

# Open innovation: the key to advancing brain health

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## Editorial

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## Abstract

With the exponential growth in investment attention to brain health—solutions spanning brain wellness to mental health to neurological disorders—tech giants, payers, and biotechnology companies have been making forays into this field to identify technology solutions and pharmaceutical amplifiers. So far, their investments have had mixed results. The concept of open innovation (OI) was first coined by Henry Chesbrough to describe the paradigm by which enterprises allow free flow of ideas, products, and services from the outside to the inside and vice versa in order to remain competitive, particularly in rapidly evolving fields where there is abundant, relevant knowledge outside the traditional walls of the enterprise. In this article, we advocate for further exploration and advancement of OI in brain health.

Brain health disorders include 5 of the top 10 causes of disability globally. It is essential that therapy development initiatives ultimately succeed—large corporations are critical to developing and delivering new solutions in the brain health sector. Large companies have huge resources, market penetration, and skills, especially in the dissemination of new ideas, products, and services. In addition, they produce innovations such as smart devices and app platforms that can help patients with neurological maladies and mental illnesses. They are an important component of the innovation ecosystem that includes universities, start-ups, and venture capital.

So why do corporate entities often struggle with innovation? Although they employ much of the technical and scientific talent in the market, they are also dealing with a sharp gap in brain health and entrepreneurship skills at present. Furthermore, many scientists are not trained in how to operate in corporate environments. This has led to calls for the emergence of brain health executives in the corporate setting.<sup>1</sup> Technology innovation is proceeding at a faster rate than hiring, acquisitions, and mergers can accommodate. In addition, bigger corporations, which can usually accomplish *incremental* innovation, are not nearly as adept at *disruptive* innovation—the kind we really need to bring new products and services into the marketplace and advance the cause of brain health. What is needed is an open platform providing a rapidly deployable solution for corporate innovation programs.

The concept of open innovation (OI) was first coined by Henry Chesbrough.<sup>2</sup> It describes the paradigm by which enterprises allow free flow of ideas, products, and services from the outside to the inside and vice versa in order to remain competitive, particularly in rapidly evolving fields where there is abundant, relevant knowledge outside the traditional walls of the enterprise.

What is the solution to this technology gap between innovators and companies capable of large-scale implementation? What that means in practice is that large companies can more effectively advance their innovation goals by partnering with an OI platform providing the best start-ups, entrepreneurs, and researchers in the field of brain health. This is not dissimilar to

pharma, where small biotech companies develop products that are taken to commercialization by big pharma.

Nearly everyone knows someone who has been impacted by a brain health condition, and the interest for many is sparked by circumstances that are deeply personal. Understanding the intricacies of the space is not easy, and we think that investor expertise will be developed along a curve like that of biopharma. Due diligence will be needed at every phase of technology development to understand if it serves the investor's purpose and how close to "market ready" the product or service has progressed.

External innovation platforms can be simultaneously open and bespoke, providing a turnkey solution to the talent gap. Carefully constructed OI platforms that identify and meet gaps can drive major progress in the brain health field. The OI platform can provide the setting for due diligence, comparative analysis, and landscape scoping.

To provide concrete examples, major electronic health record companies like Epic and Cerner are well positioned to help clinicians and patients in the brain health sector, given their robust standing in that market. Health insurance companies are in a unique position to deploy and reimburse novel approaches to care. Companies like Johnson & Johnson, Apple, and Roche-Genentech can also contribute with their digital-drug solutions and innovations in digital therapeutics and wearable medical devices. Social media entities like SNAP and Meta can uniquely pair biometric data with rich digital phenotyping data to develop new screening and diagnostics insights. University innovators and start-up entrepreneurs can provide expertise and promote products useful at all levels of brain health therapeutic development—from drug discovery to late-stage trials and to the marketing of approved agents.

However, there has been little investment success to date. For example, Alphabet's X, Google's "Moonshot Factory," announced in 2020 its Project Amber had failed to identify a single biomarker for depression after 3 years of searching for one (researchers then said that it is likely no such biomarker exists). More rapid information regarding the availability of desired products and possible use of the platform to crowdsource new solutions are features that could accelerate solving major pharmaceutical and biotechnology challenges.

We note the early success of the Canadian Baycrest (<https://www.baycrest.org/>; an academic health sciences center providing a continuum of care for older adults, including independent living,

assisted living, long-term care, and a post-acute hospital) in the development of the Centre for Aging + Brain Health Innovation.<sup>3</sup> The Centre provides a foundation for the funding, development, and preliminary testing of new neuro-gero technologies.

Corporations have been slow to adopt the changes in operational approach and governance that are necessary for success in the brain health innovation field.

Traditionally closed innovation models fail to make use of a network of talent that can more readily advance brain health products, services, and solutions.

By contrast, in an OI paradigm, "seekers" (firms, including Big Tech and Big Pharma companies, looking for advances in a particular field) interact with "discoverers" (innovators developing novel approaches) and "solvers" (resource and translational platforms with a proven track record of devising solutions to innovation challenges). Figure 1 outlines closed innovation versus OI.

No one enterprise possesses all the resources and knowledge needed to drive innovation. Embracing OI is an optimal way to accomplish major progress in the brain health field.

Real innovation and progress in brain health challenges are not aligned with short-term return on capital needs. There is an urgent need to source "patient capital" from investors who are impatient for progress and solutions to debilitating disorders but can be patient for the financial returns that will follow. It was encouraging to see British Patient Capital launching a £600-million Life Sciences Investment Programme in July 2021, in collaboration with Mubadala Investment Company, although there is presently no explicit focus on neurological or psychiatric drug development.<sup>4</sup> Other solutions such as healthy brain bonds and venture philanthropy were recently outlined in our paper exploring brain capital impact investing.<sup>5-7</sup>

Of course, governments play a major role in the provision of brain health care and in the funding of brain health innovation, and they could therefore be key partners in OI platforms. Public-private partnerships, such as the Davos Alzheimer's Collaborative, provide a model for this.<sup>8</sup>

Such an open platform could be instrumental in fighting brain health innovation inequities in low- and middle-income countries.<sup>9</sup> In these settings, development in brain health innovation is hampered by a lack of expertise in entrepreneurship, technology commercialization, and technology implementation.

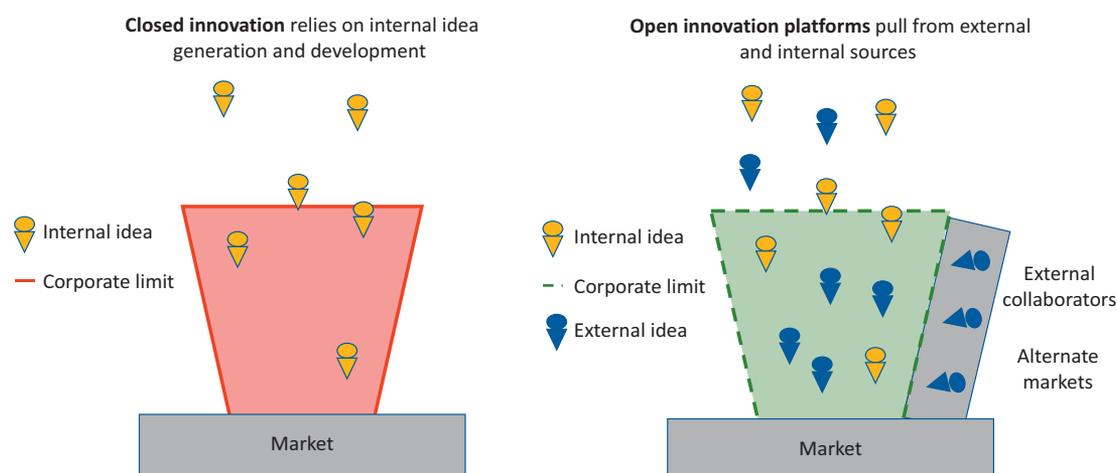


Figure 1. Open versus closed innovation.

Acquiring and applying the knowledge and experience of external partners can help gain access to talent, resources, and new markets—in short, the expertise of those who are close to innovating the solution to a problem. Finally, robust OI platforms can be a hedging strategy beyond a single product, through the creation of a portfolio of products and services targeting different elements of the brain health paradigm (eg, different technologies, geographies, or indications), and which consequently diversifies risk.

For these reasons, we are confident that OI platforms can provide a solid foundation for advancing brain health.

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