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Scale-Up Nation: The Role of IP-Transfer Restrictions in Israel's Industrial Policy

by [Erez Maggor](#)

Industrial policy is, once again, back on the political agenda. Not long ago considered “a policy that should not be named,”¹ or a “phrase that one did not utter in polite company,”² industrial policy is currently being heralded as the preferred economic policy of both advanced and developing nations. Indeed, since the great financial crisis of 2008, there is a growing worldwide consensus that society’s most formidable challenges—from adverse climate change to widening economic inequality—cannot be addressed by market forces alone.³ This trend has only accelerated since the outbreak of the Covid-19 pandemic.

In the United States, the Senate recently approved a \$250 billion industrial policy bill, the “U.S. Innovation and Competition Act,” on a bipartisan, 68–32 vote. The new legislation, which the *New York Times* called “the most expansive industrial policy legislation in U.S. history,”⁴ represents a major rethinking of the state’s role in setting the pace and direction of technological change. The proposal commits \$195 billion to fund scientific research and development in emerging technologies, provides investments of over \$50 billion in semiconductor manufacturing, and includes \$10 billion for fostering new technology hubs in the regions and cities suffering most from decades of deindustrialization.

The central objectives of today's industrial strategies are to foster new technologies and industries, create good jobs, and contribute to a growing tax base that can fund needed public services. Yet a common criticism of industrial policy is that it often fails to deliver on these ambitious aspirations due to various forms of corruption, government capture, or lack of public sector capacity. These concerns should be taken seriously. It is certainly true that when industrial policies are poorly applied, there is a risk that state assistance will be diverted to further entrench the position of leading firms and to enrich those already well-off. How, then, can policymakers ensure that industrial policy is implemented in a manner that enables innovation to flourish while steering benefits to the broader society? How can policymakers ensure that, in the words of Mariana Mazzucato, the state is not simply "socializing the risks while privatizing the rewards." ⁵

On this pressing question, a close examination of the history of successful industrial and innovation policies offers important insights. A case in point is Israel. Popular narratives of the 2000s often associated the emergence of Israel's world-renowned tech sector with its so-called entrepreneurial culture and supposed embrace of free market ideology. More recent accounts, however, have shown that Israel's emergence as a leading innovator of cutting-edge technologies was in fact the result of a political project aimed at restructuring Israel's economy.⁶ More than risk-taking entrepreneurs, it was policymakers and politicians who played a crucial role in conceiving, planning, and implementing this strategy. Much like current U.S. proposals, the core of Israel's industrial policy consisted of ambitious science and technology (S&T) and research and development (R&D) programs, which aimed to first create and then upgrade Israel's innovation and knowledge economy. It was the state and not the private sector that supplied the lion's share of funding through these various programs.

Critically, moreover, the state allocated public funds with specific terms and conditions to ensure that its industrial policies achieved public goals, rather than merely boosting the profits of private actors. These conditions were designed to regulate and restrict firms' ability to transfer knowledge (i.e., intellectual property or IP) and production outside Israel's borders.

Equally important was the capacity of policymakers to discipline private firms that ignored or failed to meet these conditions. The state could unilaterally withhold, cancel, and even demand full repayment of previously awarded funds from firms that did not comply with the applicable regulations. Because many of Israel's firms were dependent on continuous state support, the threat of delaying or withholding future proposals served as a very effective lever.

These policies were also effective because state innovation agencies had the support of leading sections of finance and industry, as well as organized labor. This robust political coalition sustained Israel's development agenda for over three decades. Once support from these constituencies started to wane, however, so did the state's ability to maintain strict conditions and effective enforcement. The weakening of these measures has resulted in diminishing social returns, as Israel's high-tech sector has become more narrowly focused on private gains via the pursuit of faster venture capital exits, rather than driving more inclusive growth.

THE CHALLENGES OF INNOVATION-BASED INDUSTRIAL POLICY

The fundamental goals of industrial policy—stimulating specific economic activities and promoting structural change—have remained the same as in the past. There is, however, a key difference between today's industrial strategies and those famously practiced in the postwar period in places like Japan, South Korea, and France. Previously, states undertook coordinated industrial strategies to enable their domestic firms to catch up to leading firms in already established, capital-intensive industries such as steel, shipbuilding, and automotive sectors. By contrast, today's industrial strategies are mostly geared toward generating *new* markets by fostering innovative technologies and products, rather than helping firms compete in already existing markets. Since the goal is to produce novel technological or scientific breakthroughs, rather than support a handful of national champions, state involvement often follows the logic of “letting a hundred flowers bloom,” providing a large number of grants to entrepreneurs with promising ideas for innovative products.

This change in the nature of industrial policy presents a new challenge: ensuring that firms and start-ups receiving public investment in the R&D stage will later generate the positive economic spillovers—new technologies, good jobs, and stable tax revenue—that the state seeks to foster in the first place. The creation of jobs in the manufacturing sector is particularly important since, relative to other economic sectors, manufacturing tends to have a much larger multiplier effect as it produces a demand for additional jobs in nonmanufacturing industries.⁷

Particularly in today's globalized economy, simply funneling public funds into private hands will not necessarily or spontaneously result in these desired outcomes. This is because, once an R&D project becomes successful, private firms will seek to maximize their rewards at the expense of the public interest through various means. First, firms may sell their promising technology to larger, more established multinational corporations—a practice that the House Judiciary Committee recently concluded

“degrade(s) competition and stifle(s) innovation.”⁸ At the same time, firms often look for opportunities to shift certain business functions to places with cheaper labor costs or less rigorous safety and environmental regulations, as well as shifting profits to global tax havens. These tactics severely diminish the public’s return on its investment.

For example, during the last two decades, many American firms have severed R&D and design from production by offshoring virtually all of their manufacturing processes to Asia. This transition, from an “innovate here/produce here” model to “innovate here/produce there,” has led to a precipitous fall in the number of Americans employed in manufacturing, from around 17 million in 2000 to under 12 million by 2010. Furthermore, since many technological sectors still require a close connection between research, design, and production (e.g., capital goods, aerospace, energy, and pharmaceuticals), innovation has started to follow production offshore to produce an even more destructive “produce there/innovate there” model.⁹ At this point, it is clear that implementing an effective industrial strategy is the only way to reverse these trends.

CARROTS AND STICKS

How did Israel address these challenges, and what factors contributed to its success? In the mid-1970s, Israel, like most other developing economies, was facing intensifying economic problems. These included economic stagnation, dwindling foreign reserves, and an expanding balance of payments deficit. Recognizing the limited potential for further growth of its traditional industrial sectors, state planners at the Ministry of Trade and Industry (MOTI) concluded that Israel’s economy was in “urgent need [of] rapid technological development” and required “an accelerated effort in the field of industrial R&D.” Fully aware of the limited size of Israel’s industrial firms, both in annual turnover and manpower, as well as the inherent risk of such investments, state planners also noted that “industrial R&D in Israel will not be able to develop fully without massive government aid.”¹⁰

Charged with the task of accelerating investment in innovative technology was the newly formed Office of the Chief Scientist (OCS). Housed within MOTI, this agency was to be responsible for designing and implementing various risk-sharing programs that supplied public funding for cutting-edge industrial R&D in select science-based industries. The OCS’s flagship initiative was the R&D Grants Program. This program offered early-stage funding in the form of matching grants for the development of an innovative, export-targeted industrial product or process. Throughout the 1970s, the R&D program grew in both size and scope, and in 1984 was given further statutory support through the “Law for the Encouragement of Industrial Research and Development” (R&D Law).

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In the early 1990s, OCS created three additional channels to provide financial and institutional support to the emerging high-tech sector. The first was the Technological Infrastructure Program, which supported the formation of an R&D consortium that included both tech firms and academic institutions. The second was a Technological Incubators Program that offered resources and institutional support for novice entrepreneurs, including many recent immigrants from the former USSR. The final and most important program was “Yozma,” a \$100 million state-owned venture capital (VC) fund that would play a key role in spawning Israel’s dynamic VC sector. This fund made direct investments and provided matching funding for ten additional, private VC funds, most of which are still active today. As a result, the VC sector became the main source of scale-up investment for Israel’s promising start-ups.

Crucial to OCS’s success was the fact that all of the agency’s programs combined public funding (“carrots”) with strict conditions (“sticks”). In particular, OCS’s conditions were designed to ensure that Israeli firms avoided the slippery slope of “innovate here/produce there,” and that the state’s R&D investments benefited the public. Most important in this regard were requirements stipulating (a) that all products emerging out of OCS-funded projects must be manufactured exclusively in Israel, and (b) that the IP created during the R&D stage must not be transferred beyond the state’s borders. Additionally, firms whose projects were successful (i.e., those generating sales) were required to repay the original grant in the form of royalties, usually 3–5 percent of annual revenues, capped at 150 percent of the original grant.¹¹ These stipulations all appeared in the standard agreements signed between OCS and grant recipients as early as 1975. They were subsequently established in the R&D Law when it was legislated in 1984. Since the R&D Law became the binding legal framework for all OCS operations, the same conditions applied to almost all other funding schemes administered by the agency over the years, including the Technological Incubators Program and the Technological Infrastructure Consortia mentioned above.

The purpose of these requirements was to ensure that once a state-funded R&D project succeeded, its fruits would remain in and contribute to the domestic economy. As former chief scientist Dr. Yehoshua Gleitman explained at the time:

The state of Israel is investing a significant sum of money and is doing it when the risk is at its highest. . . . It wants to then reap the economic benefits of this investment. We are not interested in recouping our investment; we want to help nurture an industry that will employ workers.

In other words, although the state permitted grant recipients to patent prototypes without asserting any ownership stake, IP rights were limited in ways designed to ensure that firms would scale up production and continue to operate locally. In this manner, the various benefits of the state's initial investment in R&D would be realized domestically and produce social rewards, alongside private gains.

To guarantee that the conditions set forth in the R&D Law would not remain a dead letter, in the early 1980s OCS set up an in-house unit responsible for oversight and the collection of royalties. Thereafter, representatives of OCS would visit beneficiary firms to inspect the progress of funded projects and assess financial records. The fact that R&D grants were not distributed in advance in one lump sum, but rather in a piecemeal fashion and according to a prearranged schedule, allowed OCS to set benchmarks and then withhold payment when projects did not progress as planned.

Most significantly, however, were the institutional capacities added to OCS following the 1984 R&D Law. Specifically, this law empowered OCS to unilaterally withhold, cancel, and even demand full repayment of previously awarded funds. In 1995, at the request of the Chief Scientist, a new amendment to the R&D Law classified the unauthorized transfer of state-funded IP outside of Israel as a criminal offense, punishable by up to three years in prison. While there are no known cases in which individuals or firms were prosecuted for such an offense, it nonetheless gave OCS a threatening stick to go along with its various carrots.

Because almost all of Israel's firms in this period submitted R&D projects to OCS on an annual basis, and because many of them were dependent on continuous state support, the threat of delaying or withholding future proposals served as a very effective lever over disobedient firms. Since royalty payments were due on future sales, the R&D Law also empowered OCS to maintain continuous oversight of firms, and provided access to their financial records, long after the actual R&D was complete. This oversight allowed the agency not only to monitor royalty payments but, more importantly, to ensure that firms abided by the local manufacturing and IP retainment requirements.

As intended, such conditions were instrumental in the expansion of Israel's high-tech sector. A good illustration of how these requirements led to local commercialization is the case of Given Imaging, which pioneered the endoscopy capsule technology. Originally founded in 1997 by Dr. Gabi Iddan, previously a scientist in the missile division of the state-owned Rafael Advanced Defense Systems, the start-up received upwards of \$5 million in R&D funding from OCS. In 2001, after Given Imaging's product was cleared by the U.S. Food and Drug Administration (FDA), the

firm sought to begin mass production. The technology required to manufacture the sophisticated capsules, however, did not exist in Israel. Since the R&D Law prohibited the transfer of production abroad, the commercialization of the firm's patented technology required the establishment of a large production facility in Israel, which Given Imaging established with the help of the American firm Pemstar. By November 2001, the required manufacturing plant was erected in the peripheral Israeli town of Yokneam Illit, where it eventually employed close to a thousand workers in manufacturing.¹²

The carrots and sticks of the R&D Law not only compelled domestic firms to scale up their operations locally. They also succeeded in getting a few world-leading multinational corporations, including National Semiconductor and Motorola, to open R&D centers in Israel and later to expand into advanced manufacturing of microprocessors. As noted by Dan Breznitz, this was almost the exact opposite of the usual model for multinationals entering emerging economies. Typically, they first open assembly and manufacturing lines, and only with time expand to develop more technologically sophisticated operations.¹³

As a result of these efforts, starting in the mid-1970s, Israel experienced a remarkable increase in the rate of high-tech exports. Until the 1980s, Israel's main exports were textiles, clothing, and processed food, with high-tech products accounting for only 14 percent of the country's manufactured exports. Yet by the early 2000s, high-tech accounted for a staggering 54 percent of Israel's industrial goods exports. Notably, this development was also responsible for the creation of new high-paying jobs. Between 1995 and 2011, the number of workers employed in high-tech sectors more than doubled, from 98,000 to 215,000. Today, Israel's number of high-tech employees stands at about 335,000, comprising about 10 percent of total employment.¹⁴ This latter figure represents the highest rate in the OECD and is more than double the OECD average.¹⁵ Over the years, various econometric studies have demonstrated the direct causal relationship between OCS's various R&D programs and these impressive development outcomes.¹⁶

THE POLITICAL ORIGINS OF ISRAEL'S INDUSTRIAL POLICY

To understand OCS's successful implementation of Israel's industrial strategy, it is necessary to look beyond the specific form and content of the country's industrial policies and to explore their institutional origins. More specifically, it is necessary to examine how these institutional capacities were shaped by politics.

Most important in this regard was a political coalition between the state and sections of private industry whose economic interests aligned with the developmental priorities of the state. Such a coalition emerged in Israel in the mid-1970s and included vanguard investment bankers, leaders of established industrial conglomerates, representatives of organized labor, and entrepreneurial scientists and engineers looking to commercialize innovative technologies developed in public research universities or through the military. Whereas the failure to build similar coalitions served as the main political obstacle to development efforts elsewhere,¹⁷ in Israel, this coalition underpinned the state's efforts to restructure industry in the direction of a knowledge-based economy and played a pivotal role in the successful implementation of its innovation policies.

The interests of this coalition were represented by an organization established in 1975 named "The Israeli Industry Center for R&D," or MATIMOP, its Hebrew acronym. MATIMOP's founding partners included OCS, the Manufacturers Association of Israel, and the Histadrut, Israel's general federation of labor. Once formed, MATIMOP became a key forum for constituent coordination and public-private cooperation. It not only represented the interests of the emerging tech sector but also provided OCS with the political clout necessary for implementing its most important policy programs. When necessary, the organization lobbied to increase government spending on R&D or mobilized against attempts to curtail it. In the 1980s, MATIMOP advanced numerous policy proposals, including the R&D Law. In fact, it was the leadership of this organization that first proposed the law and then saw it through the legislative process.

Notably, during the legislative process, MATIMOP's representatives did not oppose the articles of the law that imposed conditions on state assistance that limited firms' operations abroad. Three main factors help explain this somewhat surprising outcome. First, it is important to stress that when the R&D Law was first legislated, high-tech firms still operated within the vertically integrated Fordist mode of production in which, unlike today, the colocation of R&D and manufacturing was still very much the modus operandi of the industry. Yet firms not only chose to scale up operations and manufacture in Israel because they were accustomed to doing so. They did so because they were strongly incentivized by the state, mostly through Israel's Investment Law, which offered additional grants and tax breaks on the condition that firms locate their manufacturing facilities in Israel's peripheral regions, where the state was interested in fostering economic development and creating good jobs. Finally, the fact that organized labor was a founding member of MATIMOP further cemented the support of domestic industry. This is because, at the time, the labor federation represented thousands of workers in the tech sector whose jobs would remain protected by local production requirements. Such consensus around state conditions is similar to the developmental

experience of places like South Korea, Japan, and France, where the state's development agenda was not imposed upon but rather advanced in alliance with the domestic business community.¹⁸ You have reached your limit of 1 free article this month. Please [subscribe](#) to receive unlimited access to this site. Already have an account? [Sign In](#).

The consensus around the restrictions of the R&D Law persisted throughout the 1990s. In fact, up until the early 2000s, key figures from private industry called for *strengthening* the existing requirements. For example, in March 1999, after the Israeli software company New Dimension was acquired for \$700 million by the American firm BMC, leading voices from the private sector openly criticized the agreement. The chairman of the Electronics Industries Association and a serial entrepreneur, Zohar Zisapel, criticized OCS's approval of the sale. As he explained:

What is troubling is not the sale of the company . . . but the ability of the new owners to move the technology and production outside of Israel. The transfer of manufacturing abroad should be restricted in a draconian fashion. Today the OCS is willing to release firms from their obligation [not to transfer IP] in return for paying a fee equivalent to 3 times the original government grant they received . . . but OCS should demand not 3, but 30 times the amount of their investment.

The chief scientist at the time, Dr. Orna Berry, concurred, adding, "There is room to reassess the R&D law and check whether the existing restrictions on the sale of knowledge and production abroad are sufficient."

A FRAYING CONSENSUS

Israeli industry's consensus on the conditions of the R&D Law did not endure much longer, however. Starting in the 2000s, the merits of the law's domestic manufacturing requirements and the blanket ban on the transfer of IP were meaningfully challenged for the first time.

By this point, the landscape of Israel's high-tech industry had changed significantly, mainly due to the rise of Israel's VC sector, which emerged out of OCS's Yozma program mentioned above. In just a few years, this industry amassed significant power and influence, as it quickly became the main source of investment capital for start-ups and young firms. It was during this period that leading voices from within the VC sector began advocating for reform of the R&D Law and specifically for eliminating the unconditional prohibition against transferring IP.

VCs' opposition to this regulation arose from their traditional business model. VCs pursue extremely high returns by investing in and nurturing firms in profitable, typically IP-driven sectors such as software, IT, or biotechnology. Furthermore, most VCs function under a rather limited timeframe, as they are typically structured as limited partnerships with set fund commitment dates (e.g., an investment period of three to five years followed by five to seven years of harvesting). Their returns are monetized through one of two exit routes: either an initial public offering, usually on the NASDAQ or, more commonly, via an acquisition by a large multinational firm. But since Israel's R&D Law prohibited the transfer of IP, the likelihood of OCS-funded firms being acquired by foreign multinationals was greatly diminished, as buyers would be deterred from acquiring firms whose IP they could not fully control.

While the VCs fiercely advocated against the law's IP provisions, it should be emphasized that they were not in favor of eliminating the R&D Law. The VCs were (and are) still very much dependent on the innovations and technologies developed through the state's various funding schemes. As Chemi Peres, the managing general partner and co-founder of the VC fund Pitango explained:

VCs mostly invest at the stage where we can help firms become profitable. We do not want to bother too much with the development of technology. There we cannot bring our investors the yield in the timeframe they expect it. We want to invest when a company already has a product and is about to penetrate the market.

In other words, the VCs wanted the state to keep providing the subsidies but refrain from attaching any conditions.

Notably, state managers also changed their views on the issue. Representative of this shift was the support the proposed changes received from Ehud Olmert—then the minister of trade and industry, and future prime minister. He took the view that amending the law was necessary to make Israeli start-ups more attractive to foreign investors.

While the government largely sided with the VCs, some policymakers were worried that implementing such changes would negatively impact Israel's economy. As one member of Knesset remarked at the time: "[Israel] has an advantage in R&D, but according to

[the changes] being discussed here, we risk being turned into a research lab. Everyone will come and exploit our talented workforce to carry out research, but the manufacturing and the jobs will go elsewhere. [Sign In](#).

Similar concerns were voiced by Israel's advanced manufacturing interests who had an obvious stake in maintaining the existing regulations. They argued that when R&D was publicly financed to foster economic development, the relevant firms were obligated to continue operating locally.

These debates continued through several legislative cycles. Ultimately, the reformed R&D Law more closely aligned with the position of the VC sector. In 2005, the outright ban on the transfer of IP was lifted and replaced with a fee. From this point onward, firms that wished to sell their IP were charged a fee that ranged from three to six times the sum of the original government assistance provided. This mechanism was far more favorable to private investors than the government's initial proposal, which suggested a payment based not on the government's original R&D investment, but rather on the price at which the firm's IP was being acquired. Yet the VCs' strong opposition to this proposal, which would have amounted to far more substantial payments to the state, resulted in much softer terms.

These reforms to the R&D Law not only marked a fundamental transformation of Israel's original industrial strategy, but they also had negative impacts on Israel's economy going forward. Most significantly, firm scale-ups in Israel became far less common. Rather than become large firms, many promising Israeli start-ups would now be acquired at earlier stages by large multinationals, like Apple, Facebook, Google, and Microsoft.¹⁹ In 2013, an Israeli Knesset report summarized the adverse consequences of this growing trend:

The main weaknesses of the local high-tech industry are the failure of small companies to scale up into advanced production and the absence of large firms. Despite the rapid increase in the number of start-up firms, a significant number of successful companies are sold to foreign entities before they have reached the stage of extensive production and marketing. [While] the entrepreneurs and investors, mostly the VC funds, benefit most from selling the venture in the relatively early stages, the economy would benefit more from the continued expansion of these companies.²⁰

The central problem with increasing early-stage acquisitions by multinational corporations is that this model does not generate the positive spillovers that domestic scale-ups do. One clear example is job creation. When a growing firm is acquired and converted into a subsidiary of a foreign corporation, the potential additional jobs in manufacturing, customer support, marketing, logistics, and middle management are typically lost. To highlight just one illuminating statistic: for each employee of an Israeli high-tech manufacturer, two additional local jobs in nonmanufacturing industries are created. Each R&D center employee, on the other hand, creates only one-third of an additional job.²¹ Because job growth in multinational R&D centers has been far more rapid than the growth of local high-tech firms in recent years, this has had a remarkably negative impact on the creation of additional jobs in the economy. As Dan Breznitz has written:

By following this strategy, Israel has moved to the top of the global league in business R&D investment intensity, number of high-tech companies listed on nasdaq, and level of VC dollars invested per capita. These factors certainly fueled Israel's impressive economic growth over the last twenty years, yet during the years of extreme high-tech growth, the rest of the economy enjoyed no positive spillovers. Productivity and wages in all other sectors of the economy declined or remained stagnant, and the high-tech boom focused almost exclusively on financial exits, offering extremely well-paid jobs with a chance of fabulous riches, but only to the geek elite. (More than 95 percent of the venture capital invested in Israeli firms has been foreign, hence, after financial exits, the money and the profits are channeled back to their foreign investors.)²²

CONCLUSIONS

Let us now consider America's emerging industrial strategy in light of the lessons drawn from the history of Israel's high-tech sector and the industrial policies that shaped it. First, it should be acknowledged that the legislation currently debated in Congress represents a bold and ambitious vision for rebuilding the industrial base across sectors, technologies, and regions, as well as tackling some of the world's most serious challenges, including climate change and economic inequality. In this regard, the Biden administration has no doubt embraced an active role for government and proposed to commit meaningful levels of state funding to realize its goals. Yet the administration has

so far avoided imposing conditions on its generous incentives. It has also largely ignored the importance of building the institutional capabilities necessary to enforce any conditions and ensure that private sector activity is aligned with public priorities. [You have reached your limit of 1 free article this month. Please subscribe to receive unlimited access to this site.](#) [Already have an account? Sign In.](#)

Such concerns were briefly raised during the Senate debates over the U.S. Innovation and Competition Act. During the hearings, Senator Bernie Sanders argued that government support should come with conditions. Echoing Mazzucato, he emphasized that “We are not going to socialize all of the risks and privatize all of the profits.” Sanders’s proposed amendment prohibited semiconductor companies receiving subsidies from buying back their own stock, outsourcing jobs, or paying their executives more than fifty times the pay of their median worker. Recipient firms would also have been required to give the government a partial ownership stake in the form of equity.²³

Members on the other side of the aisle raised similar concerns. For example, Senator Marco Rubio said lawmakers needed to do more to ensure technologies funded by the U.S. government did not ultimately wind up in foreign hands. “What if a year from now we . . . read an article . . . that says, ‘The Chinese have stolen a quarter—25, 30 percent—of the [intellectual property] developed by the money that’s put forward in the bill that was passed?’ We’re all going to feel pretty stupid around here.”²⁴ In the end, the bill did not include the amendments introduced by Sanders and Rubio, leading the two senators to vote against it.

More fundamentally, based on Israel’s experience and the broader historical record, robust industrial policies require far more than the support of a handful of legislators. What is required is the formation of long-term political coalitions of organized interests that share the state’s development agenda.

It was exactly this kind of political coalition, including capital-intensive industries, internationally oriented investment banks, as well as organized labor, that facilitated the enactment of Franklin Roosevelt’s transformative New Deal agenda.²⁵ This coalition not only ensured industrial recovery following the Great Depression but also enacted various industrial policy measures, such as the establishment of the Tennessee Valley Authority, which restructured industry and raised living standards for millions of Americans.²⁶ A more recent, albeit more limited coalition underpinned the U.S. National Nanotechnology Initiative (NNI). Conceived and initiated by the federal government, the NNI created a broad partnership between private firms such as DuPont and Raytheon, academic institutions like MIT, and arms of government including science and technology units from the U.S. Army and the Department of Defense.²⁷ Developing these kinds of long-term collaborations between public and private entities is a crucial

yet underappreciated factor that will determine whether contemporary industrial policies will be effective in generating an inclusive, sustainable, and resilient response to America's national and global challenges. [Already have an account? Sign In.](#)

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NOTES

¹ Reda Cherif and Fuad Hasanov, “The Return of the Policy That Shall Not Be Named: Principles of Industrial Policy,” International Monetary Fund, March 26, 2019.

² Ha-Joon Chang and Antonio Andreoni, “Industrial Policy in the 21st Century,” *Development and Change* 51, no. 2 (2020): 324–51.

³ Much has been made of China's ambitious “Made in China 2025” plan, which aims to propel the Middle Kingdom from technological follower to innovation leader. Yet China is far from the only nation to put forward bold industrial policy. In France, President Macron recently outlined “France 2030,” a five-year, €30 billion investment plan to boost the country's high-tech industries and reduce dependence on imported raw materials and electronic components. In 2019, Germany released the “National Industrial Strategy 2030” that seeks to ensure the long-term competitiveness of its national champions and support the development of digitization, artificial intelligence, and battery cell manufacturing. In Brussels, EU institutions such as the European Investment Bank (EIB) and the European Investment Fund (EIF) have joined forces with European governments, universities, private investors, industry, and labor in the creation of industrial alliances around the development of electric battery production, semiconductor technologies, and cloud computing.

⁴ David E. Sanger et al., “Senate Poised to Pass Huge Industrial Policy Bill to Counter China,” *New York Times*, June 7, 2021.

⁵ Mariana Mazzucato, “The Entrepreneurial State: Socializing Both Risks and Rewards,” *Real-World Economics Review* 84 (June 21, 2018): 201–17.

⁶ Dan Breznitz, *Innovation in Real Places: Strategies for Prosperity in an Unforgiving World* (New York: Oxford University Press, 2021); Erez Maggor, “Politics of Innovation: The Entrepreneurial State and the Making of Israel's ‘Start-up Nation,’” PhD diss. (New York University, 2020).

⁷ William B. Bonvillian and Peter L. Singer, *Advanced Manufacturing: The New American Innovation Policies* (Cambridge: MIT Press, 2018).

⁸ Adi Robertson and Russel Brandom, “Congress Releases Blockbuster Tech Antitrust Report,” *Verge*, October 6, 2020.

⁹ Bonvillian and Singer, *Advanced Manufacturing*; Suzanne Berger, *Making in America: From Innovation to Market* (Cambridge: MIT Press, 2013).

¹⁰ Here, I draw mainly on my dissertation research: Maggor, “Politics of Innovation.” See also: Erez Maggor, “The Politics of Innovation Policy: Building Israel's ‘Neo-Developmental’ State,” *Politics & Society* 49, no. 4 (2021): 451–87.

¹¹ The fact that repayments were conditioned upon successful sales lowered the risk associated with the investment, thereby significantly lowering barriers to entry. Also, because OCS subsidies were recycled back into the industry in the form of new R&D grants, this access to this site did not reduce the fiscal capacity of OCS without requiring additional budget appropriation. [Already have an account? Sign In.](#)

¹² In March 2014, Given Imaging was acquired by the Irish multinational Covidien and became a private company. This occurred only after the R&D Law was reformed in 2005, softening regulations banning the transfer of IP, as discussed herein.

¹³ Dan Breznitz, “Industrial R&D as a National Policy: Horizontal Technology Policies and Industry-State Co-Evolution in the Growth of the Israeli Software Industry,” *Research Policy* 36, no. 9 (2007): 1465–82.

¹⁴ “[Israel Innovation Authority’s 2021 Innovation Report](#),” Israel Innovation Authority.

¹⁵ “[OECD Economic Surveys, Israel](#),” March 2018.

¹⁶ Moshe Justman and Ehud Zuscovitch, “The Economic Impact of Subsidized Industrial R&D in Israel,” *R&D Management* 32, no. 3 (2002): 191–99; Manuel Trajtenberg, “Innovation in Israel 1968–1997: A Comparative Analysis Using Patent Data,” *Research Policy* 30, no. 3 (2001): 363–89.

¹⁷ Richard Doner and Ben Ross Schneider, “The Middle-Income Trap: More Politics Than Economics,” *World Politics* 68 no. 4 (2016): 608–44.

¹⁸ For South Korea, see: Vivek Chibber, *Locked in Place: State-Building and Late Industrialization in India* (Princeton: Princeton University Press, 2003). For Japan, see: Chalmers Johnson, *MITI and the Japanese Miracle: The Growth of Industrial Policy: 1925–1975* (Stanford: Stanford University Press, 1982). For France, see: John Zysman, *Governments, Markets, and Growth: Financial Systems and the Politics of Industrial Change* (Ithaca: Cornell University Press, 1984).

¹⁹ Matthew Kalman, “[Israel’s ‘Startup Nation’ Is under Threat from the Tech Giants That Nurtured It](#),” *MIT Technology Review*, January 8, 2019.

²⁰ Anat Levi and Roy Goldschmidt, “Analysis of the Office of the Chief Scientist Budget,” Knesset Research and Information Center, May 2013.

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