

*Olivér Kovács*

# Reversing the Great Suppression

Unleashing the Catalytic Public  
Sector for Innovation Dynamism



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Budapest, 2023

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## Foreword

“Something did happen to me somewhere that robbed me of confidence and courage and left me with a fear of discovery and change and a positive dread of everything unknown that may occur.”

Joseph Heller (1997)

By paraphrasing one of the most well-known quotes from Joseph Heller’s famous novel, *Something Happened*, something did happen to the world economy somewhere that robbed the innovation ecosystem of confidence and courage and left it with a fear of discovery and change and a positive dread of everything unknown that may occur. There has been a growing impression that something might have happened to the world economy since there has been a lot of cacophonous noise in terms of whether the developed world has been really and irreversibly on a track toward prosperity or it has been just heading for something completely different. On the one hand, life is much better today than it was before. Violence has been on the decline for a long time mainly up until the 2022 war between Russia and Ukraine, the average age has been increasing, the proportion of people living in extreme poverty is at a historic low, as is child mortality. In 1820, 84% of the world’s population lived in poverty, their proportion was 42% even in 1981, but today it is less than 9%, even though the population has been exploding in the meantime. In fact, over the course of two hundred years, the world’s GDP increased a hundredfold, and the average GDP per capita increased twelvefold. Up until the black swan event of the outbreak of the Covid-19 pandemic in December 2019, thanks to vaccinations, medicines and the availability of clean drinking water, epidemics that decimated humanity for centuries were reduced. So, on



the one hand, there is the proposition of historical progress and the gradual improvement of the world economy, but on the other hand, there are many question marks. It seems as if we have missed some opportunities in relation to socio-economic development or as a Dutch proverb says, we have been fishing behind the net. Albeit no serious cataclysms have occurred since the 1960s in the developed world, the optimism about historical progress seems to have lost its validity. Classical left-wing thinkers see climate change as catastrophic, while authoritarian and radical populism is reviving, inequality generated by capitalism is increasing, and the end of the pandemic is thought that it is never going to be in sight. In developed democracies, growing divisions are causing increasingly serious political and social tensions being followed by more radical attitudes and even science denialism. Consequently, it is really difficult to think that there is any hopeful direction in the history and in the innovation dynamism of the socio-economic ecosystem.

There is therefore the impression that we live in unprecedented times forcing many to leave old routines behind. Without being exhaustive, enough to look at what kind of momentous things happened that were almost unimaginable before. Due to Covid-19, the European Union has committed itself with surprising speed to a huge recovery package by amending its budget and to a certain extent redirecting its crucial funds. Due to the Russian–Ukrainian war, the objective of greening out the economies has become a top priority, urging a radical change of direction in energy resources. Importantly, it was not always like that. For example, over the past decade, the Netherlands was considered the frugal member of the European Union, perpetually opposing more expansive EU budgets and fiscal risk-sharing. Nevertheless, today we see that the wind of unprecedented times has also touched the country where being innovative is a compelling necessity for survival. The age of the invariability of values that have long been treated as a virtue is also over. The newly established Dutch four-party coalition government embarked on a path that was previously considered reprehensible by bursting a good deal of public spending which represented a firm breaking with the country's traditional focus on balanced budgets and the idea of small public sector.

So, it seems that the great survivor of our time is the old motto: *navigare necesse est*. More than a decade ago, the author of this book was involved in a comprehensive European research project on inland waterways transport. During one of the interviews, a Dutch captain reminded the special features and the difficulties of shipping. In the age of great geographical discoveries, the chances of discovery were greatly endangered if the ship spent too many years at sea without clearing it of shellfish accumulating on the bottom of the ship. The shells end up being such a burden for the boat that they can even pull it into the deep. The ship needs to be freed from the shells. One innovative way to do that is to anchor the ship in a freshwater port on the Rhine where sea salt water is no longer a distraction. In these circumstances, the shells will soon loosen and fall off on their own.

Metaphorically speaking, in the socio-economic innovation ecosystem, the public sector and economic governance also help steer the economy's ship in the whipped waves of socio-economic and financial turbulences in an effort to navigate toward a flow of innovation that unburdens the ship so that it can continue its travel to prosperity. Once forces are emerging that could pull that ship into the deep, public sector and economic governance must go for dealing with the situation (in an innovative way). Otherwise, there will be no discoveries, values will sink, there will be no dynamism in the economies either. It can be the case for instance when excessive financial burdens are on the bottom of the economy's ship or when the expanding financial universe suppresses the real economy by pursuing short-term and big financial gains being tantamount to treasures. Something similar happens in Richard Wagner's opera *Das Rheingold*, where the theft of the treasure of the Rhine is actually the manifestation of the original sin by having harmful consequences for the natural order of things. Such kind of disharmony may undermine the dynamism of the socio-economic innovation ecosystem as well.

This book revolves around the issue why innovation dynamism in the socio-economic innovation ecosystem of developed countries (especially European ones) seems to have become suppressed, what distortions is the system loaded with, and how the public sector could help via innovating

itself. Since we are not satisfied with the comforting views that the problem is simply that today it is harder to come up with innovative ideas because of the complexity we face,<sup>1</sup> we do believe that it is right to apply a sort of systems approach when addressing the “something happened” hypothesis. Ferenc Jánosy, a Hungarian economist who dealt exactly with dynamic recovery periods<sup>2</sup> and who now seems to be undeservedly forgotten, emphasised that the social system is like a stretched net: if one grabs it only at one point, the net will peak out at that particular point. One has to pick and grab several points of it in parallel to actually be able to lift the entire net. In this spirit, we have to pay attention to the system, the configuration of its dynamic processes by focusing on several points and processes at the same time in order to really elevate socio-economic progress. When another Ferenc, the renowned Hungarian composer, pianist, conductor and music teacher, Ferenc Liszt did introduce Richard Wagner to a music-loving Viennese princess, Wagner was asked what kind of instrument He plays, He answered: I can play the piano a little, but with real dynamism I do play very well an orchestra. Perhaps we are not far wrong when we say that the public sector and economic governance must influence the interplay of cooperating parties in an effort to help creating innovation dynamism.

One of our central messages is that even if we have the levers, the public sector has to fight for innovation dynamism. It is an absolute necessity once we admit that the chain of complex challenges that are taking shape and often reinforce each other points to the unsustainability of some of our foundational social institutions upon which the stability and developmental direction of societies in the developed world have been built for decades. It is our firm belief that the state, the public sector must be aware of the institutional foundations and systemic configuration, their changes, or their unchanging nature, and must not only ring the bell, but also act imaginatively for real innovation dynamism, which requires both enthusiasm and humility. As the great connoisseur of *Ringing*, Wagner put it: imagination creates reality. Let’s add right away that

<sup>1</sup> JONES 2009: 283–317; ASTEBRO et al. 2020.

<sup>2</sup> JÁNOSSY 1966: 282; JÁNOSSY 2018: 282.

it essentially depends on political will. However, the work of the economist ends here, as He/She has no key to the playground of politics. A scientist can do one thing: not being afraid of empty echoes. This monograph was written in this spirit and with the implicit aim of stimulating fruitful dialogue not only among economists with various backgrounds but also in a cross-disciplinary way which can lead to new ideas. It is a cliché, but it often looks like it is still worth emphasising: major scientific results were often made after observing and considering different points of views and aspects. This is no different in relation to the research topic of our book, which ultimately examines the nature of complex systems (socio-economic ecosystem) and innovation. For instance, Ilya Prigogine, who was awarded the Nobel Prize in 1977 for his contributions to non-equilibrium thermodynamics, particularly the theory of dissipative complex systems, argued that one of the most important things in his life was the discussion with his colleagues. Another deservedly recognised scientist, Philippe Aghion revealed that his work on innovation dynamism based on the Schumpeterian creative destruction narrative was the result of discussions with Peter Howitt, whom he ran into regularly when he left his office and went for a walk on the university campus. If we do our research in isolation without dialogue with others, we can get only the result we wish. This is especially true in the case of the public sector as well; a dialogue is needed with other actors in the system.

Since others may also participate in the results either one way or the other, the Author is grateful for the constructive comments of the reviewer Professor Balázs Hámori, and is also deeply indebted to his loved ones for their valuable patience and support, without which this book would not have been possible.

Budapest, 2023

*Olivér Kovács*



## Chapter I

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# Introduction

According to an anecdote, Damocles was one of the flatterers of 4<sup>th</sup>-century BC ruler Dionysius II of Syracuse, a tyrant living in Sicily. In a conversation, Damocles praised the richness and the majesty of the power of Dionysius II, the abundance of its possessions, the superlatively beautifulness of His royal palace. Damocles thought that a rich man like Dionysius II must be nothing but happy. The tyrant replied by asking Damocles whether He is up to taste this happiness, and the young man immediately said yes. Damocles was then allowed to sitting on the throne, receiving the finest food and drink, and the servants provided and pampered him well. But Dionysius II ordered the servants to hang a sword hanging from the ceiling over Damocles's head on a thin thread from a horse's mane, after which Damocles could not really concentrate on anything else but the impending danger (his appetite was gone, his interest in the richness immediately dissolved into the air).

Seeing today's rather erratic world economy, we may have a feeling like Damocles experiencing paradoxical disproportions. In spite of the abundance of the financial sphere, and despite the ever-growing public sectors, the real economy in developed countries has been more and more featured with a sort of suppressed innovation dynamism. It implies that an impending danger is out there.

### SETTING THE SCENE

Today the developed world lives with a protracted sense of crisis. Since the 2008 financial and economic crisis, economic governances all around the developed world have been by and large functioning in a constant crisis management mode. It still holds with the eruption of the global pandemic

of 2019. Actions imposed to curb the crises manifested as serious stimulus programmes (e.g. quantitative easing, fiscal transfer, etc.) to boost demand in overcoming painful recessions. Paradoxically, excessive stimulus and fiscal laxity have resulted in suppressed innovation dynamism in the real economy (as we call it: Great Suppression) in a time when not only managing the crises but also supporting the structural change triggered by the digital revolution and Industry 4.0 are on the table. Great Suppression alludes to the fact that what was originally intended to help the survival of socio-economic actors, stifle down market performance. The Great Suppression is given by that fact that stimulus has led to enormous public indebtedness limiting the capacity of states as well as that of the private sectors, looming and potentially uncontrollable inflation injecting additional uncertainties into the daily life of people, and led to distorted markets by supporting uncompetitive players to exist longer (i.e. zombification in case of firms, banks). The configuration of these processes has not been addressed yet, however, such configuration has suppressed innovation dynamism in the real economy being mirrored in anaemic productivity growth and innovation performances (e.g. by 2020, labour productivity in OECD countries has declined to 1.1% from the 1.5% of 2017; while it has been almost stagnating in the Eurozone by reaching 0.2 in 2018; numbers on papers looked great, such as increasing R&D expenditures, filings for venture capitals, as the Global Innovation Index 2021 suggests, but with no real positive impetus on socio-economic innovation dynamism).

In addition, a long-term systemic trend has been undermining innovation dynamism in the real economy as well, being scientifically overlooked or neglected. Such creeping phenomena developed along longer term is the diverging financial sphere from the real economy (excessive financialisation). Still, one of the most intriguing paradoxes of today is the fact that despite all the perceptible and well-documented local and global challenges we face – ranging from the after-effects of the 2008 financial and economic crisis including the Eurozone crisis, flaring populism secessionism and nationalism across the board by endangering the sustainability of the European integration process as a whole, the escalating trade war between the United States and China

affecting many other countries, the migration and Covid-19 crises, creeping military conflicts, the ever-more deciphered and publicly discussed business scandals (e.g. Wirecard, Luckin, Archegos Capital, etc.) – it is like there is no bad news at all for the financial universe (e.g. since 2019, S&P 500 registered an unstoppable upswing the index of which could book a 71% win rate after weekly losses of 2%) and still, economic growth is neither high, nor inclusive, nor green. It proves that innovation dynamism has become suppressed by creating the impression that public sectors are mostly incapacitated to effectively address serious challenges (i.e. trust and confidence in states and economic governance has really waned since the crisis of 2008 aggravating the discontent against state and politics, e.g. electoral turnout in the developed world has been declining from the 80–90% of the 1950s–1960s to 70% by 2017).

Since states are essentially suppressing the market's immune response to unsustainable processes (e.g. selecting out zombie firms at the expense of a more inclusive growth, etc.) through stimulation, we need innovative states that will revitalise and strengthen the social capital and confidence needed for longer-term structural reforms in navigating through and coordinating the processes along the ongoing digital revolution. At this point, the issue of how to enable states to act efficiently by catalysing innovation within the public sector and inside the real economy comes to the fore. Unfortunately, addressing public sector innovation has been so far approached by applying innovation terminologies developed for the private sector.<sup>3</sup> Moreover, works on public sector innovation omits to incorporate systemic patterns that feed into low innovativeness (e.g. the runaway of the financial sector contributing to processes, such as zombification, fuelling the Great Suppression at systems level). Plus, so far, not a small part of the literature has aspired to capture the nature of innovation in the state by mentioning that there is an innovation imperative there,<sup>4</sup> still, those works either did stop at identifying rather superficial drivers (e.g. external environment, people<sup>5</sup>), or miss to address

<sup>3</sup> MULGAN–ALBURY 2003: 40; LEYDEN–LINK 2015: 264; FALK et al. 2017: 196.

<sup>4</sup> OECD 2015a; OECD 2015b.

<sup>5</sup> GLOR 2021.



the complex nexuses affecting innovation freedom within the public sector by not being barded with the aim of unleashing a catalytic state in serving innovation dynamism in the real economy along structural changes like the digital transformation and Industry 4.0 developments.

#### METHODOLOGY

The book builds on a verbal model using quantitative as well as qualitative data and information to decipher the true nature of innovation in the public sector. It concentrates on innovations that are in line with the goal of achieving structural change compatible (digital transformation, Industry 4.0), inclusive and green developments. Methods: (1) deep and systemic literature review (i.e. shorter and longer term socio-economic phenomena grounding the Great Suppression; complex systems, system dynamics, systemic prerequisites of private and that of public sector innovation, etc.); (2) analyses using various relevant data (e.g. Eurostat, World Bank, Public Sector Innovation Observatory, etc.) and indices (e.g. World Governance Indicators, Global Innovation Index; World Value Survey, Trust Barometer, Standard Eurobarometer, etc.); (3) semi-structured interviews with experts in mapping a) policies and initiatives as worst practices in bolstering the innovative public sector; b) policies and initiatives as best practices in becoming trendsetters (catalysing private trends, too); c) current demand for catalytic public sectors in Europe; and (4) ten illustrative case studies on public sector innovation feeding back to our narrative.

#### NOVELTY

The monograph seeks to fill the gaps mentioned above by introducing the major constituents of the Great Suppression, evolved along the constant crisis management in the developed world and especially in Europe, that calls for

a more catalytic public sector (i.e. an innovation trendsetter for itself and for the real economy) with the aim of reinvigorating public trust in states by contributing to a more sustainable structural change given by the digital revolution and Industry 4.0. The topic about the changing nature of the state has been with us for a while, still, the complexity of public sector innovation is not addressed sufficiently. In the discourse on innovation dynamism, the role of the state does arise, of course, but only as a regulator who can guarantee competition and exert its role of stimulating innovation through its policies. One prime case in point is the work by Aghion and his co-authors,<sup>6</sup> which completely leaves out the aspect of innovations within the public sector or through cooperation between the state and other sectors. Prevailing literature even omits to a large extent the institutional architecture of the public sector. Even the Handbook of Innovation in Public Service<sup>7</sup> did not address institutional setting, however, this is the underlying feature influencing many cardinal issues to innovation from the size and quality of evolving networks as sources of interorganisational learning and knowledge sharing. Albeit some discussions have been trying to shed light on the changing nature of the state and its policy horizon – ranging mainly from the narrative on the broken Westminster system advocating that reducing the size of the state or opening up towards greater and deeper collaborations would lead to inefficiencies and ever-more complicated challenges,<sup>8</sup> the idea of mission orientation,<sup>9</sup> or the way the public sector should consider systemic resilience<sup>10</sup> representing the capacity of a system to anticipate, absorb, recover from and adapt to systemic instabilities – these works address neither the broader embeddedness of the public sector into the fabric of the socio-economic innovation ecosystem, nor the interlinkages among subsystems like the public sector, the financial universe and the real economy.

<sup>6</sup> AGHION et al. 2021: 400.

<sup>7</sup> OSBORNE–BROWN 2013: 587.

<sup>8</sup> MULGAN 2007; MULGAN 2009: 320; GOW 2014; GRUBE–HOWARD 2016: 467–481.

<sup>9</sup> MAZZUCATO 2021: 272.

<sup>10</sup> BRUNNERMEIER 2021: 424; HYNES et al. 2022: 381–384.

There is an issue which has not been researched yet in a sufficient way, namely that while the state as a regulator and coordinator took its soothing arms and hands off the financial system since the 1970s, it has been indirectly bracketing the importance of the real economy through letting the financial universe expand. The book argues that this tectonic movement dismantled the fabric of the socio-economic system by requiring catalytic changes on several fronts.

Therefore, the book has four ambitions: (1) to introduce the concept of and to decipher the building blocks of the Great Suppression by applying a system view to the socio-economic innovation ecosystem; (2) to approach the nature of public sector innovation the potential of which has been entangled to the Great Suppression; (3) to address how public sector can stimulate innovation that also catalyses structural change in the real economy in a time of digital transformation and Industry 4.0 by mapping past and current innovation trends proven to be successful over a longer period of time, to identify public sector- and system-specific drivers and bottlenecks of innovations; and (4) to explore how more catalytic public sectors can be cultivated by building on illustrative case studies.

It is our hope that the book delivers added values for theory and practice as well. For economics science, our new-fangled narrative not only broadens the traditional research canvas by incorporating the dimension of the Great Suppression into the exploration of the true nature of public sector innovation, but also resonates to the ongoing digital revolution and Industry 4.0. It does not only outline a system view to decipher the basic prerequisites of innovation dynamism within the public sector, but also opens up new research avenues on how to make current structural change sustainable via more catalytic public sectors. Additionally, it enhances education approaches both to theoretical and applied economics by refining curricula and topics on innovation. For economic governance and public sector, the book enriches the knowledge base over evidence-based policymaking in reinvigorating innovation in the public sector, it maps and collects cases that have proven successful in the longer run in a balanced way by showcasing some failures

as well. Besides, the monograph is supposed to ground the catalytic public sector that is to bring directionality into the dynamism of the socio-economic innovation ecosystem geared toward socially acceptable, economically and politically feasible structural change (digital revolution and Industry 4.0).

#### STRUCTURE

The book is to demonstrate that there is a great deal of complex challenges faced by a socio-economic innovation ecosystem being pervaded by a non-negligible symmetry breaking among its major components (the public sector, the real economy and the financial universe) resulting in feeble innovation dynamism (The Great Suppression). Unless such disharmonious systemic configuration having low resiliency is addressed, the self-innovating capacity of the public sector itself suffers. Catalytic public sector innovation is therefore needed to be geared towards identifying resiliency-killer mechanisms and processes or at least towards mapping and deciphering redundancies, as fields of intervention, in an effort to advance efficiency and alleviate the overburdens of the public sector.

To this end, Chapter II sheds light on the polycrisis that modern economic governments and public spheres should not turn their backs on. It presents at least ten, sometimes strongly intertwined and interlinked challenges (*The Madness*), contributing to the formation of the so-called Great Suppression, to which public sectors and economic governances have mostly responded only with the aim of revitalising via stimulus. The chapter is then dedicated to the toxic nature of excessive financialisation, which is undeservably neglected in the international literature. Such symmetry breaking acts as a tipping point, which is a systemic resiliency-killer mechanism. In an effort to make a difference, the public sector needs to grow up to do that job by fostering innovations within and over its walls by embracing also the financial universe and the real economic arena. Chapter III is devoted to the issue of the catalytic public sector and its cultivation. It first outlines the theoretical

framework of public sector innovation by incorporating the fact that the challenges have been making the socio-economic innovation ecosystem ever-more complex to be tackled via reductionist scientism, rather they are calling for a more innovative public sector with a holistic and more humble governance attitude. After presenting the scope and the methodological approach, it focuses on the *state-of-the-art* empirical evidence as well as it deciphers interesting cases (primarily positive cases as next practices, but pinpointing also some negative cases as past practices) on various public sector innovations that took place in the developed countries, especially in the European Union so far. We argue that in a living and constantly developing socio-economic innovation ecosystem, the term “best practice” loses its meaning due to the complexity we face (i.e. we just do not know how to create the best so that it can be applied elsewhere). Thus, best is impossible, while the better (as next practice) is possible. The choice of those illustrative cases may seem arbitrary, their consideration is given by the logic of presenting a sort of ‘example library’ of all types of public sector innovations mentioned in the book by reflecting upon the polycrisis identified in the previous chapter. Chapter IV concludes by juxtaposing some general lessons for both theory and practice when it comes to energising a catalytic public sector for innovation dynamism.

## The Great Suppression

This chapter is to introduce the concept of Great Suppression by exemplifying that the analysis of subtleties of the complex configuration among the three highly interrelated and intertwined systems of public sector, financial sector and the real economy offers a more fertile ground in better understanding why innovation dynamism in the developed world is incapable of evolving along the path imagined and desired by policymakers. The chapter is to demonstrate that the broken symmetry among the three subsystems sprinkles mostly and merely malignant innovation dynamism in the public and financial spheres leading to suppressed real innovation dynamism in the real economy (*The Great Suppression*). In an effort to reverse such trajectory, addressing not only the real economy, but also that of the public sector and the financial universe alike is of paramount importance.

In so doing, the chapter first shows how the developed world faces a period in which crises are lined up and it does not seem that public policies have been able to tackle any of them once and for all through effective crisis management. It does also argue, though implicitly, that the ensuing crises have brought to life a crisis management narrative which has been based solely and exclusively on trying to revitalise via stimulus programmes. Finally, the chapter builds up a new conceptual framework to explain the aforementioned by shedding light on the fact that the succession of crises as well as the obsession to stimulus were the natural resultants of the current configuration of the socio-economic system interspersed with disharmonies among the subsystems (i.e. runaway of the public sector, the excessively expanding financial universe while the real economy was left behind and left out of special awareness) engendering suppressed innovation dynamism.

## SUCCESSION OF CRISES

If there is a sector that is definitely on the verge of extinction, it is disaster tourism, because, with a little exaggeration, there is no specific destination one can travel to in the age of global crises. After the era of the so-called Great Moderation, when everything looked nothing but fine in the developed world in terms of macroeconomic stability and financial development between the mid-1980s and 2007,<sup>11</sup> policymakers as well as ordinary people of the advanced world had to face a period that is highly fragmented and in which only crises emerging again and again provide permanence.

The Great Moderation had given birth to stories and scientific narratives that do not seem to get into a more palatable whole as the developed world switched to a crisis mode later on. For a long time, it seemed that policy practitioners were successful enough to solve the problem of having continuous growth while safeguarding the full control over inflation. The story was complemented by the firm belief that the broad-spectrum deregulation during the 1970s–1980s had freed the financial sector from its chains and embarked on liquidity expansion that promotes development and growth through promising innovations. Moreover, that period resulted in a conviction that modern economics serves as an effective means for economic governance in winding up depressions (i.e. our preventive tool arsenal and theories are correct and effective).<sup>12</sup> What followed, however, proved that policymakers and

<sup>11</sup> STOCK–WATSON 2003; BERNANKE 2004; GADEA et al. 2015.

<sup>12</sup> Bringing about a so-called Great Complacency as we indicated elsewhere (KOVÁCS 2022a: 432). Great Moderation can also be seen as a quieter phase of the dynamism of the socio-economic innovation ecosystem being seemingly free from attention-grabbing and detectable anomalies. The aesthetics of silence is well known in European culture. Silence, emptiness, nothing is always more ambiguous than something (concrete). There is more to be thought of in silence, while in case of something specific, it anchors expectations to a much greater extent and decisions are more cautious. In the spirit of Susan Sontag, a renowned representative of the culture of silence in art, we can now claim that for an economy to become silent is to become opaque for economists and policy practitioners to understand its underlying mechanism, hence a period of Great

economists were just chasing dreams and we are rather far from the precise understanding of what really happens in the system.<sup>13</sup>

After the Great Moderation, novel and mainly interrelated crises have arisen with new quality, in higher frequency showing an ever-more complex nature. Challenges require collective actions being not necessarily initiated and maintained by the public sector, but formed along the collaboration of it together with the real economy and the financial universe that has begun to become a separate entity. Therefore, there is a growing need from the side of the public to pursue at least the continuous addressing of “The Madness” around us.

- tipping inflation
- health crisis (coronavirus pandemic)
- engaging in the next production revolution (Industry 4.0)
- migration crisis
- antibiotic resistance
- demographic quandary
- natural disasters and climate change
- emerging patterns in emerging markets
- sovereign debt crisis
- shade of populism, shadow of sanctions

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Moderation opens up an array of possibilities for interpreting that silence (see Sontag’s views in SONTAG 1967: X).

<sup>13</sup> The plea for a renewal in our approaches to better grasp what is really happening in the socio-economic innovation ecosystem did not come exclusively from the academic community right after the eruption of the 2008 financial and economic crisis, but also from the side of policymakers. For the previous, enough to look at COLANDER et al. 2009; KRUGMAN 2009; STIGLITZ 2010. While to the latter, the former central banker, Jean-Claude Trichet did also underline the necessity of overcoming the shortcomings of the ruling macroeconomics paradigm (TRICHET 2011: 12–22). Of course, since then many others did accentuate the need for streamlining our economic thinking, however, the road seems to be longer than we previously thought (see BURGHAUS et al. 2018: 112–163; Kovács 2022a: 54–87).



*Tipping inflation*

In the aftermath of World War II, only a few scholars, pundits and economic practitioners considered inflation a potential threat, however, up until to the midst of the 1980s, when the so-called Plaza Accord came to light, inflation rates were relatively high (ranging from 12% to 16% even in the United Kingdom). Until now, it really seemed like we managed to keep inflation in check (i.e. inflation's long run trend was stable – when a shock occurred inflation tended to get back to manageable levels),<sup>14</sup> but now two black swan events (the Covid-19 pandemic sparking rising commodity prices due to the gaping gap between strong demand and constrained supply at both products and labour markets as well as the Russian–Ukrainian war leading to energy crisis) let the genie out of the bottle in the sense that record high inflation is here to stay (according to OECD statistics, in April 2022, the level of inflation hit a 31-year height of 7.2% across the OECD countries). As Covid-19 erupted and reached a critical level, many people started to eschew in person services while turned to elevated purchases of goods resulting in supply chain disturbances. Labour supply started to be on a negative trend being accompanied with the Great Resignation signalling greater bargaining power of the workers they usually had (e.g. only in the first half of 2021, 20 million workers in the United States resigned to seek out new opportunities elsewhere, and such tendency continued later, i.e. almost 4.3 million workers quit their jobs in January 2022). The Russian invasion in Ukraine did also contribute to the lift up of prices due to uncertainties over energy supply (e.g. statistics of the European Central Bank shows that in case of a European core country, Germany, the harmonised indices of consumer prices skyrocketed with the invasion from an already elevated level of 5.1% in February 2022 to a 41-year record height of 7.6% in March 2022). Moreover, both supply and demand shocks questioned the controllability of inflation in many developing countries (where

<sup>14</sup> Another equally important feature of such era was that the Phillips curve had flattened so that policymakers were sought to have more freedom in setting interest rates and pursuing fiscal policies that are conducive to the economy.

the global imbalances engendering ever-larger current account deficits and surpluses triggered the spectacular rise in the consumer price index).<sup>15</sup> And since bigger numbers have greater variance too, uncertainty in the global economy is growing by potentially stifling down innovation dynamism. It does also have implication on monetary policy regimes by potentially building a gradient toward going back to a world in which inflation's long run trend is considered unstable and inflation is controlled by either throwing people out of work or keeping them out of work (i.e. this is the way central banks and monetary policy can gain credibility by anchoring expectations). This is the old fashion method of monetary regime called aggregate demand management. And since public sectors in the developed world have become increasingly voluminous both in terms of functions to deliver and that of the number of public servants/workers employed, such approach appears to be adequate. However, recent development of inflation does not seem to be related to excessive aggregate demand, hence such approach is not feasible any longer. Thus, supply side procedures are also in our equation such as trade shocks, not to mention the phenomena of digital transformation and Industry 4.0 revolution working as an anti-inclusive (unemployment-heightening) mechanism with its high potential of automation and robotisation across the board. Albeit the predominant share of experts considers the sudden rise in inflation a temporary aberration since supply side shocks dissolve soon by their very nature by suggesting that regulators will under-react to it.<sup>16</sup> This is a hot topic and a moot point of today's policy discussions and hides many innovation dynamism endangering factors to which public sectors and economic governance should adapt as soon as possible. The dominant narrative

<sup>15</sup> According to the World Bank data, somewhere reaching two-digit inflation rate is exceptional, while there are countries where it has been the norm along the last decades such as Turkey (e.g. in March 2022, the annual inflation of Turkey accelerated up to 61.14% (!) from the level of 16.19% of 2021, let us underscore that the rate averaged 34.09% in the period 1965–2022).

<sup>16</sup> Andrei Shleifer, a renowned Harvard University Professor, and his co-authors applied their theory on how risk is neglected psychologically in the financial sector (for their previous work see GENNAIOLI et al. 2015: 310–314).

assumes that our today's supply side shocks are nothing but temporary ones and then inflation will get back to its normal and stable levels. Such conjecture seems to be extremely phantasmagorical once the excessive fiscal stimulus (governmental spending) is also considered an inflationary factor (i.e. rising inflation is also burning wage/salary increases so public sector workers will hardly want to be more innovative and efficient). Since resistance is futile and there is no chance of forecasting precisely the future inflation rates either,<sup>17</sup> the logical thing the public sector can do is to create monetary and fiscal spaces to become as resilient as possible while it tries to re-anchor inflation expectations. The latter is unimaginable without gaining the confidence of the public, without having its trust in the state and its institutions, which can be underpinned by fostering an ever-more efficient and innovative public sector.<sup>18</sup>

<sup>17</sup> In December 2020, OECD forecasted a brighter outlook with a global GDP growth of 4% for 2021–2022. That report did not even mention inflation as an imminent threat (e.g. low levels of inflation rates were predicted for 2022, see the case of Germany [1.3%], Eurozone [1.0] or the United States [1.4%]). One year later, world GDP growth rate was presented to be 4.5% in 2022, while the concern over fuelled inflation was mentioned given the energy imbalance caused by the struggling supply side to keep up with demand. Projections on inflation have been repeatedly revised upwards in the various editions of the OECD Economic Outlook but still being way far away the actual and real levels of it. We have to admit that our models show very modest performance, if at all.

<sup>18</sup> Let us add immediately that, contrary to the prevailing monetary views, anchoring inflation expectations does not seem to be as easy as previously thought since the financial actors deem it differently as opposed to the man of the street, i.e. inflation is felt differently and is affecting people being at various socio-economic levels rather heterogeneously (one index that weighs everyone similarly does not fit to the heterogeneity of democracy). If there is a problem with social trust, then the inflation perceptions and expectations of managers will be higher than what the central bank predicts, which may itself become inflationary (McCLURE et al. 2022). Managing such expectations would definitely need some additional trust building regarding the capacity of the public sector to act effectively and efficiently. It is now all the more important when the two black swan events resulted in an elevated inflation rate, just think of the yellow vests protests in France back in November 2018, which already showed that the general public does not tolerate endlessly the soaring fuel prices.

*Health crisis*

The coronavirus not only helped us rediscover our core values, but has also clearly demonstrated that health is a complex and multidimensional issue in the socio-economic innovation ecosystem. While the historical lesson of the health impacts of “ordinary” recessions is that they do not necessarily have negative impacts (e.g. recessions could free up time for health-enhancing activities while reducing income to be spent on health-destroying customs etc.),<sup>19</sup> a health crisis like the Covid-19 behaves in an entirely different way. The pandemic induced a public health crisis around the globe by indirectly triggering serious disturbances on the commodity markets, while infiltrating into the financial universe, by depressing the real economy<sup>20</sup> pervaded by a societal cataclysm exposed to a good deal of mental crisis as well.<sup>21</sup> Such a health crisis affects our daily economic life through many channels by underlining the crucial importance of physical and mental health in providing a fertile ground for economic growth and development. Stable and good health of the general public by itself can be seen as a sort of proof of real human developments (longer life expectancy is likely to enhance schooling and human capital). Not to mention the fact that healthy workers are still the *sine qua non* of innovation, and potentially that of higher productivity and growing incomes (i.e. this is not necessarily the case when ageing triggers higher savings over investments by leading to estate price booms but not real economic investments, etc.). After the 2008 financial and economic crisis,

<sup>19</sup> ARTHI-PARMAN 2021.

<sup>20</sup> Albeit labour markets in Europe acted as a classic automatic stabiliser, the health effect of Covid-19 had an economic impact too (being spectacularly mirrored in trade statistics) since (1) the production breakdown across the globe resulted in non-negligible vulnerabilities in products requiring inputs from specific countries; and (2) restrictions on in-person production led also to increasing vulnerability in case of products that are more difficult to produce remotely (see BAS et al. 2022).

<sup>21</sup> Studies pinpointed that permanent emergency mode is extremely stressful and has a detrimental effect on the body itself. For instance, studies showed that at least 20 to 30% of those with a severe viral infection suffer from post-traumatic stress disorder (see COCOZZA 2020).

austerity proved to be a physical and mental health destroyer in many places around the world. As it was documented carefully,<sup>22</sup> there were over 10,000 additional suicides across the developed world since the introduction of austerity measures targeting deficit- and debt-to-GDP-rates considered optimal ones (e.g. an estimated million extra cases of depression was also registered since 2007, plus, just in the US, 5–6 million people lost healthcare provision because of job losses). Studies pointed out that job losses – especially in countries where unemployment has been traditionally low<sup>23</sup> – excessive indebtedness and the serious threat of foreclosure tend to rise risks of suicidal thinking within the population, of course, in a heterogeneous way by nourishing the message that recessionary times should not be aggravated further by austerity-like policies.<sup>24</sup> One could make a thought experiment with what would have happened if Covid-19 was paired with austerity and not with stimulus (that have been the widely recommended path<sup>25</sup>). By the time I am writing this monograph, 6.2 million people died so far from Covid-19 (and its variants) since the outbreak of the pandemic in the midst of January 2020. Still, the death toll has been still rising in many developed and developing countries across the board (by reaching more than 991 thousand deaths in the United States, 522 thousand in India, 173 thousand in the United Kingdom, 162 thousand in Italy, 134 thousand in Germany, etc.).<sup>26</sup> Moreover, this line of gargantuan challenges did not leave unaffected the national politics and the trust infrastructure of the societies either.<sup>27</sup> The epidemic has placed an awful lot of additional burden on the health care system (i.e. causing severe

<sup>22</sup> STUCKLER–BASU 2013: 216.

<sup>23</sup> CHANG–CHEN 2017: 266–278.

<sup>24</sup> REEVES et al. 2018: 246–247.

<sup>25</sup> See WEDER DI MAURO 2020; BALDWIN – WEDER DI MAURO 2020.

<sup>26</sup> Data are taken from the University of Oxford database (<https://ourworldindata.org>).

<sup>27</sup> Although the pandemic has highlighted the flaws in the approach that people need to be manipulated to make the right decisions, trust and confidence in experts has decreased significantly due to expert proposals being full of complex contradictions leading to dissatisfaction of many about the crisis management imposed.

capacity problems, risking medical overload, etc.).<sup>28</sup> It was the case even in some welfare states of Europe. Due to the underinvestment activities in the hospital sector and in the entire health care system, as Eurostat (2019) demonstrated, in recent years, most EU Member States have reported a significant decrease in the availability of curative care beds in hospitals. In doing so, it reduced the chances of effectively and sufficiently controlling the spread of the disease, while treating the infected people appropriately as much as possible. In other words, the vulnerability of the healthcare system by itself may have prolonged the epidemic, especially in countries where the public acceptance of stricter policies against Covid-19 was relatively low (e.g. policies like stricter lockdowns resulting in a significant decrease in pandemic-related deaths being accompanied with stay-at-home campaigns, closures at the workplace and various schools, restricted public gatherings and limits imposed on international travel<sup>29</sup>). It is well known that confidence in democratic institutions and the elite has been declining for decades. Yet, the coronavirus could make the situation worse – research shows that teleworkers are becoming distrustful of each other.<sup>30</sup> Another aspect of trust is that, in general, it seems true that trust in the government determines the propensity to vaccinate more than

<sup>28</sup> For instance, the Italian health system faced a collapse-close state in early 2020 (see ARMOCIDA et al. 2020).

<sup>29</sup> These were found to be quite conducive in halving the reproduction rate, i.e. to slow down the spread of the virus (see CONYON et al. 2020: 17–42; DEB et al. 2020). Others did also quantify the impact of governmental policies on the progress of Covid-19 (ÉGERT et al. 2020). Let us add immediately, such policies are more likely to be effective if and when they are organically designed and are in line with the informal institutions of the given society, i.e. where the Albert Schweitzerian (1987) ethical principle of living – “I want to live, but with respecting the lives of others” – is deeply appreciated and cherished by the critical mass of the population (SCHWEITZER 2009 [1987]: 387).

<sup>30</sup> A large-scale survey of Finnish workers conveyed the message that trust among others in teleworking is significantly reduced (VAN ZOONEN et al. 2021). After six months of working from home, employees also had less trust in each other and their superiors than before. An Australian survey came to a similar conclusion (PARKER et al. 2020). Of course, this is not surprising – IBM stopped its two-decade experiment with telecommuting in 2017, before the coronavirus came out, because it thought it had a bad impact on work efficiency.

the fear of side effects. That is, the proportion of those being hesitant to be vaccinated (or the intensity of anti-vaccination movement) is significantly higher where confidence in the state and the elite is low. This is why bolstering an innovative public sector that recreates and rehabilitates trust infrastructure is of immensely importance for instance by systematically incorporating the issue of health effects of public policies of all kind.

*Engaging in the next production revolution  
(Industry 4.0)*

According to Nobel laureate Paul Krugman, productivity is not everything, but in the long run it is almost.<sup>31</sup> Productivity growth makes it possible to ensure prosperity, including the fulfilment of the welfare promises of states for the sake of the citizens, hence to realise a sustained improvement of the general standard of living. And productivity requires transformation and change. Technological revolutions are not rare in the modern history of economies. Typically, almost every 40–60 years, a new general purpose technology (or a set of general purpose technologies) emerges as a Big Boom event and starts to unfold by grounding and building up a qualitatively new techno-economic paradigm. It has been happening mainly since the 1<sup>st</sup> industrial revolution of the 18<sup>th</sup> century followed by the age of steam and railways by engendering the next revolution resulting in the emergence of the age of steel, electricity and heavy engineering to be then followed by the paradigm built on oil, automobiles and mass production, which was then replaced by the age of information and telecommunication (i.e. big boom event was the discovery and application of Intel chipset of the 1970s) an important beam of which is the advancement of various technologies including Artificial Intelligence, machine learning, and others constituting the anew production revolution aka the so-called Industry 4.0 as well. To cut a long story short, Industry 4.0

<sup>31</sup> KRUGMAN 1997.

is nothing but a protrusion of the information and communication age being with us from the 1970–1980s. This historical scenario already reflects the lack of uniformity in the literature regarding the numbering of the revolutions. Nevertheless, still, the next production revolution (Industry 4.0) is brought to life in a Schumpeterian sense by being formed as a new combination of already existing and new-fangled technologies and being applied on a larger scale. Without being exhaustive, we confine ourselves to a broader definition of Industry 4.0 encapsulating and embracing the ongoing development and ever-wider application of artificial intelligence as well. According to such definition, the warp and woof concept of Industry 4.0 means that independent and self-optimising production processes are realised via a new manufacturing philosophy and mode of operation based on the Internet of Things and Services (IoT), in which smart factories are created by connecting resources, machines and even logistics systems into an online integrated system, a kind of cyber physical system. Fundamentally, Industry 4.0 builds upon at least nine to ten technologies such as *the application of ICT* for digitalisation of information and the integration of various systems (production and customer sides) within companies and across companies; the widespread use of *sensors* for more effective control and monitoring of virtual (cyber) and physical systems; application of *robotics* and *additive production* (3D printing); digitised, *Internet-based continuous communication and interaction* not only between people or people-to-machines interaction, but also in machine-to-machine relation; *simulation* and (virtual) modelling during production processes and design; the usage of *cloud-based services*, *augmented reality* and *data mining*, and data scientists to leverage *Big Data*. Since the very beginning of the professional discourse on Industry 4.0, the view has been held that the revolution is leading to a spectacular productivity boom. Analysts, scholars, pundits and even policy practitioners are still having a predilection to envision perceptible and revolutionised productivity growth.<sup>32</sup> A study commissioned

<sup>32</sup> See AICHHOLZER et al. 2015; VAIDYA et al. 2018: 233–238; World Economic Forum 2018. A paper prepared by the European Commission on the French transformation did emphasise that *Industry of the Future* is expected to create new sources of growth and jobs



by the European Parliament and prepared for the Industry, Research and Energy Committee stated that: “[...] If successfully implemented, the potential benefits of Industry 4.0 relate to productivity gains, revenue growth, and competitiveness. The implementation horizon is to have pilots running in 2016 and full implementation as of about 2025.”<sup>33</sup>

By the writing of this book, there has not really been a perceptible breakthrough in Europe, rather only the big companies could afford some definite steps towards partly installing and relying on cyber-physical systems-like operation. Productivity stagnation at best is ubiquitous across the European Union given by the declining trend in manufacturing being coupled with the cumbersome productivity performances of the service sector.<sup>34</sup> As a consequence, there has been a gaping gap between what was once envisioned and what could be realised from it. There have been complex interactions taking the form of blind spots that we did not anticipate and thus omitted from our models at the time and that have significantly suppressed the expected productivity boom.<sup>35</sup> Let us briefly and succinctly mention only a few suppressive processes or *quelling forces* (henceforth *q force*) that have been working behind the curtain deterring many from investing intensively in Industry 4.0, thereby hindering its spread and thus delaying the emergence of the desired productivity enhancement.

*Qforce No. 1:* Growing uncertainty over ensuring effective defence against cyberattacks make the transformation economically unsustainable: as Industry 4.0 would necessitate the rising Internet-based interconnectedness coupled with the generation of ever-more (even real-time) sensitive data (Big Data), the issue of cybersecurity has become a priority since the lack of its proper addressing make business operations economically costly and potentially

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(European Commission 2017a). In comparison, other countries were to recommend the deeper installation of Industry 4.0 in an effort to increase productivity, see the Danish case in STENTOFT et al. 2017.

<sup>33</sup> SMIT et al. 2016: 7.

<sup>34</sup> European Commission 2021a.

<sup>35</sup> We explored the topic in more detail (see KOVÁCS 2017a: 823–851; KOVÁCS 2017b: 970–987; KOVÁCS 2018: 140–145; KOVÁCS 2019; KOVÁCS 2022b).

unsustainable. And since cybersecurity is far from being resolved (i.e. think of the series of malwares and ransomwares, Petya, Wanna Cry, SQL injections resulting in high-profile security breaches, etc.), and since manufacturing is the second most attacked sector, business players have been mainly eschewing great front-load investments geared toward Industry 4.0 development. A survey of 1,452 corporate decision-makers across ten EU Member States made it clear again that, mainly due to the uncertainties over cybersecurity, more than half of the companies surveyed have not even developed a strategy or roadmap for introducing and tapping the potential of Industry 4.0.<sup>36</sup> It seems that the view holds hard that there is still much room for improvement in the field of cybersecurity,<sup>37</sup> hence the spread of Industry 4.0 will be much more limited than previously thought questioning the spectacular productivity boosting character of the revolution. Importantly, in the light of the last decade and today's cyber activities (e.g. in 2007, Estonia was almost paralysed by a series of cyberattacks targeting the parliament, the banking system, some ministries, even newspapers and broadcasters; in 2008, the Russian military action against Georgia was also preceded by a serious cyberattack; while Russia was using cyberattacks in Ukraine to support military strikes during its invasion in the first half of 2022<sup>38</sup>), one should not be therefore surprised at all about the hesitation of the business sector regarding the introduction of the digitalised network system with the aim of exploiting the full scale of Industry 4.0.

*Qforce No. 2:* Rapid diffusion is likely to make the transformation socially unacceptable. Since overarching digitalisation and the broad-based application of Industry 4.0-related technologies appear as a disrupting force with respect not only to the prevailing business models and practices but also to the mental health of people, the further progress can become easily undermined.

<sup>36</sup> TeamViewer – Handelsblatt Research Institute 2022.

<sup>37</sup> COPIC–LEVERETT 2019.

<sup>38</sup> A special report on the Ukrainian cyberattack context, prepared by Microsoft (2022: 1), stated that: “[...] At least six Russian Advanced Persistent Threat (APT) actors and other unattributed threats, have conducted destructive attacks, espionage operations, or both, while Russian military forces attack the country by land, air, and sea.”

The burgeoning of new platforms *as means of connections*<sup>39</sup> (Airbnb, Hitch, LiquidSpace, Neighborgoods, Spotify, Uber, etc.) to a large extent eroded the triumphant position of well-established professions and spheres of businesses, and resistance developed in several places (e.g. Airbnb resulted in protests in the US housing market; Uber caused demonstrations and resistance from the side of taxi companies, etc.). What is more, pervasive digitalisation has been affecting our seemingly intangible dimensions as well, that is to say, intensive usage of ICT both at work and home is thought to be a continuous stress-fuelling factor by provoking depression and other mental and even physical diseases (e.g. continuous monitoring and control of workers, not to mention the coercion to compete with robots creates the culture of anxiety).<sup>40</sup> Despite the crucial importance of knowing more on the mental and physical consequences of Industry 4.0 development, studies addressing this phenomena are still in an embryonic state.<sup>41</sup>

*Qforce No. 3:* The anti-inclusive character of Industry 4.0 makes the state support of the transformation politically impractical. Given the complex configuration of at least three perplexing trends (state overload, chronic and growing inequalities, anti-inclusive digitalisation), Industry 4.0 development

<sup>39</sup> MOAZED-JOHNSON 2016: 272.

<sup>40</sup> For more on ICT stress see JOHANSSON-HIDÉN et al. 2003. Thomée and his co-authors found that online availability and activities did typically prolong stress, and e-mailing and online chatting were associated with symptoms of depression, while Internet surfing increased the risk of developing sleep disturbances (THOMÉE et al. 2007: 1300–1321). Addressing also the issue of how Big Data may become a trust demolisher channel would go well beyond our scope, however, we mention that if we have a sufficiently large and sufficiently structured data set, then with the help of computer data mining we can very easily find statistically significant correlations that are only randomly due to the law of large numbers. The purpose of such data analysis is not to support or refute any hypothesis, but merely to find coincidences to support an unscientific statement wrapped in a scientific method. Thus, Big Data may be a window into the world of arbitrary correlations. Big data makes statistical analysis faster than ever before. But large data mines also facilitate charlatanism, which can further erode the credibility and authority of science as a real and reliable source of our knowledge-building without which there is no such thing as socio-economic innovation dynamism.

<sup>41</sup> WALDMANN et al. 2020: 284–293.

can make the future of inclusiveness even darker with menace, hence the conscious, transparent and spectacular state support of such development seems to be politically dangerous and impractical. Those who have read Arnold Toynbee's pioneering works on the English Industrial Revolution know very well that one of the important conclusions of the English historian and philosopher was that as technology advances, new systems are created and there is never a return to the former. Furthermore, Toynbee also showed that certain societies rise up thanks to technological developments and collapse when they are unable to create and develop social cohesion.<sup>42</sup> Crucially, social cohesion falls short especially when chronically increasing income and wealth inequalities have become a part and parcel feature of today's developed economies being coupled with lessening fiscal capacity of the states to intervene and to broaden the social safety net due to their growing indebtedness acting as a straitjacket.<sup>43</sup> But while previous revolutions have been characterised by the ability of other sectors to absorb labour lost due to mechanisation, it is getting more and more reasonable to think that for the time being this trend will be broken with the overarching automation and robotisation potential in the digital age.<sup>44</sup> In other words, the current digitalisation milieu has already been on an anti-inclusive trajectory – by

<sup>42</sup> The 12-volume universal history over the rise and fall of human civilisations written by Arnold J. Toynbee conveys such insights. There were two volumes of abridgments to the volumes, see for instance TOYNBEE 1987.

<sup>43</sup> For almost 30–40 years, the gap between the top earners (TOP 1%) and those that are at the bottom of the social ladder has been increasing inexorably. OECD documented that the richest 10% earns almost 10 times more than the poorest 10% as compared to the 1980s when that difference was only sevenfold (CINGANO 2014; see more on the chronically increasing inequalities in ATKINSON 2015: 400; PIKETTY 2017: 816). We will get back to the issue of inequality later on in this book when for instance the growing incredulity at the diminishing progressivity in tax systems across the OECD will also be incorporated.

<sup>44</sup> For instance, Acemoglu and Restrepo showed that such absorption mechanism would require a level of retraining and upskilling from the side of the workers that do not seem to be feasible (ACEMOGLU–RESTREPO 2019: 3–30). According to earlier estimations, job replacement rate due to automation can reach the following levels: 57% in OECD countries, 47% in the US and 54% in the European Union, while 77% was estimated for China (see LOESCHE 2016).

limiting the tax revenue side of the state putting it on a delicate and swampy fiscal position – which is likely to be exacerbated further by an intensively unfolding Industry 4.0. What is more, according to OECD (2021a), the lion's share of the risk of automation is on low-skilled and low-educated workers, and, there are certain signs that the recent pandemic catalyses automation too (i.e. companies tend to reduce their reliance on human labour and the number of contacts between their employees, or re-shore some production).<sup>45</sup> What is even more thought-provoking is that, given the already existing gender inequality, a greater fraction of females than males in occupations are at high-risk of automation.<sup>46</sup> These processes altogether call for inclusiveness requiring an innovative public sector in an effort to control the unfolding of Industry 4.0 and to offer opportunities for many to use their increased leisure time meaningfully and in conjunction with higher level pro-social goals (e.g. fostering sustainable development).<sup>47</sup> Although there are voices arguing that automation may entail a positive direct effect on employment,<sup>48</sup> they argue that automation makes the firm more productive allowing it to pay higher wages whereby it could steal the businesses of its competitors – it is not clear, however, why an automatising firm would continue to strive to pay a dime of human labour costs. Nonetheless, when inclusiveness is at stake, which is currently the case, we do not have to be a fortune teller to expect that economic governance is going to refrain from supporting Industry 4.0 with full steam rather than promoting it in all sorts of way whereby delaying the emergence of the desired productivity enhancement.

<sup>45</sup> Covid-19 resulted in a perceptible rise in new and digitalised working arrangements. A report by the German Trade Union Confederation showed that 20% of employees in unskilled or semi-skilled jobs faced the usage of new software, while digitalisation was more pronounced in case of highly complex jobs (78% of workers with a university degree found themselves in an excessively digitalised job, see DGB 2021).

<sup>46</sup> See CHERNOFF–WARMAN 2020.

<sup>47</sup> Automation and robotisation will definitely reduce working time by increasing the leisure time to be spent meaningfully. This is a question and a good deal of nudging from the side of the innovative public sector that needs to meet such goal.

<sup>48</sup> AGHION et al. 2020; AGHION et al. 2022: 15–39.