Barbosa, 2013). Other aspects are added, such as the reorientation of technological innovations, a structural link in public policy, and the establishment of the collective welfare of the country (Gadelha, Costa, & Bahia, 2015).

The Brazilian government has a significant role in the development of a socially and economically important production base to increase the technological density of the Economic Industrial Health Complex (CEIS). According to Gadelha (2003), the CEIS is a structural link that involves not only social demands for goods and services in health, but also a technologically competitive production base. It consists of dynamic and systemic secondary links that, although quite different from each other, share the same political and institutional frameworks. Thus, the action of the Brazilian government is potentially inducing the dynamics of a dense and complex production chain as the CEIS because of the centrality of government in the procurement of goods and services and in inducing regional policies in health services (Bahia, Costa, Gadelha, & Vargas, 2015).

There is therefore the need for a wide-ranging discussion about the difficulties of communication and consolidation of CEIS in light of specific characteristics, economic and social conditions and the corporate and government dynamics. Thus, contrasting the analytical and empirical results, this paper aims to highlight the health innovation gaps in Brazil and raise a set of concerns around three central axes toward the composition of a research agenda on health innovations in Brazil. The intention is to place the barriers and structural/conjectural opportunities for the support of health innovation in Brazil. It is worth mentioning that the issues and considerations raised no claim of completeness of the theme, as the focus of this work is to contribute to a broader debate on this subject, which we believe is important to the development of Brazil and other developing countries in similar conditions.

This paper is divided into six sections, including this introduction. Section 2 discusses the concept of Health Innovation System (HIS), rescuing a number of recent considerations of the literature on the evolution of HIS, highlighting its implications for Brazil. Section 3 provides an overview of challenges and international efforts in health S,T&I. Section 4 presents the methodological aspects of the research. Section 5 contextualizes and discusses health innovation gaps in Brazil. Finally, Section 6 elaborates the final considerations.

Health Innovation Systems (HIS): a review of literature

The stylized dynamics of a Health Innovation System (HIS) stems from the widespread knowledge available in the literature on innovation systems (IS). A HIS is a system driven by endogenous and localized interactions between various units, such as the ecology of agents and their connections, by coordination mechanisms brought by the institutional environment, and by the growing interdependencies between domains (Orsenigo, Dosi, & Mazzucato, 2006). Different aspects such as scientific research, regulation, patient care and market processes are translated to these domains, whereby innovations are non-deterministic and emergent processes (Bloom & Wolcott, 2013). The role of social technologies is also important, as well as the institutional propagators along the coordination processes that facilitate the implementation of scientific and technological advances within the clinical activity in medicine (Consoli & Mina, 2009). Having said that, a HIS characterizes a rich ecosystem formed by individuals, institutions and organizations whose interactions aim to contribute over time to the emergence of coherent paths of technological change. Such environments emphasize the collective nature and long-term innovation processes and their dependence on generated feedback mechanisms during the delivery process of medical innovations to society, without, however, skew the incentive systems that move the different subsystems.

Therefore, an HIS encompasses a broad sphere of medical technologies and clinical services, such as new drugs, devices and medical practices that occur in the context of social technologies and institutional structures, which in turn generate the conditions for both release and dissemination. As a result, the attention of public policy must be given not only to the development of intermediate goods for the provision of health services, but also for organizational and institutional settings that support the development and introduction of new medical technologies (Gadelha et al., 2013).

The greatest challenge of our time for the consolidation of a HIS is in the design of more appropriate interpretative models of the diffusion and utilization processes of medical technologies. However, an extensive literature states that use and development of technologies are variables that go together in an innovation process that mutually shapes one another throughout a learning process, which, in turn, expands or reduces the scope for the application of the technology (Bloom & Wolcott, 2013; Gelijns & Rosenberg, 1994). The greatest difficulty, however, is in the set of assumptions that support each interpretative model.

For example, Consoli and Mina (2009) discuss the role of hospital managers, patients, insurers and regulators in the rate of diffusion and direction of medical innovations throughout the importance of these actors in the explicit identification of priorities and in the redefinition of modes of functioning and funding strategies that stimulate the emergence and spread of new technologies. Consoli and Mina (2009) argue that studies on the roles users in the adoption of innovations in the medical field are treated as static components of their analysis.

On the other hand, approaches more typically framed in the fields of sociology and health policies see the incorporation of

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