Moonshots and the New Industrial Policy: Questioning the Mission Economy

Magnus Henrekson, Christian Sandström, and Mikael Stenkula

Abstract The notion that society should be organized around large so-called missions has gained momentum in public debate, and the reemergence of active industrial policy across the world has been inspired by academic scholars promoting the idea of mission-oriented innovation policies (MOIPs). Besides this introductory chapter, this collective volume consists of 16 chapters distributed across 3 overarching themes: theoretical perspectives, empirical evidence, and alternative paths. The volume provides a comprehensive assessment and normative critique of the efficacy of such policies. In addition to summing up the main findings in the 16 chapters, this introduction provides some additional analysis, pins down the most important general conclusions, and suggests future research questions. Today's economies are highly dependent on a well-functioning process of decentralized experimentation, selection, and screening. Instead of large-scale MOIPs, governments should strive to create an institutional framework that levels the playing field for potential entrepreneurs while encouraging productive entrepreneurship.

Keywords Entrepreneurship policy · Innovation policy · Institutions · Public choice

JEL Codes H50 · L26 · L52 · O31 · O38 · P16

We are grateful for useful comments and suggestions from David Lucas and Kathy Saranpa. Financial support from the Jan Wallander and Tom Hedelius Foundation (P2018-0162 and P2023-0186), the Kamprad Family Foundation for Entrepreneurship, Research & Charity (P20220048), the Marianne and Marcus Wallenberg Foundation (2020.0049), and the Knowledge Foundation is gratefully acknowledged.

M. Henrekson · M. Stenkula (✉)
Research Institute of Industrial Economics (IFN), Stockholm, Sweden
e-mail: magnus.henrekson@ifn.se; mikael.stenkula@ifn.se

C. Sandström
Jönköping International Business School, Jönköping, Sweden

The Ratio Institute, Stockholm, Sweden
e-mail: christian.sandstrom@ratio.se

M. Henrekson et al. (eds.), *Moonshots and the New Industrial Policy*, International Studies in Entrepreneurship 56, https://doi.org/10.1007/978-3-031-49196-2_1

Introduction

We observe how governments in the West are introducing large-scale government programs in their efforts to both reboot their post-pandemic economies and to attain bold targets such as sharply reducing and eventually eliminating CO_2 emissions.

This broad trend toward increasingly interventionist industrial policies is often named missions, moonshots, or mission-oriented innovation policies (MOIPs). An archetypical example is the Cancer Moonshot, a large, government-directed effort to eliminate cancer, initiated by Barack Obama in 2016.[1] President Biden decided to reignite this MOIP in 2022. At the 60th anniversary of President John F. Kennedy's historical speech in which Kennedy had announced the idea of putting a man on the moon "before this decade is out," Biden announced:

> I give you my word as a Biden: This Cancer Moonshot is one of the reasons why I ran for President. It's part of my Unity Agenda that I laid out in my State of the Union Address to rally the American people to work together. Because we know this: Cancer does not discriminate red and blue; it doesn't care if you're a Republican or a Democrat.[2]

The renaissance of moonshot policies is interesting, especially bearing in mind that the first Cancer Moonshot was put in place over 50 years prior. In his 1971 State of the Union speech, President Richard Nixon declared:

> The time has come in America when the same kind of concentrated effort that split the atom and took man to the moon should be turned toward conquering this dread disease. Let us make a total national commitment to achieve this goal.

Unfortunately, as is widely recognized, this first Cancer Moonshot, known as the War on Cancer, fell far short of its aspirations (e.g., Faguet 2005). Rostand (1990) summarizes the War on Cancer in the following way:

> What is surprising, in this affair, is the numbers and qualifications of those gone astray. They were not half-wits, fools, or friends of the wondrous; No, they were true men of science, unbiased and honest men familiar with the scientific method: Men with cool and solid heads who, before and after their escapade, proved themselves worthy researchers.

The EU Green Deal is an example of a new MOIP, amounting to EUR 1000 billion over a 10-year period. Several of the main reports that lay the foundations for the EU Green Deal were written by a comparatively small group of scholars who have popularized the idea of MOIPs. In the United States, the Biden presidency has put in place the Inflation Reduction Act (IRA), which is a combination of debt repayment (USD 306 billion) and funds specifically targeting cleantech. The design and implementation of these policies is influenced by the advice of scholars such as Mariana Mazzucato and colleagues. Economists such as Dani Rodrik at Harvard

[1] White House (2022a).

[2] White House (2022b).

University have also been instrumental in advocating the renaissance of industrial policies (Juhasz et al. 2023; Tagliapietra and Veugelers 2023; Rodrik 2022).[3]

Despite many historical examples of failed moonshot policies, policymakers and scholars who engage in these large-scale programs which aim to accomplish industrial and environmental renewal are rarely questioned. Often, it appears that these policies are put in place with little scrutiny and prior analysis. This trend is in many ways a manifestation of renewed belief in the efficacy of government interventions, formulated by Mazzucato (2022, p. 93) as follows:

> Governments are the only actors capable of underwriting the scale of investments required; of coordinating multiple actors around the common goal of decarbonization; and of ensuring the costs and benefits of a green transition are distributed equitably across society so that social injustices are tackled alongside environmental crises.

We have witnessed a growing number of scholars questioning the entrepreneurial state and the idea of a mission economy (Wennberg and Sandström 2022; Muldoon and Yonai 2023; Kantor and Whalley 2023; Kirchherr et al. 2023), but this trend toward critical examination of such policies is still in its infancy. In the collective volume *Questioning the Entrepreneurial State* (Wennberg and Sandström 2022), 32 scholars offered a combination of theoretical and empirical contributions on the topic of industrial policy. Critical praise of the volume has emphasized the importance of both more grounded theoretical perspectives and further empirical studies of MOIPs (Muldoon and Yonai 2023). Moreover, the accelerating trend toward more proactive industrial policies, under labels such as Inflation Reduction or Green Deals, has spawned a need for continued inquiry into the workings of industrial policy in general and MOIPs in particular.

We begin this introductory chapter with an overview of the ongoing debate concerning the role of the entrepreneurial state and industrial policy. Then, we review and summarize the different contributions to this volume. It consists of three parts: (i) theoretical perspectives on MOIPs; (ii) empirical examinations of MOIPs, including in-depth case studies and reviews of previous studies; and (iii) contributions pointing to alternative ways to accomplish economic and social development.

Throughout this volume, we rely on the OECD's (2021, p. 15) definition of a MOIP as

> a co-ordinated package of policy and regulatory measures tailored specifically to mobilise science, technology and innovation in order to address well-defined objectives related to a societal challenge, in a defined timeframe.

[3] Tagliapietra and Veugelers (2023) is an ambitious volume published by Bruegel. It consists of 12 chapters by a total of 18 authors including world-leading scholars Philippe Aghion, Dani Rodrik, and Laura Tyson. The volume asks whether industrial policies can be designed "that strengthen green growth and economic security without hurting competition, economic openness and cohesion in the EU" and whether it is "possible to do so without stronger EU-level governance, backed by financial resources" (p. 12). In his Foreword, Bruegel Director Jeromin Zettelmeyer asserts that the answer to the first question is Yes and that this cannot be achieved unless the EU assumes a stronger governance and financing role.

Relatedly, the OECD specifies a set of criteria for a MOIP, adding that these policies ideally also (i) involve different actors from different fields and sectors; (ii) address a grand challenge or wicked problem; (iii) have a defined deadline that is medium- or long-term with (iv) clear, measurable milestones along the way; and (v) involves an element of risk.

Questioning the Entrepreneurial State

In some respects, this volume is a sequel to *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (Wennberg and Sandström 2022), which was published in 2022 as an open access book available for free download. In its first year, the book was downloaded more than 180,000 times, and in September 2023, the number of downloads surpassed 200,000. The book has been presented at numerous academic seminars and conferences as well as to policymakers across the globe.

The volume received positive reviews in, e.g., the *Journal of Evolutionary Economics* (Boudreaux 2022), the *Journal of Economic Literature* (2022),[4] *International Small Business Journal* (Stam and Vogelaar 2023), and the *Review of Austrian Economics* (Holcombe 2022), and was endorsed by scholars and policymakers. Josh Lerner of Harvard Business School, David Audretsch of Indiana University (the most cited scholar in entrepreneurship economics), and former Swedish Minister of Finance, Anders Borg, have all endorsed the book (see endorsements in Wennberg and Sandström 2022).

Despite having engaged so many well-reputed authors and receiving widespread attention and praise from both scholars and policymakers, the response from Mariana Mazzucato and her colleagues was meager. On April 27, 2022, Mazzucato posted this response on *X* (then *Twitter*):

> Critical thinking on innovation policy is key but using a book to attack a strawman of an idea is just another distortion. Response to be followed by longer article.

When asked 4 months later about this longer response, no answer came from Mazzucato. However, the following comment was made on the third of September 2022 on *X* (then *Twitter*) by Rainer Kattel, professor and deputy director of the Institute for Innovation and Public Purpose at University College London (UCL):[5]

> The collection is intellectually embarrassing, arguments in most articles have no legs to stand on. And I am not sure most authors even realize they are serving the agenda of Cato-wannabes.

[4] Unsigned review in Vol. 60, No. 4, p. 1545.

[5] On the initiative of Mariana Mazzucato, the Institute for Innovation and Public Purpose was founded in 2017 with herself as its director. It is fair to say that the institute was founded with the express purpose of providing a platform for Mazzucato and her ideas.

When professors with elevated positions at prestigious universities such as UCL respond in this way to fellow scholars seeking to engage in a discussion, it is a signal that the topic warrants further examination.

There are several other examples of policymakers and scholars who have tried to initiate an open discussion about MOIPs and the renaissance of industrial policy. For more information, see Olof Hallonsten's chapter in this volume about innovationism and the new public intellectuals. Such attempts have usually received little attention and been ignored by proponents of MOIPs (Hallonsten 2024).

The Critique

Questioning the Entrepreneurial State gathered a group of scholars who brought forward different theoretical angles to the limitations and challenges related to MOIPs and the notion of an entrepreneurial state. Several insights emerged from this combined effort. Governments cannot act as entrepreneurs because they face no real market or risk and can therefore not be evaluated (Larsson 2022). For similar reasons, they are less able to act entrepreneurially (Sarasvathy 2022). Relatedly, they are likely to lack ownership competence (Murtinu et al. 2022). Other critical work has been of a more empirical nature, pointing to the lack of information and knowledge among policymakers who are in the position of enacting these initiatives (e.g., Sandström and Alm 2022) and that missions tend to favor vested interests rather than new entrants or institutional entrepreneurs (Bergkvist et al. 2022).

Beyond Wennberg and Sandström (2022), we see increasing scholarly interest in the actual workings of MOIPs. Some of this critique has been of a more theoretical nature such as Lucas et al. (2018). Richard Nelson and co-authors argued that MOIPs "are not the right models for new programs aimed at the challenges we now face" (Foray et al. 2012, p. 1697). Grand societal challenges cannot be solved using a mission-oriented approach because such challenges

> are all very different than the challenges faced and met by Manhattan and Apollo. These programs were aimed to develop a particular technological capability, and the achievement of their technological objective signaled the end of the program. (p. 1698)

Other scholars have applied public choice perspectives on policymaking, suggesting that incentives may diverge among policymakers, government officials, and interest groups in society. This renders the possibility of a societally beneficial outcome less likely (Muldoon and Yonai 2023).

The Rationale Behind This Volume

The rationale behind this volume is threefold. First and arguably most important, larger and more ambitious government programs continue to be initiated across the

European Union and in the United States. For example, the EU program Horizon Europe is structured to address five mission areas regarded as "grand social challenges."[6] Running from 2021 to 2027, the program has a total budget of EUR 95.5 billion. The EU's Green Deal is committed to spending EUR 1000 billion over 10 years in order to attain climate neutrality by 2050.[7] More than 40 percent of these resources (EUR 430 billion) are earmarked for hydrogen-based technologies.[8] The US equivalent is the Inflation Reduction Act of 2022, which will "provide more than USD 369 billion for climate solutions and environmental justice and put the United States on a path to cut carbon emission by an estimated 40% by 2030."[9] These new programs—initiated on both sides of the Atlantic Ocean—are inspired by Mazzucato's books and by the broader literature on innovation systems. Mazzucato (2021) describes how congresswoman Alexandria Ocasio-Cortez and senator Ed Markey in the United States as well as the president of the European Commission, Ursula von der Leyen, were inspired by her work. Mazzucato recalls in her book that she advised the European Commission regarding the design and implementation of the Green Deal, which covers various subsidies and guaranteed loans related to a range of missions including the reduction of CO_2 emissions.

Second, many programs are put in place without significant prior analysis of the risks and problems related to large-scale government missions. Past examples of underperformance or outright failure are often disregarded. Research on innovation policy more generally pays little attention to failure, and there are few studies aiming to explain how and why innovation policies fail (Kärnä et al. 2022). As noted by Josh Lerner in *Boulevard of Broken Dreams* (2009, p. 5), "for each effective government intervention, there have been dozens, even hundreds, of failures, where substantial public expenditures bore no fruit." Kärnä et al. (2022) document that these dozens, or hundreds, of failures are largely absent in the literature on innovation policy. In order to develop sound policies, it is important to look at both successes and failures; we therefore see a need for more explicit attention focused on how and why MOIPs may fail. Relatedly, we see a need for additional theories that

[6] https://research-and-innovation.ec.europa.eu/system/files/2022-06/ec_rtd_he-investing-to-shape-our-future_0.pdf.

[7] The proposed financing of the EU Green Deal is set out in the EU Green Deal Investment Plan (European Commission 2020). It comprises two principal financing streams totaling EUR 1 trillion. Over half of the budget, EUR 528 billion, will come directly from the EU budget and the EU Emissions Trading System. The remainder will be sourced through the InvestEU program, which combines EUR 279 billion from the public and private sectors to 2030 and EUR 114 billion from national co-financing. It will provide an EU budget guarantee to allow the EIB Group and others to invest in higher-risk projects, enabling private investment. The European Innovation Council has also set aside a EUR 300 million budget to invest in market-creating innovations that contribute to the goals of the EU Green Deal.

[8] The president of the European Commission, Ursula von der Leyen, stated that the European Green Deal would be Europe's "man on the moon moment" (https://www.euractiv.com/section/energy-environment/news/eu-commission-unveils-european-green-deal-the-key-points/).

[9] https://www.c40knowledgehub.org/s/article/Climate-action-and-the-Inflation-Reduction-Act-A-guide-for-local-government-leaders?language=en_US.

highlight both the costs and the benefits of various innovation policies. We note that several scholars have emphasized the importance of articulating political economy perspectives on MOIPs more clearly and challenge these ideas on both theoretical and empirical grounds (Muldoon and Yonai 2023; Holcombe 2022). Several contributions in this volume try to do so explicitly (e.g., Holcombe 2024; Waldron and Coyne 2024; Henrekson and Stenkula 2024; Schnellenbach 2024).

Third, the lack of substantive reactions so far from Mazzucato and colleagues—paired with the fact that other scholars and policymakers have experienced a reluctance to engage in critical debate—indicates that this subject is in great need of further inquiry. If new policies and government programs are established based on information provided by scholars soliciting policymakers to promote their own agendas, it is essential for economic and social progress that such academics engage with and respond to the work of their critics. We continue this introduction with a brief historical and conceptual background to MOIPs.

Historical and Conceptual Background to Mission-Oriented Innovation Policy

The idea of mission-oriented innovation has its roots in the literature on evolutionary economics (Nelson and Winter 1982; Freeman 1987) and innovation systems (Lundvall 1992; Geels 2004; Borrás and Edler 2014; Schot and Steinmueller 2016). It is clearly steeped in the tradition of what could be called third-generation innovation policy, which posits that governments should not only provide basic research and contribute to the commercialization of it but also to guide innovation efforts in specific directions. According to this approach, it is no longer enough for the government to increase positive knowledge externalities by supporting R&D activities, nor is it enough to provide targeted support or platforms strengthening the links between diverse actors such as universities, start-ups, and incumbent firms. The purposeful direction of these activities and proactive intervention in the marketplace is deemed necessary. A critical element distinguishing the mission-oriented approach is therefore *directionality*. This concept is used to underscore the importance of establishing a specific direction for innovation policies:

> The key insight of this report is that missions are both a means of setting economic growth in the direction of where we want to be as a society and a vehicle we can use to get there. (Mazzucato 2018, p. 28)

> Missions are a way to implement directionality inside an economy. (Mazzucato 2021, p. 124)

While several scholars have proposed more directed innovation policies, no one has been more successful in diffusing such ideas and popularizing them to policymakers than Mariana Mazzucato. Using the Apollo and Manhattan Projects as illustrative examples, she argues that the state should initiate bold efforts into novel, unchartered territory, thereby guiding and driving change to achieve social

and economic progress. The fact that Mazzucato (2018), the study from which the above quote comes, is an official document of the European Commission highlights how popular mission-oriented policies have become among policymakers.

From this perspective, policymakers are given a pronounced role as the primary agents behind desirable changes:

> Moving to a greener low carbon economy means redirecting all sectors and all actors – public, private and civil society – towards economic growth in a sustainable and inclusive direction. (Kattel et al. 2021, p. 18)

MOIPs are initiated in order to apply a "moonshot" logic to grand societal challenges. In this sense, MOIPs can be regarded as an attempt to extend Richard Nelson's work in the 1977 book *The Moon and the Ghetto*, where he discussed why humanity could put a man on the moon but failed to eradicate poverty. The purpose of MOIPs is to mobilize actors from various parts of society to address important challenges. Its proponents claim that missions can be launched in order to transition to green energy, address homelessness, clean up oceans, or increase equality, to name a few examples. Ideally, these missions provide an overarching umbrella where actors can be mobilized and collaborate.

How to Read this Volume

This collective volume contains three distinct parts in addition to the introduction. Part II presents a collection of theoretical perspectives on MOIPs (Coyle 2024; Holcombe 2024; Schnellenbach 2024; Hallonsten 2024). Part III examines the empirical evidence related to MOIPs. It consists of explorations of the empirical evidence used to justify missions (Yerger 2024a, 2024b), three case studies of failed MOIPs (Lucas and Boudreaux 2024; Alves 2024; Waldron and Coyne 2024), an assessment of previously published analyses of MOIPs (Batbaatar et al. 2024), an exploration of government agencies implementing MOIPs (Björnemalm et al. 2024), and a chapter in which the main takeaways from the previous chapters are identified (Henrekson et al. 2024). Part IV presents alternative strategies for policymakers to accomplish innovation and renewal (Sanders et al. 2024; Rose 2024; Svensson 2024; Henrekson and Stenkula 2024). Here we summarize each chapter and seek to integrate them into a more holistic discussion.

Part II: Theoretical Perspectives

In the chapter "State and markets: Not whether but how," Diane Coyle (2024) situates several of the contributions of this volume. Coyle asserts that MOIPs may help private and public sector actors to coordinate their efforts toward a common objective but underscores that this interaction is much more nuanced than current

accounts of the Apollo or the Manhattan projects, for example. There is a need among policymakers to offer simple solutions and hence to find ways to gain short-term popularity—a need that certain scholars have met by offering oversimplified narratives.

Coyle describes Mazzucato's overarching argument, summarizing it as "the attribution of intentionality, and the conclusion that if it worked for inventing the Internet, it can work for other societal aims." She further notes that it is widely acknowledged among economists that governments have a critical role in funding basic research and technology development and that there is by now a large and growing body of literature discussing various forms of public-private interactions and the optimal role of a government in innovation (e.g., Rothwell and Zegveld 1984; Aghion and Tirole 1994; Acemoglu 2002). Covering some of this literature, Coyle suggests that coordination problems between different actors seem to provide the strongest rationale for MOIPs but emphasizes that each mission needs to be specific concerning the problem to be addressed and that not every policy should be "shoehorned into a mission."

In the next chapter, "Engineering is not entrepreneurship," Randall G. Holcombe (2024) discusses key differences between engineering and entrepreneurship. He notes that governments may be capable of addressing engineering challenges, which he defines as solving problems, whereas entrepreneurship involves developing solutions that create more value than the cost incurred. From this perspective, Project Apollo was an engineering success, but it is impossible to ascertain whether it was a commercial success. Holcombe argues that in this sense, the Manhattan and Apollo projects cannot be invoked as examples of involvement by entrepreneurial governments. Based on this distinction between engineering and entrepreneurship, Holcombe emphasizes that firms engage in both technological and commercial exploration of new ideas, whereas governments can only develop technology. This argument has been expanded upon by other scholars (e.g., Larsson 2022; Potts 2015).

Next, Holcombe discusses outcomes of entrepreneurial efforts by a government by applying his work to political capitalism (Holcombe 2018), an economic system where profit-maximizing firms extract profits from government connections rather than by producing value for consumers. The decision to pursue one mission over another is inherently a political one, meaning that political popularity will determine what missions to pursue. Once a mission is established, societal resource allocation becomes increasingly political, which means that vested interest groups will entrench their connections and abilities to influence government. Holcombe argues that countries are more likely to end up in a tragedy of the commons where welfare-reducing activities are more incentivized as a result.

To illustrate the underlying mechanisms of MOIPs, Holcombe points to several historical examples of how politicians have formulated grand schemes and gained in popularity by doing so, including Lyndon B. Johnson's *War on Poverty* and Franklin D. Roosevelt's *New Deal*. He also describes briefly how the corn lobby managed to influence legislation to increase the amount of ethanol in gasoline. Holcombe's

chapter thus provides a public choice lens for analyzing MOIPs, providing a useful structure to explain and understand why several historical missions have failed.

In the chapter entitled "A behavioral economics perspective on the entrepreneurial state and mission-oriented innovation policy," Jan Schnellenbach (2024) develops Holcombe's political economy analysis further by expanding upon the behavioral aspects of MOIPs. Schnellenbach argues that MOIPs and the idea of an entrepreneurial state are vulnerable to several behavioral biases. These include "rational irrationality" whereby policymakers hold on to objectively untrue beliefs because they may benefit socially and politically from doing so. Policymakers are also susceptible to overconfidence, which (in combination with sunk cost fallacies) implies that more resources are allocated to initiatives with limited potential. Moreover, Schnellenbach shows how Mazzucato herself exploits behavioral biases to prop up her arguments in favor of MOIPs. Among them, a normativity bias where policy measures are justified by virtue of the goals they are supposed to implement rather than good institutions, and a frequent appeal to loss aversion, by depicting catastrophic scenarios, for which mission orientation is advertised as the universal solution.

In contrast to government policies where direct support is allocated through formal application processes, broad generic reforms such as tax deductions for R&D or lower corporate taxation would not be subject to such behavioral biases. Schnellenbach presents several illustrative examples such as the Concorde supersonic airliner project, where "it was clear from relatively early on that. . .the project was most likely to be economically unsuccessful."

In the chapter, "Innovationism and the new public intellectuals," Olof Hallonsten (2024) expands on the analysis in his book *Empty Innovation* (Hallonsten 2023) by discussing the role of public intellectuals. Drawing on Valaskivi's (2012) concept *innovationism*, which affirms that innovation has been elevated to the status of a cure-all in Western societies, Hallonsten applies a sociological perspective when exploring the roots of innovationism and the role played by public intellectuals.

He compares three different public intellectuals who have had significant influence on policymakers over the past decades: Michael Porter and his work on the competitive advantage of nations, Richard Florida and his concept of the "creative class," and Mariana Mazzucato and her work on the entrepreneurial state and the mission economy.

Hallonsten describes how public intellectuals throughout the nineteenth and twentieth centuries were often contrarian as they leveraged their status and elevated positions in academia to criticize established consensus in different areas. According to Hallonsten, the new public intellectuals rather resemble high priests who (p. 82)

> command the efficacious but essentially empty 'innovation-speak' that simultaneously proclaims the crucial importance of innovation for everything and everyone and dilutes the term beyond any operational significance.

As these public intellectuals are put on pedestals, they are able to monetize their role as professors by selling "airport literature," giving speeches and offering various consultancy services dressed up as research. Hallonsten provides illustrative data

concerning Porter, Florida, and Mazzucato. For example, more than 245,000 people follow Mazzucato on *X/Twitter*, and her speaking fee is in the range of USD 50,000–100,000.[10] According to Hallonsten, such business opportunities for professors constitute a "vanity trap" (Mulgan 2016) by offering an opportunity to set aside the tedious toil of academic research to become celebrities while still enjoying the status of their academic titles and affiliations. Interestingly, Hallonsten concludes that the transition away from academic norms and into the institutional logic of media and politics seems to be associated with little academic cost. Scholars such as Porter, Florida, and Mazzucato receive many citations despite their primary focus on nonacademic audiences. At times, the research community seems to cite and take these scholars even more seriously when they become public intellectuals. Hallonsten decries this trend toward fame begetting academic influence. This is at odds with how best practices are traditionally arrived at in academia: the vetting of information through scholarly discourse.

Part III: Empirical Evidence

Exaggerated Claims Regarding the Role of the State

In the first chapter in Part III, "Analyzing the effectiveness of state-guided innovation," Rodney H. Yerger Jr (2024a) takes a closer look at some of the key technologies behind smartphones and Mazzucato's (2021, p. 29) assertion that these were related to visionary investments by state officials rather than the product of development taking place in the market. Reviewing the history of both GPS and touchscreen technology, Yerger argues that labelling these two innovations as products of state efforts is an oversimplification and potentially a misrepresentation of history. While early explorations of touchscreen technology were made at Bell Labs, the greatest leaps of development were taken by Wayne Westerman in his doctoral dissertation at the University of Delaware (Westerman 1999). Westerman co-founded the company FingerWorks to commercialize his invention. The firm was acquired by Apple in 2005. Here, Yerger suggests that Mazzucato's argument becomes a supply chain fallacy as she effectively labels everything that has ever been involved with any government initiative a product of government efforts.

Many of the research efforts that preceded the breakthrough of touchscreen technology can therefore be regarded as basic research in its more conventional sense. To express this differently, research that was partly public and partly private was conducted and resulted in positive spillovers that were subsequently commercialized through private entrepreneurship and the strategic acquisition of this firm by a leading actor such as Apple—a company that also spent substantial resources to

[10] https://www.aaespeakers.com/keynote-speakers/mariana-mazzucato.

further develop the technology. There was no visible hand of government guiding these efforts through visionary, overarching goals.

Yerger's chapter is an important contribution as it questions the evidence originally brought forward both in *The Entrepreneurial State* and *Mission Economy*. It is somewhat surprising that anecdotes invoked to justify MOIPs have been so widely accepted despite the lack of proper scrutiny. A quick glance at the technological advances in computing is enough to realize that Mazzucato's statements about the state's role is exaggerated. Entrepreneurial ventures played key roles in the development of the integrated circuit, for example, which was co-invented by Jack Kilby at Texas Instruments (Kilby 2001) and Robert Noyce at Fairchild in 1959–1960 (Lojek 2007). The microprocessor was developed by Intel in collaboration with Japanese firms (Noyce and Hoff 1981), and mobile telephony was invented by Martin Cooper and his team of engineers at Motorola in 1973 (Cooper 2001). Moreover, Hiltzik (1999) documents how a decade of research at Xerox Palo Alto Research Center (PARC) resulted in many of the breakthrough technologies that were pivotal to the advances of the information age: personal computers, emails, ATMs, the first version of the Internet, user-friendly word-processing programs, graphical user interfaces, and object-oriented programming.

To be sure, the state has played an important role—not only as a funder of research but also as a demanding customer for R&D. It would be strange if that were not the case; the state is involved in nearly all activities in the economy, either as a customer, sponsor, or regulator. However, given the numerous accomplishments by both large companies and entrepreneurial ventures, Mazzucato's claims regarding the state's pivotal role in developing digital technology seem overly simplistic.

In the next chapter, "A case study on DARPA: An exemplar for government strategic structuring to foster innovation?", Yerger (2024b) investigates DARPA, another empirical example of crucial importance for the MOIP case. While Yerger's examination of DARPA underscores that this agency has at times been very innovative and is in several ways an exemplar of how R&D can be organized to make considerable advances, he also shows that many of these traits are difficult to transfer to other settings. Applying economic theory related to political transaction costs, Yerger identifies a set of DARPA's key success factors including autonomy, small size, and limited tenure of its program managers. While DARPA certainly has made important contributions to technological development and national defense, Yerger argues that it cannot be regarded as a sustainable and scalable way to organize government efforts in a consistent manner over time. Gradually, DARPA has become more bureaucratic and more controlled by policymakers, which indicates that this model is difficult to sustain over time due to political pressure.

In the chapter entitled, "The state of the entrepreneurial state: Empirical evidence of mission-led innovation projects around the globe," Maral Batbaatar et al. (2024) delve deeper into the literature discussing MOIPs. They identify 28 academic papers and reports that describe one or more missions, yielding a dataset of 49 MOIPs. Fifty-nine percent of the cases were still ongoing, 33 percent were described as "successful" by the originators, and 8 percent were described as failures. Not a single

one of the 49 cases was evaluated by means of a cost-benefit approach or estimated/discussed opportunity costs.

Moreover, Batbaatar et al. find that most missions do not satisfy the OECD's (2021) defining criteria for a mission such as an integrated and coherent vision; clear, measurable goals; and milestones that make it possible to evaluate them. For instance, a mere 51 percent of the missions had set deadlines for completion, and many goals were so vague that it was impossible to assess whether they had been achieved. Examples include "Establish a vital and innovative biotechnology landscape" (Prochaska and Schiller 2021), "Develop new forms of flexible automation in the footwear industry for the region to be a leading producer in the world" (Foray 2018), "Bring transformative effects from science and research in Finland," and missions aimed to "Support Finland's growth and expertise in the transport and mobility sector and get international attention" (Kivimaa and Rogge 2020).

Three Case Studies of Failed MOIPs

In the chapter "When 'what works' does not work: The United States' mission to end homelessness," David S. Lucas and Christopher J. Boudreaux (2024) analyze a recent and still ongoing mission that has failed to achieve its intended goals. Lucas and Boudreaux document the United States' efforts to combat homelessness during the years 2010–2022 and show that despite a doubling of the federal budget, the number of homeless people remained largely unchanged. The case of homelessness is referred to by Mazzucato (2021, p. 92) as an example of an area where it would be desirable to implement a MOIP. Other scholars have referred to homelessness as a "wicked problem" (Brown et al. 2013) and as a "grand challenge" (Henwood et al. 2015), also making the case suitable for study.

The US program to reduce homelessness seems to fit the definition of a MOIP. The government took an active role, involving the private sector and a wide range of nonprofit organizations to lead the sector toward four tangible goals. The government agency USICH (United States Interagency Council on Homelessness) was put in charge of the mission to eradicate homelessness. As stipulated in the literature on MOIPs, USICH sought to involve many actors, seeking broad collaboration across sectors and applying an evidence-based approach. Its goals were clearly defined: end chronic homelessness in 5 years; prevent and end homelessness among veterans in 5 years; prevent and end homelessness for families, youth, and children in 10 years; and set a path to ending all types of homelessness.

Although funding was doubled, the progress was minor. The annual budget reached USD 7.9 billion in 2022, which amounted to USD 13,500 per homeless person. If each homeless person had received this amount of money instead, it would have been more than enough to secure accommodation and thereby end homelessness. The mission design was justified by invariably referring to it as "evidence based." Such persistent use of a term that signaled objectivity and reliability made it possible for stakeholders and policymakers to ignore the lack of progress. The

chapter provides a contemporary example of a mission where all criteria for a MOIP are fulfilled and federal expenditures were greatly expanded, but the outcome still fell short.

In the next chapter, "The cost of missions: Lessons from Brazilian shipbuilding," André Cherubini Alves (2024) presents an in-depth case study of the Brazilian shipbuilding industry and the government's attempt to revive it in the 2000s. The chapter covers various aspects of the political and economic forces that lead up to one of the largest scandals in Brazil's modern history. Alves notes that industrial policy and innovation policy have often played a more interventionist role in developing countries as attempts have been made to leapfrog economies to a higher level of prosperity. He makes a distinction between old and new MOIPs, stating that the former is more of a technology-driven top-down approach pursued by experts. Here, control is centralized, and participation is more narrowly defined. In contrast, new MOIPs are defined more in terms of grand challenges, and there is more room for various stakeholders to take part in the mission.

Attempts at reviving the country's shipbuilding sector were triggered by the discovery of vast oil reserves in the deep waters off the Brazilian coast. The government sought to mobilize actors and resources from the entire economy into efforts to reach a globally competitive position in this industry, but the high expectations were not reached in the end. While Brazil already had an established shipbuilding industry in the 1950s, it had declined in the 1970s and 1980s due to mounting competitive pressure. The discovery of deep-sea oil reserves triggered a demand for advanced oil rigs. As Petrobras intended to buy these from foreign firms, labor unions put pressure on President Lula da Silva—eventually resulting in acquisition from domestic sources instead. In the following years, the government put in place a wide range of support policies largely targeting domestic suppliers.

As investments and enthusiasm grew across the Brazilian economy, these efforts were increasingly referred to as the "space race" for Brazil. Large government-led programs were put in place, including the National Program for Mobilizing the Oil & Gas Industry (PROMINP), which sought to maximize the participation of domestic firms. More regulations and programs were implemented to accelerate the process. In 2007, a Program for Growth Acceleration was initiated, giving special priority to the shipbuilding industry. At the same time, the National Oil Regulatory Agency imposed laws requiring certain minimum levels of local content in the goods and services developed. In short, the MOIP drifted into a political and economic context where interest groups demanded protectionist measures that prioritized Brazilian firms and employees, thus barring procurement from the world's best suppliers. Brazilian firms received support, obtained cheap loans, and were encouraged to participate in the supply chain.

The industry grew rapidly: Employment in shipbuilding increased from 1900 in 2000 to 46,500 in 2009 and peaked at 82,500 in 2014. Following several corruption scandals, the number of employees in the industry fell rapidly to 46,000 by 2016. Alves argues that it takes time and effort to build capabilities in a certain sector and as the country's shipbuilding industry had deteriorated, the capabilities could not match the massive support the industry received from policymakers.

The fact that the government's mission to revitalize shipbuilding resulted in major corruption scandals related to various contracts and suppliers also highlights the question of how MOIPs affect the initiating country's institutional quality. Large-scale missions, implemented under political and economic pressure to expand and grow rapidly, may create fertile soil for corruption.

In the chapter entitled "You can't develop what you don't know: The realities and limitations of foreign aid missions," Kathryn Waldron and Christopher J. Coyne (2024) apply Mazzucato's seven principles for mission design to foreign aid. Reviewing extant research on this subject, they identify two primary categories of challenges: knowledge problems and political economy problems, i.e., incentive distortions in the economy. The authors illuminate how foreign aid gives rise to several destructive incentives and related behaviors where (p. 200) "individuals and firms choose to compete for political favors, diverting resources better used elsewhere and rewarding corruption for those in positions of power over how foreign assistance is spent."

As MOIPs often contain various elements of soft loans, targeted subsidies, or grants earmarked for specific causes, it is important to discuss in what ways such funds affect incentives and behavior. Previous research has shown how innovation grants trigger the emergence of subsidy entrepreneurs, i.e., companies that systematically exploit such grants. Such firms have been found to have lower productivity and not be more innovative than other businesses (Gustafsson et al. 2020).

Foreign aid results in several other forms of destructive opportunism, and Waldron and Coyne describe how foreign aid funds and disasters result in an "NGO scramble" (Cooley and Ron 2002, p. 26), meaning that NGOs focus on those disasters that receive extensive media coverage and that they exaggerate and act opportunistically to obtain more funds, at times creating "disaster hype." The authors also point out that organizations in charge of implementing foreign aid programs may grow and suffer from poor governance; they quote the former World Bank managing director Jessica Einhorn (2001, p. 22) that the World Bank's "mission has become so complex that it strains credulity to portray the bank as a manageable organization."

Related to these observations, Waldron and Coyne point out that, under these circumstances, outcome-based budgeting faces an inherent risk to (p. 203)

> simply grow relatively unchecked regardless of whether the benefit is greater than the cost. Exacerbating the issue is the fact that government bureaus must spend down their yearly budgets in order to justify receiving additional funding in the next year.

Consequently, decision-makers face few incentives to reduce or remove funding from any projects, even in those cases where costs outweigh benefits by a substantial margin. Policy recommendations from Mazzucato and other scholars to pay little attention to costs may therefore end up legitimizing budget overruns, deficits, and sunk cost fallacies.

Laudatory Self-Evaluations by Government Agencies

In the chapter "A public choice perspective on mission-oriented innovation policies and the behavior of government agencies," Rickard Björnemalm et al. (2024) open up the black box of government agencies in charge of allocating funds to MOIPs. The authors draw on Muldoon and Yonai's (2023) work to apply public choice theory to the analysis of industrial policies. According to Muldoon and Yonai (2023, p. 3), Mazzucato's work on the entrepreneurial state depicts the government as "a dynamic, thoughtful body that makes decisions based on relevant information."

Björnemalm et al. (2024) set out to explore the behavior of these government agencies that are assumed to be both competent and altruist. This is done by taking a closer look at three government agencies concerned with innovation and renewal in Sweden: Sweden's Innovation Agency (*Vinnova*), the Swedish Energy Agency (*Energimyndigheten*), and the Swedish Agency for Economic and Regional Growth (*Tillväxtverket*). Tracking all instances when these three government agencies refer to evaluations of their activities in their annual reports over 10 years, the authors identify 654 occasions where an evaluation is mentioned. Among these references to evaluations, 84 percent were positive, 12 percent were neutral, and 4 percent expressed negative or critical views stemming from the evaluations of these agencies' programs and activities. The Innovation Agency had the highest share of positive statements (92 percent).

At the same time, these agencies ignored and scarcely mentioned evaluations or studies that were critical of their activities. The authors also identified instances where the studied government agencies were making positive statements about projects and programs which had subsequently resulted in failure and scandal. The Sekab case was evaluated by Sandström and Alm (2022); it was financed by the Energy Agency and resulted in controversy surrounding illegal activities and corruption in Africa. Nevertheless, it was referred to in the following way by the Energy Agency (2012, p. 42): "It was an excellent program and a continuation at least on the same level as during the past years is strongly recommended."

Björnemalm et al. also identify several instances where government agencies refer to evaluations which are so positive that they seem difficult to believe. For instance, the Innovation Agency writes in its annual report for 2013 (Innovation Agency 2014) that recipients of their innovation support "increased their turnover and employment more than twice as much as companies in a control group" (p. 40), that certain "companies granted funds attract more capital (14–15 times), increase their turnover (3 times), and the number of employees (2.5 times) more than a control group" (p. 40). Furthermore, the Agency asserts that its innovation support had "increased their turnover 19 times on average between the year of financing and the measurement point in 2012" (p. 11). The findings are in line with public choice theory, as it shows how government agencies act in their own interest. The three studied agencies use positive evaluations to portray their activities in a good light and, at times, to defend themselves against critique while ignoring critical evaluations. Thus, government entities in charge of implementing MOIPs are not

necessarily altruistic and competent. As MOIPs elevate them to the forefront of the economy, policymakers are likely to favor such initiatives and portray them in a favorable fashion regardless of the true results.

Main Takeaways from Parts II and III

The contributions reviewed above shed new light on the risks associated with implementing mission-oriented innovation policies. In the final chapter of Part III, "Learning from overrated mission-oriented innovation policies: Seven takeaways," Magnus Henrekson et al. (2024) synthesize the theoretical arguments and empirical observations in the form of seven takeaways that together call into question the usefulness of MOIPs. These seven takeaways are as follows:

1. Wicked problems cannot be solved through missions.
2. Politicians and government agencies are not exempt from self-interest.
3. MOIPs are subject to rent seeking and mission capture.
4. MOIPs distort competition.
5. Policymakers lack information to design MOIPs efficiently.
6. Government support distorts incentives and creates moral hazard.
7. MOIPs ignore opportunity costs.

These takeaways provide a cogent summary of the findings in Parts II and III, and elsewhere in the literature on missions, innovation policy and political economy concerning the likelihood that MOIPs will not live up to expectations.

The results presented so far in this volume therefore support the conclusions by Foray et al. (2012, p. 1697) who, in a special issue on the topic, wrote that mission-oriented innovation policies "are not the right models for new programs aimed at the challenges we now face." Given the evidence reviewed, and the fact that an increasing number of scholars are becoming critical of MOIPs, it is a cause for concern to watch how MOIPs are being implemented across the world in order to address environmental challenges and health issues such as cancer—particularly given that many of these areas have already been subject to failed missions in the past.

Part IV: Alternative Paths

While Parts II and III of this volume focus on theoretical difficulties and empirical analyses of MOIPs, Part IV is devoted to discussing alternative approaches to innovation and development, showcasing credible alternatives to MOIPS.

Part IV begins with a chapter entitled "The entrepreneurial state cannot deliver without an entrepreneurial society" by Mark Sanders et al. (2024), where they elaborate on Mazzucato's notion of an entrepreneurial state. The authors do not

dispute the importance of the government sector in mobilizing resources in the economy. Certainly, government interventions may result in a short-term boost to innovation and economic growth. But the full economic potential will only be reaped if the institutional framework in society fosters and rewards experimentation and scaling. A dominant entrepreneurial state may block outside challengers and the experimentation necessary for the economy to prosper. Long-term development requires an entrepreneurial ecosystem that facilitates bottom-up entrepreneurship in the private sector. The primary role of the government in this scenario is to provide and continually update the institutional setup to provide the right incentives for all relevant agents, to produce crucial collective goods such as infrastructure, and to subsidize services with large positive external effects such as education and basic research. This prepares the stage for the emergence of an entrepreneurial society.

As valuable and successful innovations and spin-offs often include a significant element of serendipity and many of the benefits that resulted from historical missions were unintended and provoked by challengers from outside, the conditions for acting on opportunities must be favorable and allow for experimentation and failures. The fallacy of hindsight often misleads policymakers to overlook this point, thus overestimating the potential for successfully designing interventions on the drawing board. Sanders et al. conclude that a well-balanced entrepreneurial ecosystem is needed, one that strikes a balance between the private sector's desire for unbridled autonomy and the public sector's instinct to use its powers to steer and control.

In the next chapter, "Overcoming the siren song of central planning," David C. Rose (2024) discusses the human tendency to believe in authoritarian control and central planning. According to Rose, human evolution has made us inclined to believe in authoritarian ruling in small groups. This belief in central planning is naturally transferred to a belief in similar governance structures for larger groups such as entire cities or countries. Rose further notes that humans have a tendency for *control bias*, i.e., an inclination to call for planning and control as the opposite would appear irresponsible. Rose concludes that (p. 283)

> our genes lead us to think that someone or something needs to be in control of society, not just in terms of day-to-day operation, but also in terms of how it evolves. Our genes are right about this for societies that are not much larger than the groups within which they evolved. But now that we live in very large societies, using central planning to efficiently control society is a pipe dream.

Rose develops an alternative to missions and utopian ways of thinking that is ultimately built around morality, primarily moral beliefs that instill duty-based moral restraints. If all individuals in a society are governed by duty-based morals focused on not doing harm to others, we cannot know the outcome of the combined efforts of all individuals, but we can know that it will not be negative. In this sense, morality can help societies overcome genetic biases toward control and central planning.

In the chapter "R&D tax incentives as an alternative to targeted R&D subsidies," Roger Svensson (2024) discusses the advantages of various policy instruments aimed at increasing the rate of innovation. Svensson notes that R&D subsidies are suitable when policymakers want to support a specific industry and when there is a

longer time horizon. However, such support also has downsides: It has administrative costs, distorts competition, and nurtures a culture in which companies expect subsidies. Moreover, the greater share of such subsidies is likely to end up in the hands of large incumbent firms, possibly reinforcing rather than challenging the status quo (Bergkvist et al. 2022). Tax incentives, on the other hand, are neutral regarding both effects on competition and technology. Svensson concludes that MOIPs may distort the competitive process, and because direct subsidies are allocated through an administrative and politicized process, regulatory capture is likely to take place where vested interests end up entrenching their positions and technologies.

In the final chapter, "Bottom-up policies trump top-down missions," Magnus Henrekson and Mikael Stenkula (2024) discuss what they deem to be a more viable alternative to innovation and progress without relying on an interventionist top-down approach. They maintain that MOIPs are based on an overly mechanistic view of innovation and economic growth, downplaying the problems caused by the lack of an altruistic and omniscient political sector.

Echoing what Sanders et al. show in their chapter, Henrekson and Stenkula conclude that a flourishing economy requires a well-balanced entrepreneurial ecosystem and an institutional framework that levels the playing field for potential entrepreneurs while encouraging productive entrepreneurship. Innovative entrepreneurship also requires many other actors—besides the entrepreneur—who are greatly influenced by the reward structure they encounter. To promote an entrepreneurial ecosystem, Henrekson and Stenkula discuss in more detail eight key areas, including taxation and labor market regulations, where appropriate horizontal or bottom-up policy measures can foster innovation. They end the chapter by pointing out that today's economies are highly dependent on a well-functioning process of decentralized experimentation, selection, and screening.

Rather than appealing to policymakers to become bold, visionary, inspirational political entrepreneurs, the contributions in Part IV advocate institutions that direct self-interested individuals to make decisions that increase general social welfare. However, since the emotional appeal of top-down missions as solutions to our most urgent problems is likely to persist, we must continue to inform policymakers and the general public about its risks and our collective tendency to be misled by various biases, including a genetic predisposition to call for planning and control as the opposite would appear irresponsible.

Conclusions and Future Research

Large-scale government programs and interventionist industrial policies are implemented in many Western countries without much critical inquiry. We have also witnessed an unwillingness by leading scholars promoting this strategy to debate the pros and cons of mission-oriented policies (MOIPs) (Hallonsten 2024). Moreover, a shortage of academic studies devoted to how and why innovation

policies, and especially MOIPs, may fail points to a need for a volume that takes a critical look at these projects.

The contributions in this volume explore both ongoing MOIPs and historical examples of large government-led efforts to mobilize society toward achieving certain goals. It also seeks to explain under what circumstances MOIPs may fail, which helps us identify a set of factors that, in combination, point to the risks associated with MOIPs. In light of those experiences, the last four contributions present alternative approaches to accomplishing economic and social development.

Government-led, large-scale attempts to achieve industrial renewal or fulfil various desirable goals have often failed. This volume features several case studies of such failed endeavors, including foreign aid, the Brazilian shipbuilding industry and deep-sea drilling for oil, and the large-scale US government effort to eradicate homelessness. Other examples covered in Henrekson et al. (2024) dealing with the most important takeaways from the theoretical and empirical contributions concern the role of Fannie Mae and Freddie Mac in the global financial crisis, the US War on Cancer in the 1970s, and the Swedish Million Program for housing.

While many of these programs and initiatives were put in place prior to the widespread diffusion of ideas around a mission economy, it is still clear that they were inspired by a mission-oriented logic, often with explicit reference to the moonshot. The Brazilian shipbuilding industry MOIP, which led to the most extensive series of arrests of government officials in the country's history and the imprisonment of President Lula in 2018, was at its inception in 2005 compared to the 1960s US-Soviet "space race" (Alves 2024). Likewise, Mazzucato and colleagues (Hill 2022) describe the Swedish Million Program in hindsight as a success story.

Our findings point to the risks of missions being captured by vested interests. We also observe that such large-scale government initiatives distort incentives and give rise to unproductive entrepreneurship. Subsidies, soft loans, and various targeted support programs aimed at objectives such as homeownership, building inexpensive housing, reducing homelessness, or nation-building provide an opportunity for companies and policymakers to engage in opportunistic behavior as someone else is footing the bill. Several chapters also emphasize that governments cannot set goals and design a credible plan for their accomplishment, as they have neither the ability to aggregate and process the required information nor the know-how to accomplish these goals. The success bias in the broader literature on innovation policy (Kärnä et al. 2022) also seems to characterize the literature on MOIPs (Batbaatar et al. 2024). This volume provides a corrective by taking a closer look at failures and the mechanisms that lead to failure, but it also outlines alternative approaches to accomplishing growth and renewal.

Proponents of MOIPs may criticize our suggested alternative approaches on the grounds that they deny the existence of grand challenges, such as climate change and global health inequality, that can only be solved through MOIPs. We do not deny that those challenges are formidable, but the evidence and theoretical arguments provided in this collective volume suggest that MOIPs are plagued by so many

problems that they even may prove to be counterproductive. Instead, the solutions provided in this volume consist of stepwise, bottom-up improvements and innovations guided by an institutional setup providing "rules of the game" that incentivize the relevant agents to work toward solving the most pressing issues. In effect, the "bottom-up" premise is really the foundational alternative to the "top-down" mission.

We welcome future work that takes a rigorous look at MOIPs in both theory and practice. In addition to the areas for future research highlighted in each chapter, we conclude this introductory chapter by pointing to two broad directions for further work that we deem particularly valuable.

First, several chapters in this collective volume have, to varying degrees, applied a public choice perspective to the study of MOIPs and innovation policy. As noted by Muldoon and Yonai (2023), scholars in entrepreneurship and management have often lacked a coherent body of theory that enables the study of industries and business strategies vis-à-vis the political sphere. Future research on innovation policy and MOIPs could benefit from the application of insights from public choice, robust political economy (Pennington 2011; Lucas 2019), and behavioral political economy (Schnellenbach 2024).

Second, the empirical studies in this volume have not covered MOIPs concerned with transitions to sustainability, notably the so-called "green deals" of various types. The primary reason for not studying such initiatives or attempts at green industrial transformation is that this area is so vast and has grown so quickly over the past decade that it deserves full attention in books or special issues explicitly focused on that topic. Following the publication of this volume, we will invite scholars to contribute to a new collective volume focused on exploring the effects of green deals on firms, industries, and environmental outcomes.

References

Acemoglu, D. (2002). Directed technical change. *Review of Economic Studies*, *69*(4), 781–809.

Aghion, P., & Tirole, J. (1994). The management of innovation. *Quarterly Journal of Economics, 109*(4), 1185–1209.

Alves, A. C. (2024). The cost of missions: Lessons from Brazilian shipbuilding. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 169–189). Cham: Springer.

Batbaatar, M., Sandström, C., Larsson, J. P., & Wennberg, K. (2024). The state of the entrepreneurial state: Empirical evidence of mission-led innovation projects around the globe. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 125–143). Cham: Springer.

Bergkvist, J.-E., Moodysson, J., & Sandström, C. (2022). Third generation innovation policy: System transformation or reinforcing business as usual? In K. Wennberg & C. Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (pp. 201–217). Cham: Springer.

Björnemalm, R., Sandström, C., & Åkesson, N. (2024). A public choice perspective on mission-oriented innovation policies and the behavior of government agencies. In M. Henrekson,

C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 213–234). Cham: Springer.
Borrás, S., & Edler, J. (2014). *The Governance of Socio-Technical Systems: Explaining Change*. Cheltenham, UK and Northampton, MA: Edward Elgar Publishing.
Boudreaux, C. (2022). Tilting the playing field? A discourse on state-directed innovation policy. *Journal of Evolutionary Economics*, *32*(5), 1575–1579.
Brown, K., Keast, R., & Waterhouse, J. (2013). Co-management to solve homelessness: Wicked solutions for wicked problems. In V. Pestoff, T. Brandsen, & B. Verschuere (Eds.), *New Public Governance, the Third Sector, and Co-Production* (pp. 229–244). New York, NY: Routledge.
Cooley, A., & Ron, J. (2002). The NGO scramble: Organizational insecurity and the political economy of transnational action. *International Security*, *27*(1), 5–39.
Cooper, M. (2001). Internet: A life-changing experience. *IEEE MultiMedia*, *8*(2), 11–15.
Coyle, D. (2024). State and markets: Not whether but how. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 31–41). Cham: Springer.
Einhorn, J. (2001). The World Bank's mission creep. *Foreign Affairs, 80*(5), 22–35.
Energy Agency (2012) (*Energimyndigheten*). *Annual Report 2011*. Stockholm.
European Commission (2020). The European Green Deal Investment Plan and Just Transition Mechanism explained. https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24
Faguet, G. B. (2005). *The War on Cancer: An Anatomy of Failure, a Blueprint for the Future*. New York, NY: Springer-Verlag.
Foray, D. (2018). Smart specialization strategies as a case of mission-oriented policy—a case study on the emergence of new policy practices. *Industrial and Corporate Change, 27*(5), 817–832.
Foray, D., Mowery, D. C., & Nelson, R. R. (2012). Public R&D and social challenges: What lessons from mission R&D programs? *Research Policy, 41*(10), 1697–1702.
Freeman, C. (1987). *Technology Policy and Economic Performance: Lessons from Japan*. London: Pinter.
Geels, F. W. (2004). From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory. *Research Policy*, *33*(6–7), 897–920.
Gustafsson, A., Tingvall, P. G., & Halvarsson, D. (2020). Subsidy entrepreneurs: An inquiry into firms seeking public grants. *Journal of Industry, Competition and Trade, 20*(3), 439–478.
Hallonsten, O. (2023). *Empty Innovation: Causes and Consequences of Society's Obsession with Entrepreneurship and Growth*. Basingstoke, UK: Palgrave Macmillan.
Hallonsten, O. (2024). Innovationism and the new public intellectuals. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 77–92). Cham: Springer.
Henrekson, M., Sandström, C., & Stenkula, M. (2024). Learning from overrated mission-oriented policies: Seven takeaways. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 235–255). Cham: Springer.
Henrekson, M., & Stenkula, M. (2024). Bottom-up policies trump top-down missions. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 309–331). Cham: Springer.
Henwood, B., Wenzel, S. L., Mangano, P. F., Hombs, M., Padgett, D. K., Byrne, T., Rice, E., Butts, S., & Uretsky, M. C. (2015). The grand challenge of ending homelessness. Working Paper No. 9. Cleveland, OH: American Academy of Social Work and Social Welfare.
Hill, D. (2022). *Designing Missions*. Stockholm: Vinnova.
Hiltzik, M. (1999). *Dealers of Lightning: Xerox PARC and the Dawning of the Computer Age*. New York, NY: HarperCollins.
Holcombe, R. G. (2018). *Political Capitalism*. Cambridge: Cambridge University Press.
Holcombe, R. G. (2022). Book review: Karl Wennberg and Christian Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy*. *Review of Austrian Economics*, published online.

Holcombe, R. G. (2024). Engineering is not entrepreneurship. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 43–60). Cham: Springer.
Innovation Agency (2014) (*Vinnova*). *Annual Report* 2013. Stockholm.
Juhász, R., Lane, N. J., & Rodrik, D. (2023). The new economics of industrial policy. NBER Working Paper No. 31538. Cambridge, MA: National Bureau of Economic Research.
Kantor, S., & Whalley, A. T. (2023). Moonshot: Public R&D and growth. NBER Working Paper No. 31471. Cambridge, MA: National Bureau of Economic Research.
Kärnä, A., Karlsson, J., Engberg, E., & Svensson, P. (2022). Political failure: A missing piece in innovation policy analysis. *Economics of Innovation and New Technology*, *32*(7), 1037–1068.
Kattel, R., Mazzucato, M., Algers, J., & Mikheeva, O. (2021). The green giant: New industrial strategy for Norway. Report commissioned by Manifest Centre for Societal Analysis. UCL Institute for Innovation and Public Purpose, IIPP policy report (PR 21/01). London.
Kilby, J. S. C. (2001). Turning potential into realities: The invention of the integrated circuit (Nobel lecture). *ChemPhysChem*, *2*(8–9), 482–489.
Kirchherr, J., Hartley, K. & Tukker, A. (2023). Missions and mission-oriented innovation policy for sustainability: A review and critical reflection. *Environmental Innovation and Societal Transitions*, *47*(June), Article 100721.
Kivimaa, P., & Rogge, K. (2020). Interplay of policy experimentation and institutional change in transformative policy mixes: The case of mobility as a service in Finland. SPRU Working Paper No. 2020-17. SPRU Science Policy Research Unit, University of Sussex.
Larsson, J. P. (2022). Innovation without entrepreneurship? The pipe dream of mission-oriented innovation policy. In K. Wennberg & C. Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (pp. 77–91). Cham: Springer.
Lerner, J. (2009). *Boulevard of Broken Dreams. Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed—and What to Do about It*. Princeton, NJ: Princeton University Press.
Lojek, Bo (2007). *History of Semiconductor Engineering*. Berlin and Heidelberg: Springer.
Lucas, D. S. (2019). The political economy of the collaborative innovation bloc. *Review of Austrian Economics, 32*(4), 331–338.
Lucas, D. S., & Boudreaux, C J. (2024). When "what works" does not work: The United States' mission to end homelessness. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 145–168). Cham: Springer.
Lucas, D. S., Fuller, C. S., Piano, E. E., & Coyne, C. J. (2018). Visions of entrepreneurship policy. *Journal of Entrepreneurship and Public Policy*, *7*(4), 336–356.
Lundvall, B.-Å. (1992). *National Systems of Innovation*. London: Pinter.
Mazzucato, M. (2018). *Mission-Oriented Research & Innovation in the European Union: A Problem-Solving Approach to Fuel Innovation-Led Growth*. Luxembourg: Publications Office of the European Union.
Mazzucato, M. (2021). *Mission Economy: A Moonshot Guide to Changing Capitalism*. New York, NY: Harper Collins.
Mazzucato, M. (2022). Financing the green new deal. *Nature Sustainability*, *5*, 93–94.
Muldoon, J., & Yonai, D. K. (2023). A wrong but seductive idea: Public choice and the entrepreneurial state. *Journal of the International Council for Small Business*, *4*(4), 351–361.
Mulgan, G. (2016). Public intellectuals and the vanity trap. Blog post: https://www.nesta.org.uk/blog/public-intellectuals-and-the-vanity-trap/
Murtinu, S., Foss, N. J., & Klein, P. G. (2022). The entrepreneurial state: An ownership perspective. In K. Wennberg & C. Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (pp. 57–75). Cham: Springer.
Nelson, R. R. (1977). *The Moon and the Ghetto.* New York, NY: W. W. Norton.

Nelson, R. R., & Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge: Cambridge University Press.

Noyce, R., & Hoff, M. (1981). A history of microprocessor development at Intel. *IEEE Micro*, *1*(1), 8–121.

OECD (2021). The design and implementation of mission-oriented innovation policies: A new systemic policy approach to address societal challenges. OECD Science, Technology and Industry Policy Paper No. 100. Paris: Organisation for Economic Co-operation and Development.

Pennington, M. (2011). *Robust Political Economy: Classical Liberalism and the Future of Public Policy*. Cheltenham, UK and Northampton, MA: Edward Elgar.

Potts, J. (2015). Financing risky science does not make the State an entrepreneur. *Australian Journal of Telecommunications and the Digital Economy*, *3*(2), 70–75.

Prochaska, L., & Schiller, D. (2021). An evolutionary perspective on the emergence and implementation of mission-oriented innovation policy: The example of the change of the leitmotif from biotechnology to bioeconomy. *Review of Evolutionary Political Economy, 2*(1), 141–249.

Rodrik, D. (2022). An industrial policy for good jobs. Hamilton Project—Policy proposal. Washington, DC: Brookings Institution.

Rose, D. C. (2024). Overcoming the siren song of central planning. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 271–288). Cham: Springer.

Rostand, J. (1990). *Confidences d'un Biologiste*. Paris: Presses Pocket.

Rothwell, R., & Zegveld, W. (1984). An assessment of government innovation policies. *Review of Policy Research*, *3*(3–4), 436–444.

Sanders, M., Stam, E., & Thurik, R. (2024). The entrepreneurial state cannot deliver without an entrepreneurial society. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 259–270). Cham: Springer.

Sandström, C., & Alm, C. (2022). Directionality in innovation policy and the ongoing failure of green deals: Evidence from biogas, bio-ethanol, and fossil-free steel. In K. Wennberg & C. Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (pp. 251–269). Cham: Springer.

Sarasvathy, S. D. (2022). An effectual analysis of markets and states. In K. Wennberg & C. Sandström (Eds.), *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy* (pp. 37–55). Cham: Springer.

Schnellenbach, J. (2024). A behavioral economics perspective on the entrepreneurial state and mission-oriented innovation policy. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 61–76). Cham: Springer.

Schot, J., & Steinmueller, E. (2016). Framing innovation policy for transformative change: Innovation policy 3.0. Brighton: SPRU Science Policy Research Unit, University of Sussex.

Stam, E., & Vogelaar, J. J. (2023). Book review: *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy*. *International Small Business Journal*, *41*(5), 563–566.

Svensson, R. (2024). R&D Tax incentives as an alternative to targeted R&D subsidies. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 289–307). Cham: Springer.

Tagliapietra, S., & Veugelers, R. (Eds.) (2023). *Sparking Europe's New Industrial Revolution: A Policy for Net Zero, Growth and Resilience*. Bruegel Blueprint Series No. 33. Brussels: Bruegel.

Valaskivì, K. (2012). Dimensions of innovationism. In P. Nynäs, M. Lassander, & T. Utriainen (Eds.), *Post-Secular Society* (pp. 129–156). Piscataway, NJ: Transaction Publishers.

Waldron, K., & Coyne, C. J. (2024). You can't develop what you don't know: The realities and limitations of foreign aid missions. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 191–212). Cham: Springer.

Wennberg, K., & Sandström, C. (Eds.) (2022). *Questioning the Entrepreneurial State: Status-quo, Pitfalls, and the Need for Credible Innovation Policy*. Cham: Springer,

Westerman, W. (1999). *Hand Tracking, Finger Identification, and Chordic Manipulation on a Multi-Touch Surface*. Doctoral Dissertation in Electrical Engineering. Newark, DE: University of Delaware.

White House (2022a). Fact sheet: President Biden reignites cancer moonshot to end cancer as we know it. https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/02/fact-sheet-president-biden-reignites-cancer-moonshot-to-end-cancer-as-we-know-it/

White House (2022b). Remarks by President Biden on the Cancer Moonshot Initiative. https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/09/12/remarks-by-president-biden-on-the-cancer-moonshot-initiative/

Yerger Jr, R. H. (2024a). Analyzing the effectiveness of state-guided innovation. In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 95–108). Cham: Springer.

Yerger Jr, R. H. (2024b). Case study on DARPA: An exemplar for government strategic structuring to foster innovation? In M. Henrekson, C. Sandström, & M. Stenkula (Eds.), *Moonshots and the New Industrial Policy: Questioning the Mission Economy* (pp. 109–123). Cham: Springer.

Magnus Henrekson is Professor of Economics and Senior Research Fellow at the Research Institute of Industrial Economics (IFN) in Stockholm, Sweden. He resigned as CEO of IFN in 2020 after 15 years of service. Until 2009, he held the Jacob Wallenberg Research Chair in the Department of Economics at the Stockholm School of Economics.

He received his PhD in 1990 from Gothenburg University with his dissertation *An Economic Analysis of Swedish Government Expenditure*. Throughout the 1990s, he conducted several projects that aimed to explain cross-country growth differences. Since the turn of the new millennium, his primary research focus has been entrepreneurship economics and the institutional determinants of the business climate. In this area, he has published extensively in scientific journals and contributed several research surveys to *Handbooks* in the field of entrepreneurship.

In addition to his academic qualifications, Henrekson has extensive experience as an advisor, board member and lecturer in many different contexts, in both the business and public sectors.

Christian Sandström is Senior Associate Professor at Jönköping International Business School and the Ratio Institute in Sweden. His research concerns innovation policy and the interplay between technological and institutional change. Sandström is one of the editors behind *Questioning the Entrepreneurial State* (Springer). He has published more than 30 papers in peer-reviewed academic journals such as *Technological Forecasting and Social Change*, the *Journal of Technology Transfer* and *Industry and Innovation*.

Sandström wrote his PhD thesis on the topic of disruptive innovation at Chalmers University of Technology (2010). He has been a visiting scholar at the University of Cambridge and ETH Zürich in Switzerland. Sandström has received several awards for his pedagogical skills and is a frequently hired public speaker on the topic of technological change and industrial transformation.

Mikael Stenkula is Associate Professor of Economics and holds a PhD from the School of Economics and Management at Lund University. He received this degree in 2004 with his dissertation *Essays on Network Effects and Money*. After having worked for a year as a lecturer at Lund University, where he taught microeconomics, he joined the Research Institute of Industrial Economics (IFN) in the fall of 2005. His main area of research is entrepreneurship economics.

Stenkula is part of IFN's taxation history project, which has systematically and comprehensively described and analyzed the Swedish tax system from 1862 to the present day. This study is unique

in scope—no equally comprehensive investigation of a national tax system has been conducted for any other country. In addition to the meticulous year-to-year documentation of all relevant details of the tax code, the project aims to examine how changes in the tax system affect the economy by guiding people's choices, particularly how the tax system affects entrepreneurial activity and firm behavior.

He also teaches at the Stockholm School of Economics and serves as the executive secretary of the award committee for the *Global Award for Entrepreneurship Research*, the foremost global award for research on entrepreneurship.