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Industrial policy for sustainable human development in the post-Covid19 era

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

Ferrannini, A., Barbieri, E., Biggeri, M., Di Tommaso, M.R. (2021). Industrial policy for sustainable human development in the post-Covid19 era. *WORLD DEVELOPMENT*, 137, 1-15 [10.1016/j.worlddev.2020.105215].

Availability:

This version is available at: <https://hdl.handle.net/11585/807563> since: 2024-05-10

Published:

DOI: <http://doi.org/10.1016/j.worlddev.2020.105215>

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(Article begins on next page)

Paper accepted to *World Development*

**Industrial Policy for Sustainable Human Development
in the post-Covid19 era**

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DOI: <https://doi.org/10.1016/j.worlddev.2020.105215>

Paper submitted to World Development Special Issue on
“Pandemics, COVID19, and Sustainability and Development”

Industrial Policy for Sustainable Human Development in the post-Covid19 era.

Abstract

National and local societies all around the world are fighting the most dramatic global public health emergency of our time, which has soon become an economic, social and human crisis touching all key dimensions of our lives.

Within an inevitable revamping attention on the need for government intervention to face the challenges raised by the Covid19 pandemic, industrial policy is appearing as a central piece of the puzzle. As production dynamics in every country is highly affected by the crisis, industrial policy is considered part of the response to solve dramatic economic and social problems deriving by extraordinary levels of unemployment, deprivation and poverty.

In this paper, we argue that a turning point on the connection between industrial policy, sustainability and development has been reached, highlighting the need to rethink its theoretical foundations as well as its governance and implementation processes for a new role in our post-Covid 19 societies.

Therefore, the research question underlying this paper deals primarily with the nexus between the debate on industrial policy and its effects in terms of human development, social cohesion and sustainability. For this reason, we attempt at closing the gap between different strands of literature, whose integrated connection leads to a new analytical framework with real-world implications on the role of industrial policy, not only as tool for productive dynamics, but also as a leverage for sustainable human development.

All in all, we aim at contributing to the debate on our post-Covid19 economies and societies in two ways: firstly, by providing a new integrated analytical framework on industrial policy to steer a sustainable structural change of our economies and societies towards sustainable human development; secondly, by identifying preliminary implications on industrial policy governance and implementation, investing in the

accurate and transparent design of industrial policy in the post-Covid19 era.

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Keywords

Covid19 pandemic, Industrial policy, Government intervention, Sustainable structural change, Sustainable Human development

1. Introduction

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4 National and local societies all around the world are fighting the most dramatic global public health
5 emergency of our time, which has soon become an economic, social and human crisis (Guterres, 2020)
6 touching all the key dimensions of our lives. The vibrant international debate on the Covid19 pandemic –
7 and particularly on consequent challenges and opportunities in the medium and long run – has pointed to
8 four arguments that appear central for the discussion about past, present and future trajectories of
9 development and sustainability.¹

10
11 Firstly, there is wide consensus the pandemic is exacerbating several problems of our economies and
12 societies, which were serious and evident well before it (Anand et al., 2020; Fleurbaey, 2020; Mazzucato,
13 2020; Sen, 2020; WEF, 2020a). Increasing inequality within and across countries, multidimensional poverty
14 conditions for millions of people and unsustainability of modern production and consumption patterns have
15 coupled with atrophying in the capacity of state institutions (Acemoglu, 2020), resulted from the policy
16 prescription of neoclassical economics (Chang, 2001 and Reinert, 2012, among others) and their
17 unwarranted reliance in the invisible hand of the market.²

18
19 Secondly, the differential impact of Covid19 in terms of class, generations, social groups, territories and
20 countries is undeniable and it has only begun to reveal itself (Harvey, 2020; OECD, 2020a; Piketty, 2020
21 Stiglitz, 2020). This particularly concerns the most vulnerable social groups and economies that were already
22 at risk (Venkatapuram, 2020).

23
24 Thirdly, the dramatically high human costs inflicted worldwide by the pandemic urge us to make
25 fundamental changes to our economic and social systems (Hepburn et al., 2020; Mazzucato, 2020; Piketty,
26 2020). The current state of emergency offers the opportunity to place social resilience³ and environmental
27 consciousness firmly at the centre stage for decision-making processes, and to redefine the paradigm on the
28 connection between production dynamics, wellbeing and sustainability.

29
30 Fourthly, in a similar vein the pandemic seems offering an opportunity to rethink of “what governments are
31 for” (Mazzucato, 2020), proposing a new and different framing to structure government intervention
32 properly to serve the public interest. Indeed, the magnitude of the crisis has required governments to step in,
33 shouldering more responsibilities to keeping all people, households and businesses afloat (UN, 2020)

1 through substantial targeted fiscal, monetary, and financial measures aimed at containing the spread of the
2 virus, strengthen health care systems, boost confidence and demand, and limit adverse supply effects (IMF,
3
4 2020a; OECD, 2020a).
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6 Within such inevitable revamping attention on the need for public action and government intervention,
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8 industrial policy can be considered a central pillar of the recovery strategies. As production dynamics in
9
10 every country are highly affected by the crisis, industrial policy should be part of the response to solve
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12 dramatic economic and social problems deriving by extraordinary levels of unemployment, deprivation and
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14 poverty. Many national and sub-national governments are clearly promoting actions targeting their
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16 productive sectors to keep economies on ‘life support’ (WEF, 2020a) and to keep intact the economic
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18 infrastructure of society (IMF, 2020a). Moreover, the pandemic is emphasizing the strategic nature of certain
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20 sectors (e.g. health, agrifood, logistics, ICT) and it is forcing a quick shift towards specific types of
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22 production (e.g. health-related devices and services).
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26 In this paper we argue that a turning point on the connection between industrial policy, sustainability and
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28 development has been reached, highlighting the need to rethinking the theoretical foundations of industrial
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30 policy, as well as its design and implementation processes for a new role in our post-Covid 19 societies.
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33 Traditionally, industrial policy has been foremost aiming at enhancing firms’ productivity, sector and
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35 innovation performances, in order to favour productivity and competitiveness, conceiving an implicit trickle-
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37 down approach⁴ about its effect on people and quality of life. Here, we discuss to what extent future
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39 industrial policy can represent a direct leverage to promote sustainable structural changes based on human
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41 development, social cohesion and sustainability, calling back into question the meaning and vision of
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43 development (Seers, 1969; Ingham, 1993) toward which both developed and developing countries strive.
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46 In order to achieve this objective, we attempt at closing the gap between different strands of literature that,
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48 despite having so far evolved separately, provide relevant arguments for a new framing of industrial policy
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50 and call for being integrated in a systematic way. Indeed, we believe that without an appropriate analytical
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52 framework with real-world implications, policy-makers would be left without theoretical foundations
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54 supporting the design and implementation of industrial policy for social cohesion and socio-economic
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56 progress, with the subsequent risk of exacerbating government failures. This represents an undeniable high
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1 concern at times requiring extraordinary interventions to ensure social resilience and measures to protect
2 people, households, ecological systems and business and to steer them towards a new development model.

3
4 The paper is structured as follows. After this introduction, the second section reviews the evolution in the
5 debate on industrial policy and identifies recent discontinuities that are leading to a potential turning point.
6
7 The third section briefly discusses insights drawing from real-world experiences of industrial policy and
8 potential changes in the post Covid-19 scenario. The fourth section presents the six theoretical pillars that are
9 combined, in the fifth section, in a new analytical framework. The sixth section deals with the implications
10 for industrial policy governance and implementation. The last section concludes with final remarks.
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20 **2. The evolution of the debate on industrial policy**

21 22 23 24 *2.1 The industrial policy debate*

25
26 Industrial policy is a wide-ranging concept,⁵ whose long-lasting debate has been firmly rooted in the old
27 arguments for and against government intervention, both legitimized and motivated by an opposite
28 rationality of failures (Chang, 1996; Peneder, 2017). Supporters of industrial policy mould the common
29 rationale of ubiquitous market failures (Bator, 1958) to favour the provision of public goods and the
30 management of externalities, as well as to limit the societal risks deriving from imperfect and incomplete
31 markets and from imperfect and asymmetric information, leading to adverse selection and moral hazard.
32
33 Conversely, opponents of industrial policy stress the arguments of omnipresent government failures,
34 highlighting risks of regulatory capture by partial interests and rent-seekers' pressures, potential government
35 inability to overcome important information asymmetries to properly identify targets and tools to achieve
36 determined goals, and potential internal management problems due to bureaucrats' limited capabilities and
37 personal interests (Tullock, 1967; Krueger, 1974).
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40 In the past decade, the debate has become "far less ideological and thus more productive" (Chang and
41 Andreoni, 2020, p. 325)⁶ and a renewed interest in industrial policy has put it back on the central scene of the
42 academic and policy-making debate in many parts of the world (Cimoli et al., 2009; Bailey et al., 2015;
43 Aiginger and Rodrik, 2020; Chang and Andreoni, 2020; Oqubay et al., 2020). Already before the Covid19
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1 pandemic, a ‘industrial policy rejuvenation’ (Stiglitz et al., 2013) or ‘renaissance’ (Mazzucato et al., 2015)
2 was apparent due, at least, to three reasons.

3
4 Firstly, the widespread recognition that industrialization processes are essential for the transformation of the
5 economy as a whole, and the subsequently growing appreciation of the relevance and pertinence of proactive
6 industrial policies to promote desired structural changes (Bianchi and Labory, 2006, 2011; Chang, 1996,
7 2003; Di Tommaso et al., 2013; Stiglitz and Lin, 2013; UNIDO, 2017) by diversifying and upgrading
8 economies beyond simply freeing up markets (Aiginger and Rodrik, 2020).

9
10 Secondly, the necessity for national and subnational industrial systems to reduce the risks and exploit the
11 opportunities connected to globalisation processes – particularly concerning global value chains and the
12 international division of labour (Mehrotra and Biggeri, 2007; Piore and Sofer, 2011; Pipkin and
13 Fuentes, 2017) – and disruptive technological changes – particularly automatization, digitalization, industry
14 4.0, and the Internet of things (Bailey et al., 2019).

15
16 Thirdly, economic downturns in the aftermath of the global financial crisis and the ensuing Great Recession
17 have partially pushback against the market-fundamentalist approach, which led to mis-investment in the non-
18 tradable sector at the expense of growth-rich tradables (Aghion et al., 2011) and to a limited contribution to
19 delivering long-run, inclusive and sustainable prosperity (Bailey et al., 2015).

20
21 Such revamping interest in industrial policy has two facets.

22
23 On the one side, it represents a sharp departure from the neo-liberal economic model, which had become
24 entrenched in socio-economic policy-making since the late 1970s. According to Reinert (2006), neo-classical
25 economics operates at a level of abstraction that is too high to capture the key factors recognised long ago as
26 responsible for uneven development and polarisation of the world in growing wealth versus growing poverty
27 and inequality. This has been calling for a qualitatively different way of thinking about economic (and
28 particularly industrial) policy. However, Andreoni and Chang (2018) argue that from the mid- 2000s,
29 supposedly original arguments justifying industrial policy are “rather clumsy translations of old ideas by
30 non-Neoclassical schools into the Neoclassical language”, having led to several drawbacks and limitations of
31 such mainstreaming of the industrial policy debate.

32
33 On the other side, long-term analyses have shown that – despite the neo-liberal rhetoric of its opponents –
34 industrial policy has always been all around in high-income countries (including and primarily in the US,

several OECD countries and EU member states), as well as in Asian Tigers and BRICS, whose recent comparative success has given credence to the role of the state in economic development.

Nevertheless, what it is still widely firm about industrial policy implementation is conceiving it as a technical tool to achieve given goals, which are set from the outside of such debate. In other words, for both policy-makers and scholars the salient question is to assess the technical capacity, scale and effectiveness of all types of industrial policies to meet desired objectives. The discussion on these desired societal objectives underlying the design of industrial policy is often overlooked, generally pointing to productivity and competitiveness that in turn would allow for economic growth, higher incomes and socio-economic progress.

2.2 Four recent discontinuities

Relevant discontinuities have recently emerged within the international debate on industrial policy, linked to both theoretical advancements from different perspectives and to the disruptions derived from severe global shocks, such as the 2007-2008 financial crisis and the emergence of the Covid19 pandemic in 2020.

The first discontinuity deals with the scope of industrial policy. Recent conceptualisations and analyses⁷ are increasingly arguing that industrial policy is not just restricted to industrial / manufacturing production, but rather deals with all elements of contemporary production dynamics (including, for instance, agriculture and services and their interdependencies with the industrial sector). Moreover, it broadly points to a whole-of-government understanding of industrial policy to be holistically integrated with other complementary policy strands, such as competition, education and training, environment, research and innovation, health, employment, territorial cohesion, etc. (Aiginger and Rodrik, 2020). These arguments underline ‘systemic industrial policy’ (Aiginger, 2007) as an holistic approach that attends to both demand and supply considerations while encouraging industrial development, and coordinates several policy fields with production processes as its core, while affecting upstream and downstream industries, sectoral change, clusters, and networks (Aiginger and Rodrik, 2020).

The second discontinuity deals with the role industrial policy might have in governing and sometimes driving structural change, which is at the heart of a dynamic process of economic development (Ocampo, 2020). Contributions within the spectrum of new structuralist economics (Lin, 2012, 2017) envisage an explicit role for government intervention to reshape the industrial structure and the organisational

1 configuration of the production system, thus setting economic structures towards a feasible path of structural
2 transformation and making them dynamic and capable of generating new waves of structural change.
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4 However, in this perspective industrial policy is also about governing the complex process of institutional
5 building and change that accompany any process of structural transformation (North, 1990; Aoki, 2002;
6 Chang, 1996, 2003; Di Tommaso et al., 2020a, 2020b).
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10 The third discontinuity deals with overcoming the canonical rationalities of failures to justify or contest
11 government intervention. According to Peneder (2017), the peculiar dependence on rationalities of failure⁸
12 originates in the economists' habit to accept hypothetical perfect states as normative benchmarks, inherited
13 from the canon of static welfare optimization. However, these normative benchmarks are ill defined,
14 especially in the dynamic and open systems of a globalized world (Peneder, 2017), which is a feature made
15 even more evident by the global diffusion of the pandemic since its localized emergence in Wuhan.
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24 The last discontinuity switches the attention from what failure a policy must rectify, to what it aims to
25 achieve. This is introduced by linking the structural transformation of economies to the structural
26 transformation of societies, letting new societal and environmental challenges to raise “questions about
27 industrial policy as it shapes the structure of economic activity more generally” (Aiginger and Rodrik, 2020,
28 p. 3). Undoubtedly, the debate on green industrial policy (Aiginger 2013; Rodrik, 2014; Altenburg and
29 Assmann, 2017) has been at the forefront of this discontinuity, having explored – both in theory and practice
30 – industrial policy options for managing structural change that accounts for both the productivity and the
31 environmental challenges in a harmonised way, overcoming potential trade-offs (Altenburg and Assmann,
32 2017). Indeed, placing environmental sustainability on the centre stage and as a potential driver of growth
33 has led industrial policy by several national governments (Rodrik, 2014; Mathews, 2020) and international
34 organisations (e.g. UNIDO, UNCTAD, UNDP) to increasingly deal with fostering new, clean energy
35 technologies, ultra-low carbon technologies and higher energy efficiency, in order to decouple industrial
36 development from resource depletion, pollution and waste production.
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53 Nevertheless, an integrated and indivisible concept of sustainability has been recently consolidating (Purvis
54 et al., 2019; Biggeri and Ferrannini, 2020), combining environmental concerns and awareness on planetary
55 limits to growth with both people's inclusiveness, equality of opportunities and wellbeing, and with shared
56 and long-term societal prosperity (including, but not restricted to, income growth). This is clearly embedded
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1 in the Agenda 2030 for Sustainable Development (UN, 2015),⁹ which embraces “the so-called triple bottom
2 line approach to human wellbeing” (Sachs, 2012, p. 2206) by balancing the three dimensions of sustainable
3 development, i.e. the economic, social and environmental. Its universality makes it critically relevant both
4 for developed and developing economies to harness the full potential of industry’s contribution for lasting
5 prosperity for all. However, such integrated notion of sustainability does not seem to have been fully
6 reflected yet in the academic debate and in the real-world practices of industrial policy.
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12 If taken together, these discontinuities remark the need for a decisive turning point centred on the recognition
13 that national and sub-national governments can shape the future of their societies by designing and
14 implementing industrial policies able to simultaneously steer a structural transformation of their economies
15 and societies.
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24 **3. Insights from the real-world**

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28 The evolution and discontinuities in the international debate on industrial policy are apparent when looking
29 at the variety of government intervention models on production dynamics long before the Covid19
30 pandemic.
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34 The historical experience of industrial policy in China, the United States, and the European Union is
35 illustrative of the role by governments with regards to industrialization as a more general driver of the
36 transformation of the economy and society in the long-run.¹⁰
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40 In China¹¹, an industrial policy approach characterised by long-term planning and experimentation was
41 envisaged to accompany a gradual shift of the economy and society to a capitalist model with Chinese
42 characteristics, and it is today framed within the ‘Harmonious-society’ vision.¹²
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48 In the US¹³, despite the continuous emphasis on the strengths of free markets in guiding the country’s
49 destiny, industrial policy over time was composed by actions motivated by short-term economic, social, and
50 political necessity, along with more ambitious interventions aiming to achieve more complex structural
51 adjustments and consolidate an American model of the society, as defined by economic powers and interests.
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57 In the EU¹⁴, concerns over production dynamics and de-industrialisation at both aggregate European and
58 member states level¹⁵ within a changing global context have always deserved a central attention, with a
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varying of policy frameworks on industrial policy over time mostly characterised by a mixed approach (i.e. incorporating both horizontal and sector-specific measures). Recent industrial policy in the European Union has embraced – at least in its mandate and statements – a wider societal perspective, leading to the “European Green Deal” (EC, 2019) that shapes the new European industrial strategy to transform EU’s economy for a sustainable future.

These real-world industrial policy practices highlight – and have in common – the four discontinuities mentioned in the previous section. First, the scope of these experiences of industrial policy has definitively gone beyond a primary or unique attention to the manufacturing sector, and it has been centred on stronger integration among different policy fields. Second, it could be argued from these experiences that industrial policy is primarily about promoting and governing structural change in an attempt to reach a number of different economic and societal goals. Third, the rationales supporting these government interventions go well beyond the simple correction of certain failures. Fourth, industrial policy has been often associated with direct government intervention on production dynamics to promote both economic growth and broader development objectives: namely, growth, competitiveness, productivity, but also job generation and environmental sustainability.

Nevertheless, while it is undeniable in these cases industrial policy has been used well beyond market failures’ correction, the ability to fully place human development, social cohesion and sustainability at the very centre of such industrial policies can be questioned (Oqubay, 2020). Such questioning becomes even more urgent in the post-Covid19 era (Anand et al., 2020), as preliminary economic outlooks report the collapse of global activity, uncertain recovery paths, impressive increases in unemployment, rising public and private debt, exacerbated inequality and greater global fragmentation (OECD, 2020b; IMF, 2020b).¹⁶

Among others, the international debate is devoting particular attention to two potential changes in the global industrial and technological landscape.

First, the significant disruptions in GVCs have been amplifying the pre-existing concerns over the continued viability of organizing the production of goods and services through GVCs (Oldekop et al., 2020). On the one side, this is providing stronger support to industrial sovereignty and it may lead to further growing protectionism and nationalism; On the other side, these disruptions are calling for rethinking and improving resilience in global supply chains for the future and reorienting business approaches towards ‘risk

1 competitiveness' (instead of cost-competitiveness) (OECD, 2020c; WEF, 2020b). Whatever the future
2 trends, it is clear the restructuring of value chains will have crucial implications not only for the international
3 division of labour, but also for inclusion and sustainability concerns (Oldekop et al., 2020).

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6 Second, the pandemic has significantly – and in some cases suddenly – accelerated digital transformation in
7 all sectors, showing that advanced technologies and a digital-first mindset to a physical business (whenever
8 appropriate and feasible) are necessary as the global marketplace will require more agile and flexible
9 production systems and supply chains (WEF, 2020c). More in general, data would surely become one of the
10 most significant economic assets, but such an increased reliance on digital assets would also enhance
11 potential issues of digital justice and equity for individuals, firms, communities and countries (Oldekop et
12 al., 2020).

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15 Moreover, some neglected issues in the theory of industrial policy – namely, according to Chang and
16 Andreoni (2020), reliable commitments under uncertainty, learning in production as ultimate driver of
17 industrial dynamics and influence of demand management on the conduct of industrial policy – would
18 become even more central. Their relevance would potentially increase within a global scenario characterized
19 by increased uncertainty for the next future, new trends and power relations in value chain
20 internationalization processes and revamping attention of fiscal and monetary policies to boost the recovery.

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23 Finally, taking into account these potential implications of the pandemic, Oldekop et al. (2020) argue the
24 need for a global development paradigm able to foster a transformative change in all countries towards a
25 more sustainable and equitable world. They highlight that Covid19 adds even more immediacy to face key
26 sustainability challenges and patterns of inequality through a multi-scalar approach, taking into account the
27 interconnectedness of our economies and societies.

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30 However, when combining the common insights from real-world policy practices with the potential
31 implication the pandemic might bring, we observe the partial inability of established theory in explaining the
32 reasons for a wide range of industrial policy interventions to tackle the societal challenges of our present,
33 especially in light of the debate on the post-Covid19 scenario.

4. The theoretical pillars for a new integrated framework

Based on our previous arguments, it appears necessary to build a new analytical framework with real-world implications to rethink industrial policy as leverage for social resilience and human development, in order to simultaneously advance the academic discussion and inform the policy-making debate at all levels.

Going beyond the mainstream theoretical foundations on industrial policy, our framework draws from six streams of literature and approaches, which a) similarly point to a new directionality on industrial policy, but b) have so far been connected to one another only to a limited extent.

Without any intention of exhaustiveness, for each theoretical pillar we highlight those arguments that are pushing the current and future debate towards a stronger connection between industrial policy, sustainability and development to steer the structural change of our societies. As it will be discussed later, our framework starts from well-known theoretical rationales and foundations of industrial policy (which have been increasingly consolidated in the literature as a result of the recent discontinuities in the debate). Then, it combines them – with each playing a specific role and contribution – and it suggests a unifying linkage with a sustainable human development paradigm as a main element of novelty.

4.1 Goals, targets and tools of industrial policy (Th1)

The current international debate on industrial policy is devoting increasing attention to the relation between goals, targets and tools (Di Tommaso and Schweitzer, 2013), which shapes the government ability to effectively translate general objectives in concrete and specific industrial policy programs (Chang, 1994).

The proper choice of particular targets and tools depends first and foremost on the societal goals to be pursued, and this implies discussing and finding a general agreement about the political priorities to be promoted (Di Tommaso et al., 2020a), and ensuring a consistent relation between goals, targets and tools (Di Tommaso and Schweitzer, 2013).

In this regard, the current debate is shaped by the recognition that economic growth is an essential part, but not the entire structure, of development and that the quality of growth matters, because historical evidence has shown there are different types of unsustainable growth: jobless growth, ruthless growth, voiceless growth, and futureless growth, (UNDP, 1996), but also peaceless growth (Fukuda-Parr, 2007) as well as

1 healthless growth, as the Covid19 pandemic has shown. Moreover, a more comprehensive and societal
2 understanding of competitiveness as a driver of Schumpeterian development is gaining momentum, in which
3
4 high real incomes are associated with qualitative changes of the socio-economic system (Peneder, 2017).

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6 However, this scenario opens new puzzles for industrial policy, not least because i) societal objectives risk
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8 being in conflict with one another, showing the existence of potential trade-offs (Biggeri et al., 2019), and ii)
9
10 identifying and selecting particular targets able to respond to societal goals is a controversial issue in any
11
12 policy design process, whose answer is not easy to attain (Di Tommaso et al., 2020b).¹⁷

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14 This already complicated framework becomes even more difficult when considering societal priorities
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16 different from economic growth, such as the ones made evident by the Covid19 pandemic.
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22 *4.2 The new framing of innovation economics and policy (Th2)*

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24 Similarly, within the extensive debate on innovation economics and policy, a new framing on research and
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26 innovation to accelerate transformative changes towards a more sustainable world is emerging.

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28 According to Schot and Steinmueller (2018), a first framing (emerged explicitly after the Second World
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30 War) was based on the premises that science, technology and innovation are the basis for long-term
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32 economic growth (by sustaining improvement in factor productivity) and prosperity. Thus, the promotion of
33
34 public and private R&D – regardless of its focus – through government investments and incentives and the
35
36 commercialization of scientific discovery through intellectual property rights were necessary to overcome
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38 market failures (Nelson, 1959; Arrow, 1962). A second framing (emerged during the 1980s) was based on
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40 the premise that interactive learning processes and strong absorptive capacities are necessary to bridge the
41
42 gap between science, technological discovery and application or innovation. Thus, the building of national,
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44 regional and sectoral systems of innovation through public-private partnerships and university-industry
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46 linkages become the central pillars of innovation policy focused on overcoming system failures (Freeman,
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48 1987; Lundvall, 1992; Etzkowitz, 2008).
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54 Nowadays, a third and new framing on innovation (emerged in the last decade) is based on the argument that
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56 environmental and social goals can be seen as strategic and dynamic drivers of long-term growth and
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58 prosperity, in order to drive the system towards the desired structural dynamics of our economies and
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60 societies. This is coupled with the need to overcoming transformation failures (Weber and Rohracher, 2012),
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1 highlighting that significant advances in technology have not truly resulted in disruptive innovation and
2 systemic change to build more sustainable and inclusive societies for all. Thus, the use of science,
3 technology and innovation for meeting social needs (e.g. ensure public health, ending poverty and reducing
4 inequality in all its forms everywhere) and tackling environmental challenges (e.g. climate change, energy
5 transition and circular economy) gained prominence in policy and academic debate, especially in light of the
6 Covid19 pandemic. Moreover, civil society and citizens became to be conceived not simply as consumers
7 and adopters of innovation, but also as sources of new ideas and solutions, as well as drivers of
8 organizational and business model changes and of new collaborative processes and partnerships for
9 innovation.¹⁸

10
11 A greater directionality in innovation policy fostering a sociotechnical transition towards sustainability is
12 often connected with a mission- or challenge-oriented approach (Mazzucato, 2016), which is operationally
13 translated into new public missions. They sit between broad challenges and concrete projects (Mazzucato,
14 2018), shaping and creating markets – rather than just fixing them – to solve concrete societal challenges
15 (Mazzucato et al., 2019).

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 *4.3 Values and institutions in a social economics perspective (Th3)*

34
35 The literature on social economics¹⁹ and its study of the ethical and social causes and consequences of
36 economic behaviour, institutions, organizations, and policy provides an undeniable support for our analytical
37 framework. Indeed, social economics highlights the relationships between the economy and society, and
38 particularly that “economic values cannot be separated from social values, and that economic relationships
39 are framed by broader social relationships” (Davis and Dolfmsa, 2008, p. 2). Among others, three arguments
40 from this literature have been made apparent by Covid19 pandemic and are worth being highlighted here.

41
42 First, despite the neglect in mainstream thinking about the role of societal values, it is increasingly evident
43 that governments adopt belief systems and values that shape and define their policies, thereby influencing the
44 transformation of their economies and societies (Davis and Dolfmsa, 2008).

45
46 Second, it is fundamental to problematize and engage with the notion and role of the state in economic and
47 societal processes, also by overcoming the separation between the public and the private sphere

(Dannreuther and Kessler, 2008) towards a systemic and evolutionary institutionalism perspective (Elsner, 2014).

Third, social economics scholars devote attention on what economic conditions are mandatory for a good society and how can they be achieved, along with how different social institutions contribute to a sustainable, just, and efficient economy. This argument points to a crucial challenge about industrial policy in our current time, that is finding ways to ensure that government intervention is effective and efficient in pursuing societal goals, recognizing that the problem is not *whether* to intervene, but *how*.

4.4 *The political economy of industrial policy (Th4)*

The discussion on how to intervene – or, in other words, how to design industrial policies – clearly calls the political economy perspective²⁰ into our framework, as it has long casted doubts on the idea that “social improvement may derive from a preordained tendency towards social advantage or improvement rather than from purposeful human organization” (Reinert, 2018, p. 137), as emerged through an historical approach to political economy.

Therefore, greater consideration to the structural political economy approach (Cardinale, 2018) and the dynamics of decision-making processes shaping industrial policy should be paid in each context (Andreoni, et al., 2019).

Firstly, industrial production systems should be conceived as multi-layered arrangement of interdependencies among a plurality of networked productive units, organisations and institutions, which shape and lead the structural process of production transformation (Andreoni et al., 2019; Landesmann and Scazzieri, 2012a and 2012b). This means that – as Simon (1951) notices – production organisations, not markets exchanges, are the main structures in which people (i.e. the polity and the society) are embedded and, therefore, that the governance of these organisations and systems are critical in guaranteeing their reproduction, inclusiveness, and sustainability (Andreoni et al., 2019).²¹

Secondly, industrial policy analyses cannot be reduced to a mere ‘technical problem’ within a market economy framework, with little (or no) attention – most often due to simplistic ‘good governance’ and ‘good business environment’ agendas – to any contextual and political economy considerations (Andreoni and

1 Chang, 2018), including the feasibilities of certain types of structural transformation and appropriateness of
2 target priorities by governments.

3
4 Thirdly, framing industrial development as a political economy process (Kalecki, 1976) leads to recognising
5 the political determination and dynamics of economic institutions and policies, which reflect choices made
6 by the society at large or by some powerful groups in the society (Sen, 2013). In any specific industrial
7 policy-making process we should increasingly appreciate the politics that lies behind policy processes,
8 incorporating a sense of the power relations that shape the complex relationships between key players within
9 a country's development policy process (Hickey, 2005). Indeed, these players may organise themselves to
10 exercise their agency in order to protect and promote their interests, which may not necessarily be aligned to
11 an envisioned structural change. In this regard, the political settlements framework (Khan, 2017, p. 639)
12 argues "the distribution of power across organizations affected by particular institutions was usually the most
13 important determinant of the path of institutional change, and the effectiveness of particular institutions."
14

15
16 Therefore, the conflictual aspects of institutions and the conflictual nature of the social transformations
17 should not be ignored. In particular, industrial policy undeniable involves (and opens) manifest and latent
18 conflicts – even more than other policies due to its selectivity nature (Chang and Andreoni, 2020) – that
19 shape how the policy itself, and the society at large, should be organised (Hickey, 2005). Therefore, the
20 political space of interests, power relations and conflicts underlying industrial policies should become the
21 key focus, and the management of conflicts should become a central feature for its successful design and
22 implementation (Chang and Andreoni, 2020), in order to avoid potentially reinforcing horizontal inequalities
23 among social groups, classes and communities due to asymmetries in power structures and struggles.
24

25
26 From these arguments, it follows that industrial policy is also about governing the complex process of
27 institutional building and change that accompany any structural process of production transformation.
28

29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 *4.5 Structural change of the economy and society (Th5)*

52
53 The analysis of the change in the economic and societal dynamics governed by industrial policy is today
54 expanding. In particular, a new light is shed by the debate on structural change, by combining theory of
55 configurations and dynamics of structural constraints and opportunities, with history of human and policy
56 actions driving the economies and societies along a specific trajectory.
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1 Theories of structural change²² explain how economic dynamics entails changes across system components,
2 among which the centrality of production processes is pivotal. Recent contributions in the theoretical debate
3
4 (Cardinale and Scazzieri, 2018; Quadrio Curzio and Pellizzari, 2018) argue that structural change is to some
5
6 degree open-ended, because existing structures open up a range of possibilities, but do not determine the
7
8 specific actions taken therein.
9

10 In this regard, Luigi Pasinetti's 'separation theorem' (2007) distinguishes between a fundamental level of
11
12 investigation that addresses the persistent and general features of an industrial economy, and a level of
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14 investigation addressing features of economic structures that are more contingent and likely to reflect
15
16 specific historical and institutional contexts. Such a distinction highlights the open-endedness of structural
17
18 constraints and the plurality of trajectories the economy may follow subject to any given set of productive
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20 interdependencies and institutional conditions, and depending upon the human actions (primarily including
21
22 industrial policy) undertaken to drive the economy along a specific trajectory (Quadrio Curzio and Pellizzari,
23
24 2018).
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28 In other words, interdependencies bring about a range of *feasible transformations*, which human actions may
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30 or may not take up depending on actors' objectives. Therefore, any explanation of structural change is bound
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32 to remain open-ended ex ante, because it is the manifold actions on which it is based that will activate a
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34 given path of change out of the many that are made possible by economic structures (Cardinale and
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36 Scazzieri, 2018; Landesmann, 2018).
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40 Structural change is then what defines in the end a process of economic development, which unquestionably
41
42 drives structural transformations in societies.²³ In this perspective, promoting economic development means
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44 encouraging the structural change of economies governing the interrelated structural change of societies (Di
45
46 Tommaso et al., 2020a, 2020b). It is undeniable that processes of industrialization or servitization radically
47
48 change the structure of the economy, but it is equally undeniable that they also modify the shape of the
49
50 underlying society (UNIDO, 2017). These transformations change the living conditions of individuals,
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52 communities, cities and regions, nations. They produce radical modifications in individual and social
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54 behaviours, which also drive fundamental alterations in people's needs and demand for goods, services and
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56 rights.
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4.6 *Capability approach and Human Development (Th6)*

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2 The last theoretical pillar provides a vision and direction for the structural transformation of the society
3
4 industrial policy may contribute to. Indeed, the Capability Approach and Human Development paradigm²⁴
5
6 has been central in robustly challenging a mainstream vision of development, distinguishing between the
7
8 means and goals and thus questioning the vision of development in itself, its institutions and its processes.
9

10
11 The Capability Approach proposes a fundamental shift from concentrating on the means of living to the
12
13 actual opportunities of living in itself, that is, human flourishing in terms of expanding the capabilities of
14
15 people to lead the kind of life they have reason to value. In other words, being a people-centred approach
16
17 derived from an agency-based and opportunity-oriented theory, it contributes to the conceptualization of the
18
19 multidimensionality of development, and thus people's real freedoms in daily life are central to the
20
21 development process.
22

23
24 It is important to remark that, since the seminal the contributions by Amartya Sen, the capability theories
25
26 (Robeyns, 2016) have experienced an evolution over time, being still rooted in the theoretical foundations of
27
28 the approach, but having also moved forward to further expand its original contribution to development
29
30 thinking. Above all, several capability scholars²⁵ have contributed to overcoming the CA's excessive
31
32 individualism and non-negotiable liberalism, by offering methodological, ontological and ethical arguments,
33
34 arguing for greater attention to groups and collectivities, their capabilities, the structures of living together, in
35
36 favour of a more communal ethos.²⁶
37

38
39 Similarly, the implications of the capability approach have gone beyond social policies, offering insights also
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41 to production processes (Mehrotra and Biggeri, 2005 and 2007) and innovation systems (Capriati, 2017),
42
43 among others. According to both theoretical advancements and empirical evidence, it is clear that, on the one
44
45 side, human development is deeply affected – both positively and negatively – by production dynamics; and,
46
47 on the other side, expanding human capabilities, agency and empowerment requires dealing also with
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49 industrial development processes. In particular, industrial development and industrial policies are not neutral
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51 in terms of human development outcomes, as they deeply affect – either positively or negatively – the
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53 expansion of human capabilities.
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57 This argument may lead to the identification of different trajectories of industrial development based on the
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59 interrelation between the economic and the social / environmental dimensions. In this regard, Mehrotra and
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1 Biggeri (2005 and 2007) highlight the existence of different *roads* to industrial development, by including
2 the often-neglected dimensions of social outcomes and environmental protection (such as social protection
3 and quality of labour conditions offered in industrial systems). For instance, when many workers receive no
4 social protection and may be exposed to deep health risks, and/or when informal activities are pervasive,
5 industrial development processes might follow a path opposed to human development. Such perspective
6 indicates that social outcomes, which include access to basic social services, social integration and
7 participation and environmental protection, need to be complemented and not deflected by collective
8 economic efficiency in industrial processes in order to obtain high levels of human development (Biggeri
9 and Ferrannini, 2014; Biggeri, 2020).

10 11 12 13 14 15 16 17 18 19 20 21 22 *4.7 A new integrated framework*

23 All these different streams of literature are yet to be systematically connected and integrated in a new
24 analytical framework with operational policy implications. Despite their respective theoretical roots
25 belonging to different and often separated schools of thought, we have shown that relevant common
26 arguments on the connection between industrial policy, development and sustainability have emerged from
27 their different angles.

28 From the increasing debate on the goals, targets and tools of industrial policy (Th1), we learn the importance
29 of ensuring their coherence and consistency to pursue value-based societal priorities. The emerging new
30 framing on innovation policy (Th 2) underlines the need to continuously expand knowledge and innovation
31 capabilities to promote sustainable and inclusive societies by tackling economic, social and environmental
32 challenges. The literature on social economics (Th3) highlights that governments necessarily adopt values,
33 which shape and define the essence of their policies and the capacity of different social institutions at
34 contributing to a sustainable, just, and efficient economy. From the political economy perspective (Th4), we
35 learn the need of a careful consideration of economic, political and social conditions, as well as the
36 importance of the (re)combination of partial interests into a systemic interest underlying industrial policy.
37 From the structural change literature (Th5), we understand that promoting economic development means
38 encouraging the structural dynamics of economies, while governing the interrelated structural changes in the
39 living conditions of people, communities, cities, regions and nations. The human development paradigm

1 (Th6) emphasises that industrial development and industrial policies are not neutral in terms of direct and
2 indirect social and environmental outcomes, and that the increase of economic effectiveness in view of
3 systemic objectives should be primarily directed to expanding human capabilities and ensuring
4 environmental protection.
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7
8 Therefore, each stream of literature plays a specific function in our framework, as represented in Figure 1.
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13 *[INSERT FIGURE 1 HERE]*
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17 Therefore, the convergence of these arguments let emerge the main novelty of our framework, i.e. a new
18 directionality for industrial policy in the post-Covid19 era to contribute to promote social resilience and
19 tackle a variety of societal challenges through an expanded role beyond productivity and growth
20 enhancement, which needs to be discussed in details.
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27 28 **5. Combining technical, functionalist and normative perspectives on industrial policy** 29 30

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33 The connection among the theoretical pillars described in the previous section paves the way for conceiving
34 industrial policy through an integrated framework composed by:
35
36

- 37 a) a *technical* perspective on its role as government intervention on production dynamics to pursue
38 given goals;
39
- 40 b) a *functionalist* perspective on its role to ensure the sustainability of the structural change of the
41 economy and society;
42
- 43 c) a *normative* perspective on its role to pursue sustainable human development.
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48 The technical perspective has been the prevalent understanding of industrial policy in the long-lasting
49 academic debate, which has engaged with the effectiveness and efficacy of different tools and the
50 appropriateness of different targets, thus mostly focusing on the technical implementation of industrial policy.
51
52 However, we argue that the functionalist and the normative perspectives deserve more attention for industrial
53 policy to decisively influence the trajectory of economic and social development of any national (or sub-
54 national) system, as well as to contribute to collective and shared efforts for global development (Oldekop et
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1 al., 2020). In this regard, the integration of the technical, functionalist and normative perspectives is
2 fundamental for a turning point on industrial policy, avoiding a detrimental separation and misalignment
3
4 between them.
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8 *5.1 Functionalist perspective on industrial policy*

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10 In order to define industrial policies able to address societal challenges at all levels, stronger attention should
11 be paid to the sustainability of structural changes, avoiding increasing vulnerabilities, fractures and
12
13 inequalities that may hamper the sustainability of industrial development processes themselves.
14
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16
17 In this regard, Di Tommaso et al. (2020a) refer to the notion of ‘sustainable structural change’ as a process of
18 medium- and long-term change in the relative proportions between sectors of the economy, which entails
19
20 adjustment phases of the economic and social structures,²⁷ without compromising the proper functioning of
21
22 the system. As in triple bottom line approach to human wellbeing (Sachs, 2012) underlying the 2030 Agenda
23
24 for Sustainable Development (UN, 2015), the sustainability of structural change should thus be assessed
25
26 keeping into equal account its three dimensions: the economic, social and environmental. From the economic
27
28 standpoint, sustainable structural change could therefore be associated with a path of economic growth,
29
30 whereby productivity gains in one sector release productive resources for the emergence of other sectors.
31
32 From the social standpoint, sustainable structural change occurs by preserving the integrity of the social
33
34 system, namely by acknowledging potential vulnerabilities and governing possible fractures and divergence
35
36 of interests that could make the system inoperative with respect to overall societal and collective goals. From
37
38 the ecological standpoint, sustainable structural change should generate a scale of production that does not
39
40 hamper the capacity of ecosystems natural resources to continuously regenerate themselves, avoiding
41
42 environmental collapses, permanent losses and damages.
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48 To put it briefly, in this functionalist perspective industrial policy should be considered as a powerful tool for
49
50 governing structural changes in view of systemic objectives, influencing the development trajectory in a way
51
52 such that economic transformations occur without causing the collapse of the entire socio-economic system
53
54 potentially due to environmental, social or economic vulnerabilities among a plurality of interconnected
55
56 dynamics. Successful government intervention on production and industrial dynamics must be able to
57
58 acknowledge and mitigate the potential (ecological, economic and social) threats to system sustainability that
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1 could characterize the process of structural change. In this view, the main contribution of industrial policy is
2 enhancing the system's overall ability to evolve in the long run and maintaining a well-functioning and
3
4 dynamic socio-economic system (Peneder, 2017).
5
6
7

8 *5.2 Normative perspective on industrial policy*

9

10 The relevance of this functionalist perspective has surely been enhanced by the social and economic collapse
11 of several economic systems due to Covid19. Yet, pursuing a sustainable structural change may not be
12 sufficient in the absence of a unifying and underlying vision of the state of the economy and society to be
13 achieved. Indeed, the pandemic has made evident both the importance of expanding human capabilities and
14 enabling their effective realization into achieved functionings, as well as the priority of public health,
15 freedom of movement, social and family relations, decent work, good housing conditions, quality education
16 and clean environment.
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26 Therefore, in a normative perspective, a new set of principles shaping objectives, targets and tools for
27 industrial policy are needed in order to steer the evolution of the economy and the society “towards activities
28 that are desirable in economic terms (improving efficiency), in social terms (addressing needs and reducing
29 inequality), in environmental terms (assuring sustainability and preventing climate change)” (Pianta et al.,
30 2016, p. 6). This recalls the long-lasting debate on the meaning of development in terms of goals and
31 processes (Seers, 1969; Myrdal, 1970; Ingham, 1993) towards which countries strive by means of both
32 public and private strategies and actions.
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42 In our view, the sustainable human development paradigm offers a solid base for this normative perspective
43 on industrial policy, being composed by four pillars on an equal level (Haq, 1995):
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45

- 46 i) Equity, in terms of political, economic, social and cultural opportunities, as well as distribution
47 and cohesion;
48
49
- 50 ii) Participation and empowerment, conceived as being an active individual and collective agent of
51 one's own future;
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53
- 54 iii) Sustainability, concerning equal intergenerational opportunities in environmental, social and
55 economic terms;
56
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- 58 iv) Productivity, pursuing an efficient use of local resources within production systems.
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1
2 In this paradigm, the lives of human beings – that are the agents, beneficiaries and adjudicators of progress –
3 and the sustainability of our societies in terms of *Planet, People, Prosperity, Peace* and *Partnership* (Sachs,
4 2015; UN, 2015) should be the ultimate concern for any government intervention at all levels (Biggeri and
5 Ferrannini, 2014), aiming at creating “a conducive environment for people, individually and collectively, to
6 develop to their full potential and to have a reasonable chance of leading productive and creative lives that
7 they value” (UNDP, 1990, p.1). Thus, policy interventions should focus on those factors that can lead to
8 improve productivity and value-added enhancing processes while reducing inequalities and addressing the
9 environmental tipping points at the same time (Schwab, 2019).

10
11 It follows that prosperity should no longer to be confused with the narrow and exclusive goal of economic
12 growth, nor that economic expansion would automatically deliver benefits for all. Rather, a wider notion of
13 societal (shared) prosperity grounded on a vision of sustainable human development – including, but not
14 restricted to, the economic well-being of people – should be embraced in the design, implementation and
15 evaluation of industrial policy in the post-Covid19 era.

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 *5.3 From systemic to collective interest*

32
33 The difference – yet also complementarity – between the functionalist and the normative perspective on
34 industrial policy is paralleled by the distinction between systemic and collective interest.

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36
37 On the former, systemic interest is a property of any system (e.g. regional, national or supranational) in
38 which “interdependencies are such that each interest group has to consider the preservation of the system in
39 order to effectively pursue its own interest” (Cardinale, 2015, p. 203). Indeed, there are multiple ways in
40 which the different and sometimes diverging partial interests of individuals and groups can find an
41 expression compatible with the vital conditions and viability of the system, being able to compromise on
42 suitable weights within the range of configurations compatible with systemic interest (Cardinale and
43 Scazzieri, 2020). Nevertheless, keeping the system viable is a necessary condition for each group’s and
44 stakeholder’s pursuit of its own interest, but it does not (necessarily) reflect a normative commitment to
45 some definition of collective interest (Cardinale, 2018). In other words, the systemic interest may not favour
46 a structural change towards a certain vision of development and it does not (typically) dictate a specific
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1 policy. On the contrary, it specifies a range of proportions: it is a constraint on possible outcomes, and is
2 therefore (in principle) compatible with a plurality of policies (Cardinale, 2018).

3
4 On the latter, collective interest should be conceived in terms of a set of societal objective to be pursued after
5 identifying systemic interest and its multiple possible realizations depending on the weights assigned to
6 different partial interests (Cardinale and Scazzieri, 2020). The proper definition of an industrial policy
7 requires considering the existence of multiple societal objectives, that are based on values, i.e. depending on
8 the model of society that each community (either supranational, national or regional) desires to pursue, and
9 are supported by different partial interests within a society (e.g. by territories, sectors, classes, generations,
10 etc.) that need to be recombined in a collectively shared vision.

11 Therefore, a normative societal vision would express the society's fundamental constitutive values and
12 meaning of development and its systemic interest and, along with influences external to the system – such as
13 a global development paradigm, global flows of resources and ideas, geopolitics relations – that potentially
14 shape it from the outside.

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 **6. Implications for industrial policy governance and implementation**

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35 As remarked, government failures can be even more dangerous when industrial policy is conceived in a more
36 comprehensive way (Di Tommaso et al., 2020a). It is therefore important to embed the discussion on
37 industrial policy governance and management within a comprehensive theoretical framework ensuring full
38 understanding of the conditions for the coherence and effectiveness of policy interventions.²⁸

39
40 In particular, in this paper our final attention is devoted to industrial policy governance and implementation
41 because: i) they are concerned respectively with creating the conditions for collective action (Olson, 1965;
42 Ostrom, 1990) and making it operational, by extending engagement and commitment to all societal actors; ii)
43 they incorporate an understanding of the multiple loci, layers and levels of action and kinds of variables that
44 can be expected to influence both production dynamics and societal challenges; and iii) their combination
45 makes apparent the link between the 'cognitive act' of formulating what needs to be done and the act of
46 managing its concrete deployment (Hill and Hupe, 2002).

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1 policy will depend on how the power relationships and conflicts (among social groups, firms, forms of
2 capital, countries) will create and support ‘productive coalitions’ willing to invest in the enhancement of
3 collective productive capabilities to make development processes more sustainable and inclusive, for the
4 sake of both systemic and collective interest.
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8 Therefore, attention should be paid in each context by analysing the specific structural, organisational,
9 institutional and political economy features of production systems (including their functioning and
10 evolution); the interdependencies between industrial sectors and filiéres, as a proxy for the interdependencies
11 of interest groups; and how multiple interests, conflicts and powers shape the political economy dynamics
12 leading to multiple possible realizations of systemic interest.²⁹
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19 As highlighted in Figure 2, industrial policy governance and implementation must be at the centre of a policy
20 framework shaped both by a normative societal vision and a new understanding of industrial policy
21 economics, political economy, and management as derived from their respective disciplines, as well as by
22 shocks and changes emerged within and outside each economic and social system.
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31 *[INSERT FIGURE 2 HERE]*
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35 Therefore, keeping into account the pillars and components of our framework, some implications for
36 industrial policy governance and implementation can be derived.
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42 *6.1 Co-determination of societal vision and objectives*

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44 The primary implication is the co-determination of a normative societal vision and its related objectives for
45 industrial policy. Indeed, the discussion of societal objectives and the identification of strategic priorities in
46 our economies and societies consistent with such normative vision requires concrete mechanisms for
47 participatory governance and collective appraisal, involving a wide set of actors within our societies. This
48 appears coherent with the modern shift from ‘government’ to ‘governance’ underlying any policy process
49 (Hill and Hupe, 2002) that has overcome simplistic hierarchical models. Furthermore, it embraces the recent
50 understanding of industrial policy as a design process (Rodrik, 2004; Aiginger and Rodrik, 2020), based on
51 an intensive dialogue and coordination between different stakeholders (such as government, industrial and
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1 trade-union interests, social actors), which highlight the respective opportunities and constraints, opening to
2 new solutions, experiments, and collective learning.

3
4 Any country (or region) wishing to design industrial policy for sustainable human development must then
5
6 foresee specific mechanisms devoted to discussing with key actors the societal priority challenges to be
7
8 addressed and goals to be achieved. Whatever the mechanisms, what is crucial is that different stakeholders
9
10 are called to contribute to this vision-building process to pull a systemic industrial policy (Aiginger, 2014)
11
12 and coalition-building approach to ensure a broad mobilization (Rodrik and Sabel, 2019), including the
13
14 academia, think-tanks, workers' and business' representatives, civil society organizations, and so forth. By
15
16 managing power struggles and conflicts that may emerge in a participatory formulation of industrial policy
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18 vision and objectives, it is possible to limit regulatory capture, as well as information asymmetries, which
19
20 may seriously hamper government's effectiveness in driving sustainable structural change.
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28 *6.2 Institutional arrangements for civic engagement and voicing capacity*

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30 As stressed by the political economy of industrial policy, enabling these processes and mechanisms for the
31
32 discussion of societal objectives and priorities implies investing in civic engagement and voicing capacity by
33
34 all social and economic groups and stakeholders, representing different interests. Indeed, certain social
35
36 groups potentially carry interests on industrial policy but do not necessarily organise themselves to influence
37
38 policy-making processes (Cardinale, 2018). Moreover, certain aggregations (e.g. industries, sectors,
39
40 territories) may not recognise the strict system of interdependencies that tie them to each other.
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43
44 Therefore, it is necessary to put in place institutional mechanisms to enable aggregations, social groups and
45
46 stakeholders organizing themselves in expressing their interests and realizing to be part of a community of
47
48 actors, whose partial interests should be recomposed to let emerge both a systemic interest – i.e. for the
49
50 sustainability of the system itself – and a collective interest – i.e. towards a shared normative vision. As long
51
52 emphasised in the debate, such institutional mechanisms requires achieving a balance between coordination
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54 and capture through the principle of 'embedded autonomy' (Evans, 1995), for the government to be
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56 autonomous and embedded in societal networks (in particular industry and business networks) in
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58 implementing industrial policy in practice, in order to avoid one of the main sources of government failures.
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1 For instance, if institutional structures hinder collective action, if learning processes constrain recursive actor
2 rationality, and if consultative and deliberation mechanisms are not inclusive, thus the systemic capacity to
3 design appropriate industrial policy strategies for societal goals would be significantly hampered (Biggeri
4 and Ferrannini, 2014). Furthermore, this could even lead to conflicting dynamics that result in further
5 horizontal inequalities, polarization of power and social unrest for the reclaim of policy spaces. Rather,
6 investments in expanding public deliberation, institution building and collective learning could lower the
7 magnitude and weight of transaction costs to construct a shared societal vision underlying industrial policy
8 design.
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10 11 12 13 14 15 16 17 18 19 20 *6.3 Policy coherence and multi-level alignment*

21 Policy coherence, multi-level alignment and synergic combination of top-down and bottom-up processes
22 (Hill and Hupe, 2002; Crescenzi and Rodriguez-Pose, 2011; Biggeri and Ferrannini, 2014) should become
23 hallmarks of industrial policy governance and management. Indeed, the interplay of policy interventions
24 from different levels based on multiple resources, institutions and capacities shapes both the industrial
25 performance and production dynamics and their effects on social outcomes. Ensuring that industrial policy
26 across levels are connected, integrated and aligned in the pursuit of coherent objectives and in the provision
27 of public goods is essential to avoid detrimental redundancies and overlaps of responsibilities and to exploit
28 institutional and policy complementarities for an harmonized policy towards sustainable human
29 development. In this regard, first it is important to identify those institutions and departments dealing with
30 industrial policy design and implementation at all levels of government, i.e. in charge of translating the
31 challenges and priorities into specific tools and targets for intervention; second, it is fundamental to invest in
32 the building of a continuous flow of information, as transparent as possible, within the administration and
33 across such departments; third, those involved in the making of industrial policy must have clearly in mind
34 the normative societal vision that industrial policy is trying to achieve, and understand how this is coherently
35 translated into targets and tools, thus limiting self-seeking behaviours by public officials.
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6.4 *Government capacity and complexity*

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2 Industrial policy governance and implementation need capable governments. A turning point in industrial
3
4 policy must necessarily start from the idea that governments are not destined to fail and that investing in
5
6 governments' capabilities must go hand in hand with the use of industrial policy. This appears fundamental
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8 to make both policy-makers (leading industrial policy governance) and public officials (leading industrial
9
10 policy management) able to: embrace the complexity affecting the reality of production dynamics and
11
12 societal challenges; deploy robust and evidence-based processes for the selection of strategic targets and
13
14 appropriate tools; coordinate efforts and timely react to changing societal conditions and challenges; learn
15
16 consciously from successes and failures of different interventions and tools. This would require both
17
18 governments with pre-existing weak or strong capacities to, respectively, setting or adapting the proper
19
20 governance and implementation structures for industrial policy towards sustainable human development. In
21
22 this respect the international community can play a role, particularly via international organizations and
23
24 academic networks that can envisage new roles in promoting exchanges of ideas, governance structures and
25
26 policy practices, peer-to-peer learning among public officials, and technical assistance initiatives. This would
27
28 enable multi-directional learning in designing and implementing industrial policy in all countries towards a
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30 global paradigm for a more sustainable and equitable world.
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6.5 *Monitoring and evaluation*

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39 New monitoring and evaluation frameworks for industrial policy should be designed and applied in order to
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41 recognize errors and revises policies accordingly, enhancing the relation between societal objectives and the
42
43 effectiveness of interventions, for the sake of transparency and accountability toward the public interest
44
45 (Rodrik, 2014). In particular, industrial policy outcomes – i.e. the real results, whether intended or
46
47 unintended, that are actually achieved (Lane and Ersson, 2000) – should be evaluated against sustainable
48
49 human development indicators.³⁰ Thus, assessing the performances of production and industrial systems at
50
51 national and subnational level should be based on new definitions of competitiveness, productivity and
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53 value-added aligned with concerns for human development, social cohesion and sustainability (Aginger,
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55 2014). Similar efforts for accountability would serve to prevent corruption, favouritism and other forms of
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collusive behaviour, and also to legitimize appropriate industrial policies (Rodrik, 2014) pursuing a normative societal vision.

In a nutshell, these preliminary policy implications – though singularly not new in the debate – together remark the need to invest in the accurate and transparent design of industrial policy in the post-Covid19 era. They imply to establish skills, resources, capabilities and structures in public organizations to be effective at planning and learning in partnerships with the private sector and civil society, as well as at deploying and strategically coordinating multiple policy instruments and institutions addressing complex interdependencies (Andreoni and Chang, 2018).

7. Final remarks

In our post-Covid 19 economies and societies, both in developed and developing countries, a turning point on the connection between industrial policy, sustainability and development has been reached.

On the one side, well before this pandemic industrial policy was back on the agenda, starting to being conceived through a systemic approach that extends far beyond the correction of market failures and steered by societal goals for the sake of long-run collective interest. On the other side, the pandemic has surely accelerated this shift in the academic and policy-making spheres on industrial policy, revamping attention on the need for public action and government intervention on production dynamics both to tackle dramatic economic and social problems in the short run and to steer the structural transformation of the economy and the society in the medium and long run.

Nevertheless, human development, social cohesion and sustainability do not seem to have been placed at the very centre of industrial policy yet, whose urgency is apparent in the post-Covid19 era. Therefore, we argue it is time for a decisive turning point to fully reflect an integrated notion of sustainable human development (i.e. combining environmental concerns and awareness on planetary limits to growth with both people's inclusiveness, equality of opportunities and wellbeing, and with shared and long-term societal prosperity), both in the academic debate and in the real- world practices of industrial policy.

1 Such turning point urges us to rethinking both the theoretical foundations, as well as governance and
2 implementation processes of industrial policy.

3
4 In this paper, we have argued that industrial policy should be conceived both as a technical and political
5 intervention to re-design our future societies, favouring and governing a structural transformation of the
6 industry, the economy and the whole society. This implies primarily that industrial policy must be
7 fundamentally tied to a value-based societal vision able to reconcile sustainability and development.
8 Consequently, it implies a new understanding of the multiple inter-linkages and feedbacks among industrial
9 policy economics, political economy and management, shaping its governance mechanisms and
10 implementation processes.

11
12 Our analytical framework opens up a partially unexplored line of research, which requires a mutual
13 engagement between theory and practice of industrial policy, keeping them tied to each other according to
14 real-world conditions. Future research on industrial policy, sustainability and development would be required
15 to explore the connection between societal goals, strategic targets and effective tools; conduct comparative
16 analysis of industrial policy for sustainable human development in a long run perspective; analyse multi-
17 level governance mechanisms and policy coherence; dig deeper into policy-making mechanisms and
18 institutional settings favouring the identification of a normative societal vision and a collective interest on
19 societal objectives, as well as conflict management, transparency and accountability; assess the effect of
20 different industrial policy tools on wider societal goals and challenges.

21
22 In order to implement this turning point on industrial policy for sustainable human development, it is
23 responsibility of scholars actively supporting – and engaging with – policy-makers in setting industrial
24 policies based on comprehensive, multi-level analytical principles, and carried out through robust and
25 transparent decision-making processes. This represents an element of highest concern in a world looking
26 (and needing) for new theoretical bases to design and implement appropriate multilevel responses in the
27 post-Covid19 era at all levels.
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Endnotes

¹ Since the early seminal contributions (WCED, 1987; Tisdell, 1988; Lélé, 1991; Beckerman, 1992; Anand and Sen, 2000), the debate on sustainability and development has gained momentum, having been decisively enhanced by the adoption of the Agenda 2030 for Sustainable Development (UN, 2015) along with the role played by several academic journals and societies.

² Moreover, this was unjustified both in terms of history of economic ideas – e.g. the concept of ‘invisible hand’ is only once mentioned by Adam Smith (Reinert, 2020 among others) – and in terms of modern economic theory (e.g. Arrow and Hahn, 1971).

³ See, for instance, Hall and Hamont (2013); Keck and Sakdapolrak (2013).

⁴ Such trickle-down approach also almost entirely disregarded the effect working through the network of interdependencies built on the interdependent production processes and the intertwined supply chains for goods and services (Leontief, 1941; Pasinetti, 1977).

⁵ See Aiginger and Rodrik (2020) for a careful review of definitions of industrial policy; Reinert (2020) for overview of the historical arguments that have been used to argue for industrial policy in its widest sense; Andreoni and Chang (2018) for the history of economic analysis of industrial policy.

⁶ For instance, the dichotomy distinguishing between vertical policies, which are geared towards supporting specific sectors, and horizontal policies, which are non-discriminatory and aim to promote an enabling and competitive environment for business growth (Bailey and Tomlinson, 2017), has blurred and it is now acknowledged that horizontal policies must be adjusted to the particular context of an industry and they affect sectors differently, leading towards a more integrated perspective (Peneder, 2017).

⁷ See, for instance, Di Tommaso and Schweitzer (2013); Andreoni and Chang (2016); Aiginger and Rodrik (2020).

⁸ Be it either of markets (Bator, 1958), systems (Smith, 2000) or strategic (Cowling and Tomlinson, 2011) for the supporters of industrial policy, or governments for its opponents (Tullock, 1967; Krueger, 1974).

⁹ It represents the new universal global Agenda, composed by 17 Sustainable Development Goals (SDGs) and 169 targets adopted by the United Nations in 2015 (UN, 2015). As for the production dynamics and industrial policy, the Agenda 2030 dedicates specific attention to: SDG#8 “sustained, inclusive and

1 sustainable economic growth”, especially through full and productive employment and decent work for all;
2 SDG#9 “sustainable industrialization”, conceived as the primary driver in fighting poverty and preventing
3 social polarization, especially through the integration of small-scale industrial and other enterprises into
4 value chains and markets.
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9 ¹⁰ Analyses of the industrial policy practices in these three cases become crucial due not only to their
10 undeniable centrality in global production networks, in financial and investment flows, in research and
11 innovation processes and in consumption patterns, but also to their weight and influence in the international
12 policy debate on government intervention and industrial policy. Back in the past as well as in the recent
13 present, their policy experience has often been taken (and in some cases imposed) as a model for developing
14 countries, as in the case of the Washington Consensus (Gore, 2000; Saad-Filho, 2007), the post-Washington
15 Consensus (Fine et al., 2011) or the most recent Beijing Consensus (Bird et al. 2012). Other groups of
16 countries surely have relevant experiences of industrial policy and government intervention governing
17 structural change, shaped by the variety of their capitalisms, government systems and investment capacities
18 (Amsden, 2001). For instance: East-Asia countries, such as Japan and South Korea, to gain and keep global
19 leadership in advanced manufacturing sectors; emerging countries, such as Brazil, India and South Africa, to
20 avoid the ‘middle-income trap’; countries characterised by high availability of oil production and/or
21 sovereign wealth funds, such as Saudi Arabia, Russia and United Arab States, for economic diversification;
22 African economies, such as Ethiopia, Botswana and Ghana, to get out of poverty.
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40 ¹¹ See, for instance, Biggeri (2008), Rodrik (2010), Di Tommaso et al. (2013, 2020b), Ratigan (2017), Cai
41 and Sun (2018), Barbieri et al. (2019a, 2019b, 2020), Biggeri and Bortolotti (2020).
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¹² For instance, impressive industrial GDP growth in China has been accompanied by environmental
degradation, workers’ exploitation, and unbalanced development among Chinese provinces (Biggeri, 2008),
requiring policy changes and new strategic targets (Barbieri et al., 2020; Biggeri and Bortolotti, 2020).

¹³ See, for instance, Block (2008), Di Tommaso and Schweitzer (2013); Mazzucato (2013), Di Tommaso et
al. (2020c); Tassinari (2019).

¹⁴ See, for instance, Aiginger (2014); Mosconi (2015); Pianta (2014); Pianta et al. (2016); Eder and
Schneider (2018).

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¹⁵ Talking about industrial policy in the EU is complicated due to the undeniable importance of competition policy within the single market, the interplay of responsibilities and competences between the supranational, national and regional levels, and the multiplicity of strategies, programmes, frameworks and regulations that are discussed, announced and – to a different extent according to conditions in each member state – implemented and made operational (Landesmann and Stöllinger, 2020).

¹⁶ Among others, organizations like OECD, IMF and IGC are tracking the key policy responses to Covid19 in different areas of the world.

¹⁷ According to Di Tommaso et al. (2020a), ‘targeting’ has most focused on those more dynamic industries that show the best chances to compete in international markets and reach systematically a new large-scale demand for consumption. Nevertheless, the uncertainty connected to the future competitiveness and economic performance of different targets remains one of the most critical issues in defining an industrial policy (Lin and Chang, 2009).

¹⁸ According to Schot and Steinmueller (2018), the consolidation of this third framing does not imply lessening the importance of – or even abandoning – the previous policy practices, as investment in knowledge infrastructure and R&D continues to be fundamental, as well as strengthening interactions and learning process among all societal actors within national, sectoral, regional and transnational systems of innovation.

¹⁹ See, for instance, Pressman (2006); Dannreuther and Kessler (2008); Davis and Dolfsma (2008); Elsner (2014).

²⁰ See, for instance, Robbins (1981); Dahrendorf (1988); Chang (1994).

²¹ This resembles also Reinert’s (2006) theoretical insights on wealth as a product of systemic factors, an argument early established in the industrial policy debate as in List’s (1841) ‘national system of political economy’.

²² According to Cardinale and Scazzieri (2018), classical political economy explains structural change in terms of proportionality conditions determining the way existing structures adjust to temporary or persistent sources of change. In particular, the classical approach to medium-term dynamics sees structural change as a sequence of transformation stages leading the economy from one position to another along a trajectory driven by some initial disturbance. In contrast, the classical approach to long-term dynamics views structural

1 change as a trajectory in which economic structure is modified because of a persistent change of fundamental
2 parameters.

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4 ²³ See, for instance, Baranzini and Scazzieri (1990); Deutsch and Syrquin (1989); Kutnetz (1971); North
5 (1990); Syrquin (1988, 2008).
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8 ²⁴ See, for instance, UNDP (1990); Sen (1992, 1999, 2009); Nussbaum (2000, 2011); Drèze and Sen (2002);
9 Mehrotra and Biggeri (2007); Biggeri and Ferrannini (2014); Capriati (2017).
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12 ²⁵ See, for instance, Evans (2002); Stewart (2005); Ibrahim (2006); Deneulin and McGregor (2010); Biggeri
13 and Ferrannini (2014); D'Amato (2020).
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16 ²⁶ On these concerns, the debate among the capability scholars is very animated. For instance, according to
17 Robeyns (2016), all capabilitarian theories should be normatively individualistic (thus having the advantage
18 of each and every affected individual as ultimate concern), while D'Amato (2020) relegates ethical
19 individualism to optional status and proposes collectivist capabilitarianism to allow capabilitarian theorizing
20 in explicitly non-liberal socio-political contexts.
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23 ²⁷ See, for instance, Landesmann and Scazzieri (1990, 1996); Scazzieri (2018); Bianchi and Labory (2019a,
24 2019b).
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27 ²⁸ Here, we draw from implementation theory (Pressman and Wildavsky, 1984; Hill and Hupe, 2002) to
28 complement our discussion and move towards implications for public management of industrial policy.
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31 ²⁹ This contributes overcoming also the limited integration of economics and politics within the
32 developmental state literature, which made it remarkably and paradoxically static as a portfolio of economic
33 policies or as a political structure (Fine, 2007).
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36 ³⁰ See Biggeri et al. (2019) and Biggeri and Ferrannini (2020) for a review of sustainable development
37 indicators and datasets.
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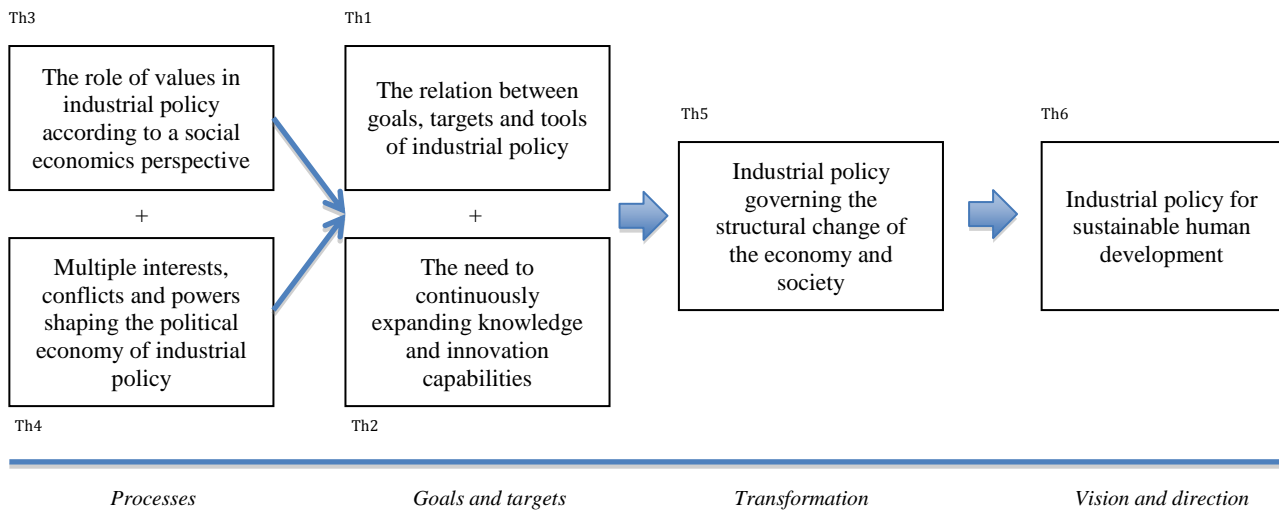
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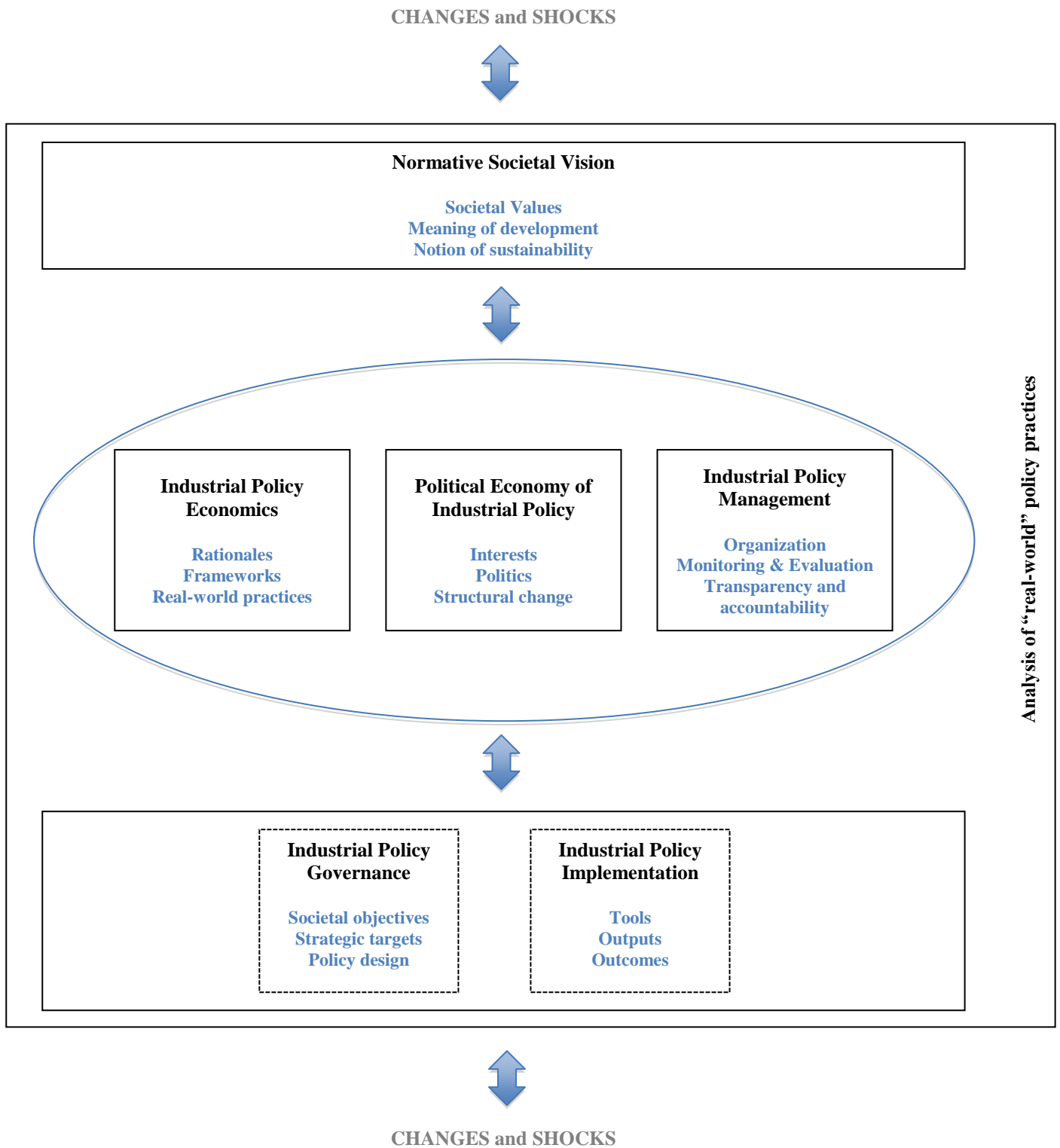
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Figure 1. The contribution of different theoretical pillars to a new integrated framework on industrial policy



Source: Authors

Figure 2. Industrial policy-making in the post-Covid19 era



Source: Authors

Highlights

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1. The Covid19 pandemic urges us to advancing a new and different framing on government intervention to properly serve the public interest.
2. Production dynamics in every country are highly affected by the pandemic, with drastic changes that might become structural in our economies.
3. A turning point on the connection between industrial policy, sustainability and development has been reached to tackle wide societal challenges.
4. A new analytical framework with real-world implications is needed to support industrial policy governance and implementation.
5. Industrial policy in the post-Covid19 era should steer the structural change of our economies and societies towards sustainable human development.

Conflict of interest

I, on behalf of the other co-authors, affirm that there are no potential conflict of interest according to www.elsevier.com/conflictsofinterest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work.

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