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Executive Summary
**The Funding Gaps in the Israeli Bio-
Pharma Industry and Building a
Government Co-Investment Fund**

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About the Milken Innovation Center Fellows Program

The Milken Innovation Center Fellows Program accelerates Israel's economic growth through innovative, market-based solutions for long-term economic, social, and environmental challenges. Our goal is to accelerate Israel's transition from a Start-up Nation to a Global Nation with solutions that others can replicate.

The Program awards annual fellowships to outstanding Israeli graduate students. We train and deploy some of Israel's best and brightest young professionals to create pragmatic financing and economic policy solutions. Our applied research and Financial Innovations Labs® are a launching pad for transformative change, using innovative financing mechanisms, programs and policies to bridge social, regional, economic and productivity gaps within Israel and between Israel and the world.

In addition, Fellows craft their own projects during their internship aimed at barriers to job creation and capital formation in Israel. The Fellows' research, carried out under the guidance of an experienced academic and professional staff, support business and policy makers to shape economic reality in Israel. The program offers the ultimate training opportunity, combining real-life work experience with applied research.

Throughout the year, Fellows receive intensive training in economic and financial analysis, public policy and research methods. They acquire tools for communication and presentation, policy analysis, leadership and project management. The fellows participate in a weekly research training workshop where they work with senior economic and government professionals, business leaders, and top academic and financial practitioners from Israel and abroad. They also participate in an accredited MBA course, taught at the Hebrew University School of Business Administration by Prof. Glenn Yago.

Fellows Program alumni can be found in senior positions in the public and private sectors. Some serve in key positions in government ministries while others work at private-sector companies or go on to advanced graduates studies at leading universities in Israel, the United States and Great Britain.

The Fellows Program is a non-partisan. It is funded, in part, by the Milken Institute and other leading philanthropic organizations and individuals in the United States and Israel.

For nearly a decade, analysts and experts in the Israeli bio-pharma industry have reported a steady decline in the number of new drugs approved for use by the US Food and Drug Administration (FDA). This is the result of many factors, including the long time required for complicated testing, verification, and approvals, the massive amount of funding needed to sustain these long-term development efforts, and new and evolving insights into illnesses and cures.

As a result, today, many young companies remain in the start-up and research and development stages characterize the industry. About 70% of are not yet in revenues and growth. Despite the maturing of the industry in recent years, it is still characterized by companies that do not reach production and sales stages. While this is common around the world, it is particularly pronounced in Israel. Most of the scientific innovations that are discovered in Israeli universities and research centers are developed and finally manufactured outside of Israel, and the foreign companies that acquire them are the ones to earn the huge profits from the sales of the drug. The reasons for the slow development of the Israeli bio-pharma industry and the few successes in this field is a lack of supply of financing that is currently insufficient in scope and quality.

This study attempts to examine the accepted argument and to examine additional market failures in the industry by analyzing data that reflects the state of industry today and its development in recent years. The study will propose an innovative financing model that will help to solve the identified market failures and that will help move the industry forward.

The research reviews trends in the Israeli bio-pharma industry and identifies the main market failures in the industry today. The key trends including the growth in the number of companies and advancing in terms of stages of technological development in which most of the companies are today. The trends in the supply of financing in the industry, from private investors to public funding and government financing of the Innovation Authority is also documented. For example, in the past year there has been a sharp drop in the amount of public and private capital raising, a decrease of about 70% compared with 2013-2015. The research also describes the main barriers in the industry: financing gaps, a low supply of "smart" investors, and the absence of debt players.

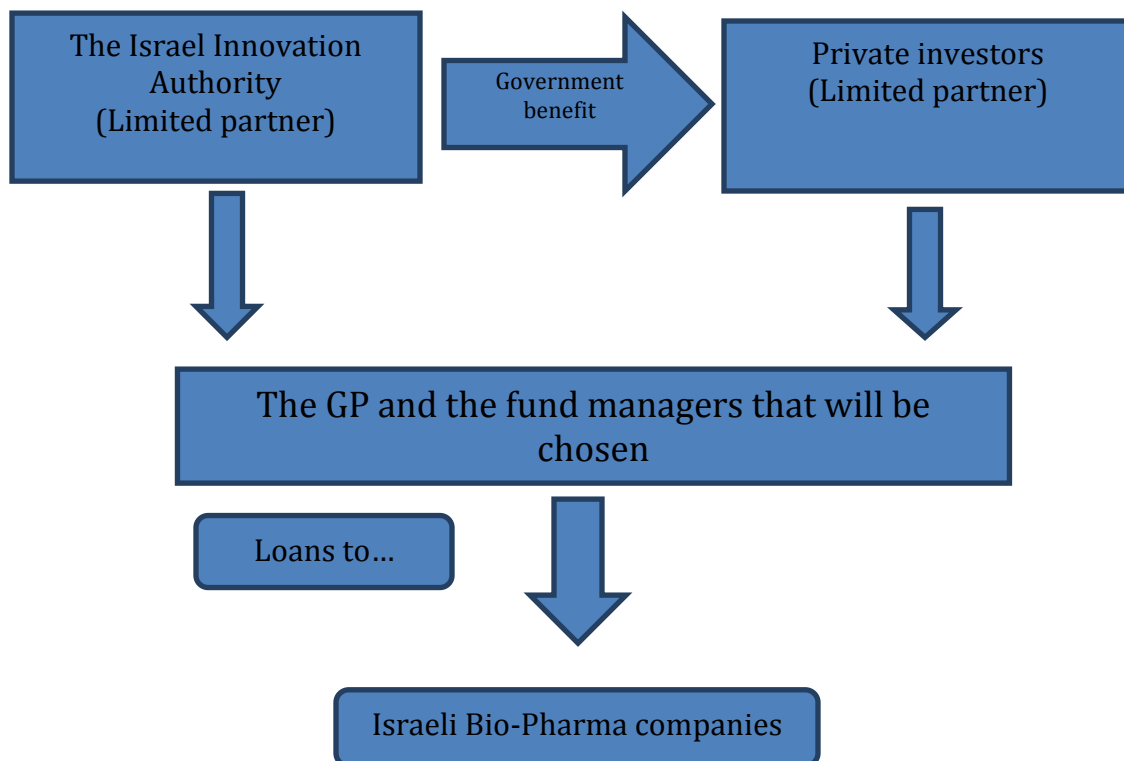
The research identifies and examines four unique and innovative models in the UK, the US, and Israel that were built to address similar market failures in the biopharmaceutical industry to those identified in the research. The first model examined was initiated by the Israeli government in 2011 to address the funding gaps in the life sciences industry that were identified at the time. The second model, which was built just a few years ago in Britain, was also initiated by the local government,

following the identification of a shortage in funding in the area of dementia, a disease many of its citizens have. The third model examined is the venture capital fund that was established in the US and uses a unique structure to finance the fund - the debt structure. The fund is the first of its kind in the world that is financed with debt and it invests in the global bio-pharma industry. The last model that is presented is a unique project in the United States that aims to accelerate the long process of translating discoveries and medical breakthroughs into revolutionary commercial drugs. The project provides funding and consulting to companies in the project.

The research assesses the relevance of each model to the Israeli market and its specific market failures, and examine whether it is preferable to fully adopt one of the existing models or whether it is preferable to formulate a new model. The conclusion is that intelligent integration of parts of the models surveyed, along with the idea of lending to companies instead of capital investments, would do much more to reduce the three most restrictive market failures in today's industry.

The research includes specific recommendations, which are mainly the establishment of a venture capital fund in cooperation with the Israel Innovation Authority and the private sector, which operates in the model of providing debt to Israeli biopharma companies.

The structure of the proposed fund:



Today there is a lack of activity in Israel, while in the United States this channel has been existent for years. Over the past five years, one Israeli biopharmaceutical company (out of about 190) has received financing in the form of debt. The opening of the debt channel, which until now has been closed to Israeli biopharma companies, will increase and diversify the financing options available to them. Companies seeking to continue to develop their products and reach commercialization stages will be able to avoid the pressure to implement early exit strategies, develop the ability to generate revenue and profits over time, and thus promote the maturation of the Israeli bio-pharma industry. In addition, debt investments in the company require its manager's financial discipline and clarity in meeting the milestones in the development of the product because they are the basis for future revenue or recruitment that will allow meeting the periodic repayments agreed upon with the fund. The possibility of borrowing money at a relatively early stage not only expands the financing strategies open to Israeli biopharmaceutical companies, but also requires them to "mature," be more systematic and sustainable financially and operationally, , thereby increasing their chances of success.

In the recommended fund, , the Israeli Innovation Innovation will be a limited partner and will reduce the risk inherent in private investors' investments, , thereby increasing its appeal to investors. This will be done in the following ways:

(1A hurdle rate of 5%, which ensures that the fund managers will begin to benefit from the fund's yields only after the limited partners receive 5% of the fund's profits, 2) The transfer of compensation from government profits to private investors profits. The government compensation provides investors with protection against losses of the fund and gives an additional priority when the earnings are distributed. This promises that even in a situation when fund itself loses profit, the private investors still have a chance to see positive returns.

The research also includes a description of the principle terms of the fund. This includes the limitations of the fund's investment, the commitment of the fund managers, the term of the fund, the expenses, and the way the fund divides its profits. Finally, the research includes a financial simulation that examines the financial feasibility of the fund and the ability to reach a positive return for its all stakeholders, including investors and the government.. The results of the simulation shows that the recommended debt fund can achieve a positive return for its investors.



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