

Metamorphosis of Capitalism: Chronicle of Schumpeterian Thinking

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Abstract This chapter advances Post-Schumpeterian Economics to address the profound transformation of capitalism in the twenty-first century. While Schumpeterian economics has been highly successful in explaining innovation-driven growth and structural change in the second half of the twentieth century, its established framework increasingly fail to capture the scale, complexity, and existential nature of contemporary global challenges. Comprehensive Neo-Schumpeterian Economics (CNSE) represented a first major conceptual advance by integrating industry, financial markets, and the public sector into a three-pillar, co-evolutionary framework that enables an endogenous understanding of structural change, institutional dynamics, and socio-economic transitions driven by technological paradigms. Here we argue that even this extended framework insufficiently addresses the growing fragility and missing resilience of capitalist systems i.e. the requirement of evolutionary robustness. Repeated global crises—from the dot-com collapse and the global financial crisis to the COVID-19 pandemic—demonstrate that innovation-driven development does not automatically generate positive-sum outcomes. Moreover, the Anthropocene exposes a fundamental blind spot in existing Schumpeterian approaches: the neglect of ecological boundaries and the destabilized relationship between humans and nature. At the same time, currently emerging disruptive technological paradigms introduce new geopolitical and existential risks that exceed the explanatory reach of innovation-centered models. Post-Schumpeterian Economics is introduced as a framework that embeds innovation and economic development within a planetary, social, and geopolitical context. Economic development is reconceptualized as a process of transformation rather than growth alone, guided by the dual objectives of prosperity and security. Security is understood both as planetary security and as geopolitical and existential security. The chapter concludes that Post-Schumpeterian Economics offers a coherent research agenda for integrating innovation dynamics with ecological constraints, social justice, institutional change, and power relations, thereby providing a forward-looking framework for understanding and shaping the future of capitalism under conditions of global existential risks.

1. Introduction

In the German Pre-March period, Georg F. W. Hegel formulated in the 1820s the sentence ‘Every age has its own concepts, its own truth’ in his lectures on philosophy and history at the University of Tübingen. This sentence has lost none of its significance 200 years later. Nevertheless, in particular economics still finds it difficult to question and continuously develop the prevailing central explanatory models for a specific economic system, namely capitalism. This essay deals with the developmental dynamics of capitalism since its ongoing metamorphosis in the last century and the intellectual debates that have been conducted on this subject in the International Joseph Alois Schumpeter Society (ISS) since its foundation 40 years ago.

The very founding of the ISS marked a reorientation in the emphasis placed on key elements for understanding capitalist systems. After half a century of capitalism's golden age, which was described and shaped by neoclassical economic theory with its deterministic and equilibrium-oriented optimization models, irreparable cracks began to appear in this intellectual construct in the late 1970s. Due to the criminal neglect of innovation and technological paradigms, as well as structural changes in national economies triggered by this, this approach lost its explanatory power.

The departure from neoclassical economics marked the beginning of a new era of Schumpeterian thinking. Schumpeter's ideas on economic development were revisited and brought into line with current developments. These were primarily elements from the industrial real economy, such as entrepreneurship, innovation and technological progress, integrated into the principle of 'creative destruction', which served as the engine of growth and change. Prosperity is measured by 'positive sum' success, as economic added value in which the winners outweigh the losers and the latter are fairly integrated into development (trickling-down effect, social upward mobility).

The newly founded International Joseph Alois Schumpeter Society plays a central role in this intellectual cosmos. Within its sphere, new, relevant and explanatory approaches are being developed that stand in stark contrast to the still-dominant neoclassical and Keynesian economic theories. In the decades that followed, these approaches were to usher in a shift towards supply-oriented economic theory, which, based on innovation, was to shape not only the national economy but also its economic policy (Hanusch, H., 1999).

Because of the overwhelming success of neoclassical and Keynesian economic theories during the golden age of capitalism after World War II—and their dominant role as the scientific mainstream—this further development did not occur without painful ruptures that persist to the present. Schumpeter's ideas, above all because of their basic incompatibility with equilibrium-oriented optimization models, have found little application in the economic mainstream and are sometimes dismissed even today as scientific aberrations. The focus of the mainstream was and still is on costs. Innovation is seen as a disturbing factor.

The first period of neo-Schumpeterian economics, however, failed—partly due to its one-sided focus on innovation-driven industrial dynamics—to set something equivalent against the prevailing comprehensive theoretical edifice of neoclassic economic theory. In particular, the development of a Schumpeterian theory of the state and of financial markets was not advanced. This deficit has been recognized and discussed within Schumpeter Society circles since the 2000s. Future orientation and the unavoidable Knightian uncertainty associated with it also play a decisive role for financial markets and the public sector: industrial innovation dynamics are linked, in a co-evolutionary process, to the dynamics of change in the financial sector and to institutional change in the public sector—and can only be understood jointly.

This insight led to a second period of Schumpeterian thinking, in which a so-called Comprehensive Neo-Schumpeterian approach (CNSE) was developed (Hanusch and Pyka, 2007a, b). It is based on a three-pillar concept in which long-term development dynamics are conceptualized through the interplay of industry, financial markets, and the public sector. This view makes it possible to treat major changes in capitalist economic systems not as a consequence of exogenous shocks, but to trace them back to processes that unfold endogenously (Hanusch and Hara, 2018). Take, for example, a new technological paradigm such as digitalization in the recent past. It induces an innovative structural change in a capitalist national economy, which in turn fosters a socio-economic transition—namely from an industrial “manufacturing society” to a post-industrial “service society.” As a further consequence, the balance of influence between the institutional pillars in the affected economies also shifts; e.g. in a (toxic) co-evolutionary process, financial markets become autonomous, move from a national into a global framework, and in this context exert massive worldwide feedback effects on income development and distribution.

Alongside the conventional Schumpeterian goal of “positive-sum” development, the concepts of “co-evolutionary robustness” (i.e. in terms of complex systems “resilience”) and “avoidance of fracture” gain central importance when one looks at economic history since the beginning of the 21st century. In the first decade of this century there were already two global economic crises, in 2000 and 2008, that could not meet these requirements. The first was caused by uncontrolled developments in the real economy and is known as the real-economy dot-com crisis. The second was triggered by the financial sector and is known as a real-estate-related speculation crisis.

Decades later, therefore even the institutional extension in CNSE proves insufficient to adequately explain the ongoing metamorphosis of capitalist national economies as it unfolds in reality. Above all, climate change visible everywhere and the effects of the COVID-19 pandemic, but also massive geopolitical changes—not least driven by a profound technological paradigm shift, namely that of artificial intelligence (Olson, 2024)—pose global challenges of an existential nature. They require again a renewed development of Schumpeterian thinking if it is to remain relevant in the 21st century. The keywords for this period are sustainability and transformation (Pyka, 2024): nothing will remain as it was—and above all, nothing may remain as it is—if we want to develop effective solution strategies for coping with these planetary challenges that reach into all areas of life (Hanusch, H. 2024).

This chapter was born from the conviction that our existing Schumpeterian framework is insufficient to fully comprehend, let alone navigate, the fundamental challenges that lie ahead. The Neo-Schumpeterian model of economic development, successful as it was in the second-half of the 20th century, does not account for a sustainable transformation of economy and society. Primarily triggered by new technological paradigms based on

the quest for “green innovations” and the application of artificial intelligence the chapter seeks to bridge that gap by proposing a new analytical framework: Post-Schumpeterian Economics.

The goal is to extend Joseph A. Schumpeter’s powerful insights on capitalism based on innovation, creative destruction and economic evolution into the 21st century context of global existential risks and to show how they are discussed since its foundation in the “International Joseph A. Schumpeter Society” in the last 40 years.

2. From Neo-Schumpeterian Economics to New Challenges

Since the 1980s, the inadequacy of traditional economic theory for analyzing economic dynamics and technological innovation has become increasingly clear. In particular, the assumptions of homogeneous markets and perfect information, as well as the equilibrium orientation, proved to be obstacles to explaining the metamorphosis of capitalist national economies—based on technological innovations, the emergence of new industries, and the transformation of existing institutions—in their multifaceted appearance and complex dynamics. The Neo-Schumpeterian innovation-oriented approach, prominently introduced and elegantly systematized by Dosi et al. (1988) with regard to innovation dynamics, expanded economic thinking by emphasizing the central role of innovation as the driving force of growth and development in the real sector of a national economy. The new approaches provided important impulses for a more modern, enterprise-oriented economic policy. Schumpeter’s concept of “creative destruction” and the central role of his entrepreneur enabled an understanding of how technological novelties destabilize existing structures while simultaneously creating new economic opportunities. The renaissance of Schumpeterian thinking (Freeman 2007) found an allied theoretical partner in the then-emerging powerful field of evolutionary economics (Pyka and Dopfer, 2018), which Nelson and Winter (1982) successfully developed further; it was gratefully taken up in academia and politics to support the global economy, which since the oil price crises of the 1970s had been plagued by stagnation and fading growth dynamics. The new concepts and proposed solutions were widely considered – in particular in the applied domain of economic policy - to be most relevant.

In the first decades after the end of the Cold War, Neo-Schumpeterian economics showed impressive explanatory power. It was able to adequately capture the growth dynamics of globalization, the emergence of innovative clusters, and the international diffusion of innovative technological processes and products (Nelson et al., 2018; Freeman, 2019). Innovation, as the founder and driver of technological paradigms, was not only recognized as a central source of growth and development but also explained endogenously, which led politics and industry to increasingly focus on promoting technological capabilities.

With the beginning of the 21st century, however, it became increasingly apparent that the explanatory power—and thus the relevance—of neo-Schumpeterian Economics has been declining due to its one-sided emphasis on industrial dynamics. A way out was presented by Hanusch and Pyka and introduced into the debate: Comprehensive Neo-Schumpeterian Economics (CNSE) (Hanusch and Pyka, 2007a). This concept extends the conventional neo-Schumpeterian approach, which focuses on firm-based technological innovation as the driving force of economic dynamics, into a broader theory of economic change. The approach emphasizes innovation within an institutional three-pillar framework, bringing into focus the future orientation and potential qualitative changes in all sectors of a capitalist economy, namely industry, the state, and finance. Novelty remains the central engine: innovation is the essential driver of long-term economic development and qualitative changes in economic and social systems. In a Schumpeterian context, these processes always also produce winners and losers. This dynamic exists in all sectors—open, uncertain, and unpredictable. Economic development is not an orderly, deterministic process, but is characterized by uncertainty, non-linear effects such as increasing returns, lock-in, positive feedback, and discontinuous change.

Unlike in the conventional Neo-Schumpeterian approach, Hanusch and Pyka argue that all three institutional sectors of a capitalist national economy (industry, the state, and financial markets) are characterized by innovation-driven change and are also intertwined in co-evolutionary processes. The industrial sector is responsible for innovation dynamics in production and competition; the financial sector for credit provision, financial innovation, and the resulting effects on economic dynamics; and the public sector for changes in state institutions, regulation, and the steering of knowledge and research activity. All three areas are marked by uncertainty, develop simultaneously, and require future orientation. They influence one another reciprocally and therefore must be analyzed together.

The CNSE approach retains the evolutionary-economic and systems-theoretical perspective: the economic system is understood as a complex system that continuously evolves. CNSE thus takes up the concepts of innovation systems theory and expands them, as an interdisciplinary approach, to include financial and public-policy elements. Economic theory, innovation studies, complexity theory, and institutional economics are linked.

This provides CNSE with a framework to treat innovation, industrial, financial, research, and education policy as integral components of economic development. In this way, three goals of this expanded Schumpeterian approach are fulfilled: (a) to formulate a coherent, holistic theory of economic dynamics, (b) to connect technological entrepreneurial and policy knowledge, and (c) to analyze economic development comprehensively by linking industry, financial markets, and the state.

What the CNSE approach did not keep sufficiently in view, however, is its “evolutionary robustness.” Schumpeter is indeed considered an economist of crises, but he would certainly not have expected the force with which global crises can develop out of his system. The dot-com crisis of 2000 should be mentioned here in particular. Ultimately, it was based on an overly optimistic expectation in the real and financial economy regarding the future development of capitalist national economies—an expectation that escalated into speculation and greed as economic behaviors (Minsky, 1986), leading to a crisis-prone and fragile situation.

But even years earlier in the United States, the technological paradigm of digitalization had accelerated the transition from an industrial to a post-industrial social system, thereby creating the roots of social dislocations that today are becoming visible in most threatening way for the economic and political constitutional order of that country and also radiate across the globe. For a variety of reasons of failure, the “winners” and “losers” of this metamorphosis of capitalism in the U.S. were squeezed out of a societal “positive-sum situation” and pushed into a “zero-sum society.” What was missing was the deployment of an appropriate set of instruments in the sense of an “avoidance of fracture,” which is indispensable for a functioning Schumpeterian system—for example, a social and welfare-policy role of the state adapted to the changing situation.

From this crisis perspective alone, the CNSE approach clearly needs to be supplemented. But there are even more significant reasons to consider it no longer relevant and effective. Existential crises of a global nature – climate change, exceeding planetary boundaries, geopolitical instability and pandemics – clearly demonstrate the limitations of an approach in the Anthropocene era that is primarily based on a cultural perspective and that (a) focuses on man-made, human-related economic development and (b) concentrates solely on the innovation and technological dynamics that take place within this framework and dominantly in the Northern Hemisphere. Despite the systemic orientation, the system boundaries are too narrowly defined, as they criminally neglect the importance of nature and the ecological environment. Alexander von Humboldt (1803) wrote in his American travel diaries that ‘everything is interaction’, an insight that becomes even more significant with the crossing of planetary boundaries (Rockström et al. 2009). A dystopian situation has developed in the relationship between humans and nature, which economics can no longer ignore. Schumpeterian Economics is requested to make a necessary change of perspective. Economic development in the traditional sense must be redefined as a process of transformation.

On the one hand, this must be based on a green technological paradigm that transforms the economic and social development process into one that is appropriate for the Anthropocene. In addition to economic prosperity, the ‘security of climate and nature’ plays a decisive role in this process. On the other hand, alongside the existential challenge associated with the relationship between humanity and nature, we are simultaneously confronted with new, potentially dystopian threats that additionally arise from a new technological paradigm based on artificial intelligence and referring to the relationship between humans and machine “supremacy” (Olson, 2024). Beginning with large language models and extending beyond them to synthetic biology and laboratory automation, a metamorphosis is emerging that is capable of fundamentally transforming the economic, social, and ecological systems capitalism is embedded in, encompassing producers and consumers as well as the rules of the game. Previously unimaginable utopian, but also dystopian, scenarios are moving within tangible reach—scenarios that may be accompanied by a fundamental global restructuring of the current rule-based systems in economics and politics. Due to their complexity, these developments exceed the explanatory capacity of both the conventional Neo-Schumpeterian approach and the CNSE approach. Both frameworks are insufficiently equipped to capture the complex interactions—both positive and negative—between innovation, economic and political power, social justice, and the ecological limits of capitalist economic activity. What is required is a systemic extension of these approaches to grasp the manifold and intricate interactions of the new technological paradigm under the rubric of “coevolutionary robustness.”

Above all, this requires the incorporation of the notion of “existential threat,” which has thus far been largely neglected in economics, as articulated in the concepts of the risk society (Beck 1992) and the “shock of the global.” In the latter, the historians Ferguson et al. (2010) seek to trace, for the past decades, discontinuities and ruptures in the economy (“crisis of industrial society”), society (“ideological, religious, and intellectual upheaval”), and politics (“global challenges and international society”). These constitute core components of a metamorphosis of capitalism that is based on technological paradigms and on a Schumpeterian fundamental dynamic that replaces the old with the new and, in doing so, seeks—if not to determine, then at least to influence—the future of humanity.

3. Post-Schumpeterian Perspectives

Post-Schumpeterian economics extends the perspective of the CNSE approach in several respects. For it, it is not only the cultural human-centered interplay in economic activity that is of central importance. Innovations and structural change are not viewed in isolation with reference to humans, but as part of comprehensive transformation processes embedded in a planetary ecology, a world society and welfare, as well as in newly emerging geopolitical power structures. Alongside the goal of economic prosperity, the quest for security gains a significant role—manifesting as “planetary security” when it comes to the relationship between humans and nature, or as “geopolitical security” when it concerns the relationship between humans and “machine intelligence.” Both security requirements are components of the “co-evolutionary robustness,” which aims to prevent humanity from reaching irreversibly a tipping point of its existence (avoidance of precipices).

In the term “Post-Schumpeterian Economics,” the prefix “post” refers to the second part of the term—economics—and invokes the necessity for economics to engage with the full complexity of the interplay between economic, technological, social, and natural development. The Schumpeterian aspects of creativity and innovativeness as the basis for new technological paradigms and the development dynamics triggered by them remain the heart of this approach, since the multiple crises of the present demand new solutions and categorically rule out a simple “more of the same.” In this sense, Schumpeter continues to play a central role as THE economist of future orientation and of innovation. The focus still is on knowledge and technological development and the related change, as transformation to a sustainable economic and social order is by no means compatible with maintaining today's lifestyles (in the so-called developed world). Continuing with the conventional idea of economic growth is not a solution. Transformation to a sustainable economic and social order cannot be reconciled with the hygge concept of mainstream growth approaches, which aim - like the US MAGA movement - for a return to industrial times. Innovation and knowledge are still central components of the transformation process but require to be complemented with planetary and geopolitical security and embedded in the risk society.

The relevant transformation processes to address the “global challenges” simultaneously take into account ecological, social, and moral dimensions alongside economic and technological ones (Pyka, 2024; Pyka, Fischer and Buckisch, 2025). They must meet both the requirement of “prosperity” and the condition of security in the sense of “co-evolutionary robustness.” Innovation remains a central driving force, but it is treated within a larger interplay of society, ecology, human intelligence, and artificial systems. Eco-humanist and eco-modernist approaches, for example, show that technological progress and planetary responsibility must not be played off against each other, but must be reconciled (Pyka, Fischer & Buckisch, 2025).

Transformative innovation policy plays a key role in this habitat. It includes targeted industrial strategies and state management in the sense of benevolent “supervising” (Hanusch and Hara, 2026). Coordinated global agreements are also needed to increase societies’ capacity for development, reduce global inequalities, and strengthen resilience to crises (Lundvall, 2014; Hanlin et al., 2023.; Kraemer-Mbula et al., 2020). Polycentric governance models that emphasize collaboration and involve local, national, and global actors prove particularly suitable for addressing complex challenges such as climate change, pandemics, and threats to personal or national status—for example through AI and artificial systems (Ostrom, 2010; Paredes-Frigolett and Pyka, 2025).

The relationship between the real economy, the financial economy, and the public economy must also be rethought in the sense of “co-evolutionary robustness”. The three institutional pillars of CNSE (industry, the public sector and financial markets) coming again into view and ask for approaches of a “collaborative strategy” which are connected to a benevolent adaptation of roles and responsibility across them.

A central element for solving this complex problem structure is the explicit inclusion of both winners and losers of global transformation processes—at the national level in the form of social and income inequalities and in the international context in the form of unequal development standards. This means, in particular, including the Global South into the analysis. The core integration of the transformational aspects of the Southern Hemisphere is a condition-sine-qua-non in the analysis of the required transformation. The 2020 pandemic made clear that transformative innovation at the global level can only have sustainable impact if it also includes developing and emerging countries and takes their specific capacities into account (Kraemer-Mbula et al., 2020; Hanlin et al., 2023). Transformative innovation policy therefore requires global coordination and—given the irreducible complexity—must be flexible and locally adaptable. At the same time, education, income distribution, and access to knowledge are crucial prerequisites for enabling technological and social innovations to bring about the desired transformations (Stiglitz, 2010; Rodrik, 2004; Mazzucato, 2013) and for ensuring that the “losers” are not left behind. Otherwise, from a national perspective, this inevitably leads capitalist economies into a “zero-sum society” (or even a “negative-sum society”) with considerable potential for social unrest. In the international context, significant political tensions may arise that could expand into serious conflicts.

Alongside innovative producers, consumers play a central role in Post-Schumpeterian Economics: conscious consumption, new lifestyles, and the reduction of mass consumption are necessary to achieve the combined goal of prosperity and “planetary security” (Meadows et al., 1972; Bellassen et al., 2022, Wilke et al., 2021).

Empirical studies in agriculture, food systems, and global innovation systems highlight the importance of this integrative perspective. From the adoption of new rice varieties in Southeast Asia (Napasintuwong, 2014, 2015, 2020) to the role of certified foods in Europe (Bellassen et al., 2022) and on to laboratory automation in biotechnology and pharmaceuticals, it becomes clear that innovation is deeply embedded in social, ecological, and political structures. Emphasizing the need for global cooperation, stakeholder engagement, and attention to consumer lifestyles is therefore crucial for a relevant and successful understanding of transformation dynamics.

The Post-Schumpeterian perspective further recognizes the growing significance of power structures in capitalism—whether in the existing digital information society or in an emerging future society that will be shaped to the highest degree by AI. In the market economy, global tech giants such as Microsoft, Amazon, Alphabet, or Meta are beginning not only to dominate markets, but also to influence political governance, cultural norms, and geopolitical power relations (Rikap and Lundvall, 2023; Paredes-Frigolett and Pyka, 2023; Rushkoff, 2022; Slobodian, 2025). Post-Schumpeterian economics must therefore think beyond pure market mechanism and its rationality and incorporate topics such as geo-economic monopoly power, nationalistic primacy, or other behavioral excesses of a political nature like autocracy or authoritarianism more strongly than otherwise into its analyses (Lundvall 2014).

In the geo-economic realm, the emerging technological paradigm of AI seems to be unfolding a geopolitical dynamic in which the United States and China currently hold a leading position (Kissinger et al., 2022). Between these two largest economies in the world, a technological competition for global primacy is likely beginning (Wang, 2025). What starts as an economic competition seems—after China’s rapid catching-up over the last decades—to be turning more and more into a political conflict that could transform economic competitors into political enemies. A friend–enemy mode of thinking, however, would bode nothing good for the future of capitalism in either country—echoing Carl Schmitt (1932), the famous German theorist of the state. Both the Chinese model of “state capitalism” based on political autocracy and the U.S. model of “entrepreneurial capitalism” increasingly framed by tendencies towards an authoritarian political government style would have to worry about their future importance.

4. Preliminary Conclusions

Post-Schumpeterian economics calls for a shift in analytical perspectives: away from an isolated, nationally focused, quantitative notion of growth, toward a global perspective in which transformation, sustainability, social responsibility, global justice, and existing power relations are considered in an integrated manner. Growth and prosperity, technological innovation, and dynamism remain central, but they are (a) embedded in a planetary context that takes ecological, social, and transnational dimensions into account, and (b) analytically situated within a contextual framework shaped by the concepts of transformation and “evolutionary robustness.” Only in this way can the existential challenges of the twenty-first century—climate change, pandemics, artificial intelligence, and geopolitical instability, as well as inequality at national and international levels as inducing elements of geo-economic fragilities and geopolitical and existential risks—be addressed in a systematic and long-term manner.

Contemporary evolutionary economics is aware of these new requirements (Dopfer et al., 2023) and is in the process of developing new research agendas accordingly (Dosi 2023, Dopfer et al., 2026). Interdisciplinarity will play a crucial role in this endeavor (e.g. Pyka et al. 2022), and developments in so-called complexity economics (Elsner et al., 2025) will increasingly make it possible to fully engage with the complexity of the metamorphoses of capitalism.

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