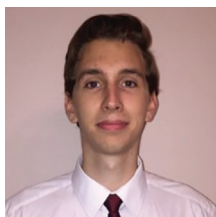


From Social Structures to Techno-Economic Paradigms: Comparison of Four Phases of Capitalism Theories

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Abstract: The 2008 great financial crisis brought the question of the cyclical development of capitalism back to the center of political economy. To understand the nature of post-crisis capitalism, it is inevitable to evaluate the literature on the temporal phases of capitalism. This article presents four theories about the periodization of capitalism: the social structure of accumulation theory, regulation theory, techno-economic paradigm approach and systemic cycles of accumulation school. The article shows that, despite the different perspectives, each of the phasing approaches leads to similar results about the periods of capitalism. Moreover, the article concludes that every phase of capitalism has four elements: techno-economic paradigm, socio-institutional structures, demand regime and hegemonic state.

Key words: phases of capitalism; social structure of accumulation theory; regulation theory; techno-economic paradigm approach; systemic cycles of accumulation theory

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1. Introduction

The 2008 crisis has brought serious challenges to capitalist development. While the pre-crisis era was characterized by the spread of neoliberalism, privatization,

deregulation and free trade, in the post-crisis period we can witness the opposite: regulatory reforms, the rise of the state and the escalation of trade conflicts. We can think of the US–China tariff war or the regulation of financial institutions as good examples. These new phenomena have generated new debates in political economy about the nature of post-crisis capitalism. It has become an important question: what kind of a phase of capitalism has begun after the crisis if there is a new phase at all? There are different views on this debate. While some authors emphasize stability and argue that crisis could not defeat the previously dominant form of neoliberal capitalism (Crouch 2011; Schmidt and Thatcher 2014), others state that a new phase of capitalism has emerged. Perez (2016) argues that this is the advent of a green golden age, and Nölke and May (2019) interpret the new era as illiberal capitalism. In addition, Kotz (2017) raises the possibility that this is a transition period to a new regulated phase.

Which position grasps more accurately the post-crisis era? To answer this question, we must evaluate the literature on the phases of capitalism. The article presents four contemporary theories about the periodization of capitalism: the social structure of accumulation school, regulation theory, techno-economic paradigm approach and systemic cycles of accumulation perspective. The research aims to evaluate and compare these approaches. The first question seeks to answer what are the key concepts and features of these theories. Every adequate phasing theory must have two crucial characteristics. First, it should explain what determines a distinct phase of capitalism, and what are the key features of a phase. Second, it should also explain the change, i.e., how a phase collapses, and how a new phase emerges. In the case of every theory, the paper will focus on these two characteristics by evaluating five aspects: what determines a distinct phase of capitalism, the main elements of a phase, the cause of the change, the launching mechanism of the new phase, and the types of phases. The second question is how these theories interpret the periods of capitalism after the Second World War. By answering these questions, the paper can be a reasonable starting point to decide how the post-crisis period of capitalism can be interpreted.

The article has four parts. First, it briefly assesses the origins of periodization theories. Second, it evaluates and compares the theories by answering the first research question. Thirdly, it explains how these theories interpret the phases of capitalism after the Second World War and also after the 2008 crisis. In the end, it presents a brief synthesis of the theories.

2. Origins of Phases of Capitalism Research

To introduce and compare the four contemporary periodization theories, it is worth briefly outlining the theoretical origins of phases of capitalism research. We must

name three influential economists in relation to the periodization of capitalism. First, Karl Marx who was the father of this theoretical perspective. His historical view was periodic with successive socio-economic systems at higher and higher levels from slave-holding societies, through feudalism and capitalism, to communism. He also presented the development of capitalism through the stages of simple cooperation, manufacturing and modern industry in the first volume of *Capital*. Thus, Marx's works have created the basis for the periodization of capitalism. The first wave was the Marxian Stages Theory which emerged at the beginning of the twentieth century thanks to the works of R. Hilferding and V. I. Lenin. While the former identified finance capital as a stage of capitalism in the twentieth century, the latter interpreted this era as the stage of imperialism (Kotz 2017). Another explanation can be found in the works of Baran and Sweezy (1966), who identified this new stage as monopoly capitalism. Nikolai Kondratieff, who analyzed the long waves of capitalist development in the 1920s, can also be placed in the Marxist tradition. He measured the cycles of prices in capitalism with quantitative data (Gutiérrez-Barbarrusa 2019). This long-wave theory became influential among Marxist scholars after the Second World War and it appeared in the works of Ernest Mandel who linked it to Marx's theory of the falling rate of profit (Mandel 1995), moreover, it has a major impact on the world-system theory elaborated by Immanuel Wallerstein.¹

The second important economist whom we must mention was strongly inspired by Marx and Kondratieff, but he represented a unique way of thinking: Joseph Alois Schumpeter. He developed a coherent business cycle theory. In this theory, he distinguished three cycles, the Kitchin cycles with 3–5 years, the Juglar cycles with 7–11 years, and the long waves that he referred to as Kondratieff cycles with 45–60 years (Gutiérrez-Barbarrusa 2019). His cycle theory focused on innovation. In his model technological progress is driven by innovations and innovators and it unfolds in cycles. Innovations destroy existing industries through creative destruction, which is manifested in crises. The crisis, in turn, opens the way for the spread of innovations, which, in the longer term, triggers a so-called “capitalization effect” leading to a strong boom. This expansion will finance new innovations.

The third important thinker is Karl Polanyi, whose book *The Great Transformation* has inspired researchers on the periodization of capitalism. According to Polanyi (2001), there is a double movement within capitalism. The first movement is the rise of self-regulating markets that are constantly disrupting social relations. The logic of the market and capital takes labor, land and money out of their social context and degrades them into commodities. In contrast, the counter-movement is slowly building up. The essence of the counter-movement is the reaction of society that tries to embed self-regulating markets in social relations. This double movement theory became a distinct periodization perspective.²

Theoretical Origins of Phases of Capitalism Research

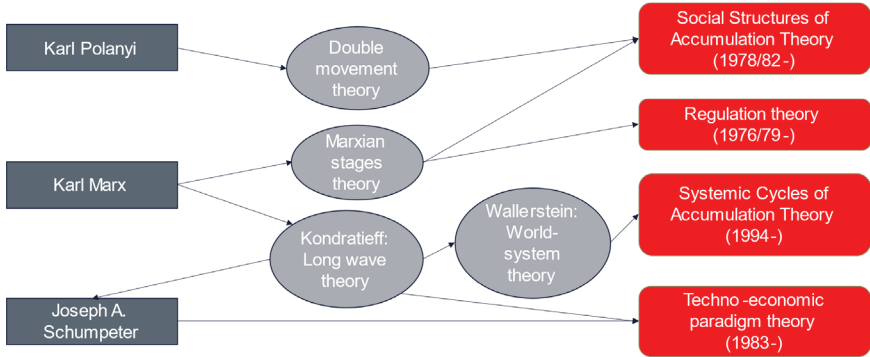


Figure 1 Theoretical Origins of Periodization of Capitalism Theories (the Arrows Represent the Direction of Influence)

Source: Author's elaboration.

In the footsteps of the Marxist, Schumpeterian and Polanyian traditions, four new theories of the phasing of capitalism have emerged since the 1970s. First, the regulation theory based on the Marxian Stages analysis appeared, elaborated by Michel Aglietta (1979) whose book was first published in French in 1976. Later this perspective moved closer to institutional economics (McDonough and Nardone 2006; Harada and Uemura 2019). The second was the social structure of accumulation theory which had also Marxist roots. The first versions of the social structure of accumulation theory could be found in the work of David Gordon (1978), and Gordon, Edwards and Reich (1982). Later the theory moved closer to the Polanyian tradition (Wolfson 2003). The third theory, called techno-economic paradigm theory, emerged in the 1980s and combined Schumpeter's work with long-wave tradition. The theory was elaborated by Carlotta Perez (1983). And in the 1990s, the systemic cycles of accumulation theory appeared. It is mainly based on the world-system approach and it was developed by Giovanni Arrighi (1994). Figure 1 depicts the origins of the four contemporary periodization theories.

3. Evaluation and Comparison of the Theories

The following section evaluates the four different theories one by one and then compares them. The question to be answered is what are the key concepts and features of these theories. The paper evaluates five aspects: what determines a distinct phase of capitalism, the main elements of a phase, the cause of the change, the launching mechanism of the new phase, and the types of phases.

3.1 Social Structure of Accumulation Theory

The founder of the social structure of accumulation theory (SSAT) is David Gordon (1978). The theory has Marxist origins, yet also has Keynesian assumptions (Kotz 1994). According to the SSAT, capitalists only invest in production if their profit expectations are predictable (Lippit 2010). However, expectations are inherently uncertain, thus sustainable capital accumulation requires a stable institutional framework that creates predictability (Kotz 1994). They call this institutional framework the social structure of accumulation (SSA). While every economic system is embedded in an institutional environment, McDonough (2011) argues that this becomes particularly important in capitalism, because it is a conflictual system. Contradictions between labor and capital and capitalist competition require the existence of a stable institutional system to sustain capital accumulation. The social structures of accumulation stabilize profit rates and long-term expectations, thereby enabling capitalists to invest (McDonough 2015). In addition, an SSA can promote a high rate of profits, and rising demand in the long run (Kotz and Basu 2019). This is why the creation of an SSA leads to a rapid and stable growth period (Bowles, Gordon, and Weisskopf 1986). In line with these, an SSA is a set of long-term, coherent economic, political, cultural and ideological institutions that underpin the stability of capital accumulation in a phase of capitalism (Kotz 2017).

However, SSAs are not eternal, the internal contradictions of capitalism and the process of accumulation itself gradually erode the SSA in power (McDonough 2011). According to Kotz (1994), this leads to the collapse of the key institutions of the SSA, and as a consequence accumulation process slows. The collapse of the institutions leads to stagnation and crisis, which can only be overcome if a new institutional structure emerges that can once again ensure the stability of capital accumulation (McDonough 2015). But how can a new SSA emerge? Based on McDonough (2011) political and ideological innovations are necessary to create a new institutional structure. Kotz (1994) emphasizes that the crisis sharpens the class conflicts and class struggle, and this process can lead to these innovations. Each class and non-class actors propose new institutional reforms that can promote rapid capital accumulation. Out of this struggle, a new SSA emerges.

The SSA theorists first evaluated the post-war period. However, this post-war SSA collapsed in the 1970s. The new period led to new challenges for this theory. Although the era from 1980 was characterized by a stable institutional structure called neoliberalism (Kotz 2003), the growth was not as rapid as in the post-war period (Wolfson and Kotz 2010). To solve this puzzle Wolfson and Kotz (2010) reformulated the theory. They argue—contrary to the original formulation—that

an SSA does not need to promote rapid growth. Instead of growth and accumulation rates, they focus on profitability. They claim that for capitalists' profit rate matters, they seek an institutional structure that can promote higher profit rates. Higher profit rates may promote rapid accumulation, but it is not necessary. With this reformulation, they can identify the new phase as a neoliberal SSA, which could stabilize the profit rates but it did not lead to rapid growth.

This was not the only innovation. The SSAT started to move closer to the Polanyian double movement approach (Wolfson 2003). For example, Wolfson and Kotz (2010) identify two types of SSAs: liberal and regulated ones like the double movement theorists. They distinguish these two phases based on five criteria: role of the state in the economy, capital–labor relations, capital and capital relations, labor–labor nexus and the dominant ideology.

According to Wolfson and Kotz (2010) in the liberal phases, the dominant ideology is free-market liberalism. It is not a coincidence that this leads to a reduced role of the state in the economy. The relationship between capital and labor is characterized by conflicts, which results in the dominance of capital. Competition between capitalists is intensifying, and industrial and financial capital are becoming independent of each other. Furthermore, competition between workers is also intensifying. Wolfson and Kotz (2010) argue that in the regulated phases, the dominant ideology promotes greater state involvement and market regulation. This implies an increasing role for the state. The search for compromise takes precedence over the conflicts between capital and labor. Competition between capitalists is reduced and cooperation is strengthened, with closer links between financial and industrial capital. Among workers, solidarity rather than competition becomes common.

McDonough (2015) claims that the two types of phases reach a crisis in two different ways. In liberal phases, the dominance of capital over labor prevails, which is reflected in the share of income. This leads to a situation in which labor takes a smaller and smaller slice of total income, leading to a shortage of demand. Jaffe (2019) argues that liberal phases are characterized by supply-side policies to underpin the capacity to produce and the demand-side policies are neglected. According to McDonough (2015) the strengthening of financial capital, which becomes independent of industrial capital, can temporarily deal with the demand gap by stepping up lending. In the long term, however, this leads to a financial bubble and crisis, which can only be resolved by a strengthening of the role of the state and thus the rise of a regulated SSA. In the regulated phases, however, the share of labor in income increases at the expense of capital, which after a certain time leads to a decline in profit rates and it can create a profit-squeeze crisis. This can only be solved by deregulation and the rise of market mechanisms, which will lead to a phase of liberal capitalism (Wolfson and Kotz 2010).

3.2 Regulation Theory

The first version of the regulation theory could be found in the work of Michel Aglietta (1979). Aglietta evaluated US capitalism in his famous book, *A Theory of Capitalist Regulation*. He relied on the Marxist tradition and started from the general laws of capital accumulation elaborated by Marx. He introduced two important intermediate concepts, which have become well-known in the regulation theory: the regime of accumulation and the mode of regulation.³ The regulation theory argues that every phase of capitalism or as they call every mode of development contains these two components.⁴

According to Aglietta (1979), the regime of accumulation is a form of social transformation that supports the appropriation of surplus value (profit) within certain limits. As Westra (2019) points out the traditional regulation theorists identify two types of accumulation regimes: extensive and intensive regimes. The extensive regime of accumulation is characterized by mainly absolute surplus-value appropriation, while intensive regimes are represented mostly by relative surplus-value appropriation (Westra 2019).⁵ Moreover, there is a third type: an intensive accumulation regime with mass consumption. It means that the whole mode of life and consumption norms are transformed to increase surplus value (Kotz 1994; Mavroudeas 1999).⁶

However, the later regulation theorists reformulated this Marxian conceptualization. For example, the tradition led by Robert Boyer argues that there are two basic features of every accumulation regime, first the nature of accumulation (intensive or extensive) determined by Aglietta (1979) and the characteristic of demand (Harada and Uemura 2019). Boyer (2018) argues that two kinds of demand regimes exist: wage-led and profit-led regimes. Furthermore, Lipietz (2001) interprets the accumulation regime only as the macroeconomic logic of a phase of capitalism and he distinguishes it from the technological framework of production. In this perspective, the accumulation regime represents mainly the demand side of the accumulation, which is why this formulation is similar to the post-Keynesian concept of demand regimes and growth models.⁷ Nevertheless, there are more Schumpeterian interpretations of the accumulation regime, for example, what O'Hara (1994) presents. In this view accumulation regime is the technological and organizational framework of production.

Besides the accumulation regime, every phase of capitalism contains a mode of regulation. The mode of regulation is a set of institutions that are essential for the reproduction of the accumulation regime (Mavroudeas 1999). These institutions coalesce and regulate capital accumulation in a distinct period (Westra 2019). As we can see the mode of regulation is similar to the concept of the social structure of accumulation. Regulation theorists classify two basic modes of regulation: competitive ones which are better suited to the extensive regimes and monopolist ones which are more appropriate for intensive regimes (Lipietz 1988; Mavroudeas

1999). There are five important institutional forms of every mode of regulation: wage–labor nexus (e.g., collective bargaining, consumption norms), monetary and credit system (e.g., dollar standard, interest rates), forms of competition (e.g., competition versus monopoly), forms of state intervention and last but not least position of the state in the international system (Boyer and Saillard 2002; Boyer 2005; Westra 2019).

Kotz (1994) argues that in the regulation theory the cause of the phase change is the contradictions between the accumulation regime and the mode of regulation. Two cases are possible. Firstly, when the old mode of regulation does not allow the emergence of the new accumulation regime. Secondly, when the regime of accumulation is exhausted with the given mode of regulation (Kotz 1994). A new phase can emerge when new opportunities for production appear and as a consequence, a new regime of accumulation can evolve.

3.3 Techno-Economic Paradigm Approach

The techno-economic paradigm approach was elaborated by Carlotta Perez (2011). The theory is mainly based on Schumpeter's and Kondratieff's long-wave theory. However, the theory breaks with the notion of waves. Perez (2011) argues that the concept of wave can be understood as a simple fluctuation of the Gross National Product (GNP) around a long-term trend. In contrast, she emphasizes the importance of the interrelation among economic, technological and political spheres (Gutiérrez-Barbarrusa 2019). Therefore, instead of waves, she uses the great surge of development as a distinctive period in capitalism. The great surges of development represent both the techno-economic and socio-institutional spheres of the capitalist system (Perez 2011). She distinguishes two sub-systems within capitalism: the techno-economic paradigm and socio-economic framework (Perez 1983; Tylecote 1992). The theory also claims that the techno-economic sub-system has a much faster rate of response (Perez 1983). That is why every surge is created by a technological revolution which establishes first a new techno-economic paradigm and then it leads to a structural change in the socio-economic framework (Perez 2011). However, Perez (2013) refuses that technology determines the social and institutional framework, she rather emphasizes the co-evolution of the two sub-systems.

Nevertheless, Perez's theory pays more attention to technological revolutions than socio-economic change. Perez (2011) states that technological revolutions are different from a random collection of innovations because of the strong interconnectedness and interdependence of the technologies. Moreover, they can transform the rest of the economy and society. According to Perez (2011), there have been five technological revolutions in capitalist history. First, the Industrial Revolution from the 1770s and then the Age of Steam and Railways from the

1830s. The core country of these was Britain. Then the third one was the Age of Steel, Electricity and Heavy Engines from the 1870s that originated in the US and Germany. The fourth revolution was the age of oil, automobile and mass production from the early 1900s with the US as a core country. And the last technological revolution was the Age of Information and Telecommunications in the 1970s. This was also spread from the US. Perez (2011) presents that each technological revolution created new industries and infrastructures or transformed existing ones. Within each techno-economic paradigm, we can therefore identify sectors that pioneer and disseminate new technologies. After the first technological revolution, it was textiles, after the second, railways, then steel and heavy industry, then mass-produced cars and, most recently, telecommunications (Perez 1983, 2010).

Perez (2010) argues that these technological revolutions create three phenomena. They cause changes in the relative cost structure, create and multiply new profitable opportunities, and challenge the old organizational structures. These processes create the potential for the emergence of a new techno-economic paradigm. The techno-economic paradigm is essentially a technical, organizational and economic common sense of production by integrating the achievements of a given technological revolution (Perez 1983, 2011).⁸ In the first technological revolution, the techno-economic paradigm was factory production and mechanization; in the second, the economies of agglomeration and industrial cities; in the third, giant structures; in the fourth, Fordist mass production; and in the last, microelectronic-based information and communication technologies (ICT).

Perez (2013) argues that each techno-economic paradigm unfolds in two parts in capitalism. First, there is always an installation and then a deployment period. The installation periods are characterized by the Schumpeterian “creative destruction,” where the new techno-economic paradigm gradually overwhelms the old one. The role of the financial sector, which finances new innovations, becomes important. In these periods, the institutional and social framework is determined by free-market ideologies and competition between capitalists can be fierce (Perez 2013). The over-strengthening of the financial sector induces a financial bubble and it will lead to a financial crisis. These installation phases can be separated into two parts: irruption phases where the technological revolution begins and frenzy phases which represent the financialization (Gutiérrez-Barbarrusa 2019). Then comes the deployment period, when the dominance of the current techno-economic paradigm creates extraordinary growth. This occurs when financial capital is reined in and the state’s role is strengthened and the whole society benefits from the new technologies. This phase will fade out with the gradual rise of a new technological revolution and techno-economic paradigm, which will give way to a new installation phase (Perez 2016). These deployment periods can be divided into synergy phases which are the golden ages of the techno-economic

paradigm and maturity phases when the decline of the paradigm begins because of the new technological revolution (Gutiérrez-Barbarrusa 2019). As we can see in this theory, the periods are overlapping each other.

As Tylecote (1992) claims the cause of the change in this theory is the new technological revolution and new techno-economic paradigm which cannot coexist with the old social and institutional framework. The emergence of the new techno-economic paradigm creates a crisis, and the crisis restructures the socio-institutional framework to support the new techno-economic paradigm. However, the theory distinguishes between two types of crisis: financial bubbles between the installation and deployment period, and the crisis of the techno-economic paradigm after the deployment periods.

3.4 Systemic Cycles of Accumulation School

“The systemic cycles of accumulation theory” is mainly based on the world-system approach and it was developed by Giovanni Arrighi. In his major work *The Long Twentieth Century*, Arrighi (1994) divides the entire lifetime of capitalism into more practicable units of analysis: systemic cycles of capital accumulation (SCA). The theory argues that each of these cycles can be associated with a hegemonic state (Robinson 2011). Arrighi uses the Gramscian concept of hegemony to express that this state governs and leads the world system with consent and coercion but it does not have direct dominance (Westra 2019). In this view, every systemic cycle represents a hegemonic cycle.

Arrighi (1994) divides the systemic cycles of accumulation into two parts: material and financial phases. The theory relies on Fernand Braudel’s observation that financialization represents the maturity phases of a hegemonic cycle (Arrighi and Moore 2001). Arrighi (1994) connects Braudel’s views with the famous Marxian formula (Money–Commodity–Money; M–C–M’) which describes the accumulation process in capitalism. Arrighi states that the key feature of this process is that capitalists want to reach greater flexibility of capital (Westra 2019). Following this formula, greater flexibility can be reached in two phases. According to Arrighi and Moore (2001), first there is the material phase, where money (and liquid assets) held by capitalists are transformed into commodities (illiquid assets) (M–C). The material phases are generally characterized by strong extensive growth, which allows capitalists to invest their money in production to increase the mass of capital. This represents the golden age when the hegemon governs the world system. This is followed by a financial expansion phase. In these phases, the growth of production is fading and the conversion of commodities into money begins, which reinforces the role of the financial system. At this time the increased mass of capital sets itself free from commodity form and it is converted back into money (C–M’) to reach greater flexibility. The two phases, therefore, represent the two components of the capitalist accumulation process.

Arrighi (1994) distinguishes four cycles of hegemony in capitalist history with a material and financial phase: the Genoese, the Dutch, the British and finally the US systemic cycle of accumulation. He argues that every systemic cycle represents a distinct regime of accumulation. The regime of accumulation means the strategies and structures through which these hegemonic states have led the world capitalist system first toward the material and then toward the financial phase (Arrighi and Moore 2001).⁹ Thus the end of a cycle means the end of the regime of accumulation. For a new cycle to emerge it is crucial to restructure the capitalist world economy. According to Arrighi and Moore (2001), this restructuring involves the process of internalization of costs by a new regime of accumulation. They argue while the Dutch regime could internalize protection costs, the British regime did the same with production costs. Moreover, the same pattern reappeared again when the US regime internalized transaction costs. They also distinguish two types of regimes of accumulation based on the organizational structures and geographical expansions. The Genoese and the British regimes were cosmopolitan-imperial and extensive regimes because they were responsible for the geographical expansion of the capitalist system. The Dutch and the US regimes were corporate-national and intensive regimes because they were responsible for the consolidation of the capitalist system in a geographical sense (Arrighi and Moore 2001).

As we can see the cause of the change in this theory is the fade of the regime of accumulation and the decline of the hegemon. The launching mechanism of the new phase is the emergence of the new accumulation regime. As Arrighi and Moore (2001) state the material and financial phases are separated by a so-called “signal crisis,” which signals the decline of the hegemon’s power. The next accumulation cycle, hence, the hegemonic transition, is brought about by a major financial or so-called “terminal crisis” (Arrighi and Moore 2001). According to Arrighi and Silver (2001), the financial phases represent the crisis of the hegemon. In these phases interstate competition and rivalry are intensifying, social conflicts are escalating, and new configurations of power are emerging. These phenomena lead to the breakdown of the hegemon and chaos in the world system. Arrighi and Silver (2001) argue that in this chaos, the systemic capabilities needed for hegemony are increasingly concentrated in the hands of one actor. This process leads to the emergence of a new hegemon.

An influential extension of the theory was developed by Jason Moore. Moore (2015) argues that every systemic cycle of accumulation relies on Cheap Nature, which can maintain the accumulation process. Cheap Nature contains cheap labor-power, cheap food, cheap energy and cheap raw materials. Moore states that a new systemic cycle always has to renew the Cheap Nature to support a new phase of the accumulation process (Moore 2019).

3.5 Comparison of the Theories

This section compares the different theories according to the analyzed aspects. Table 1 depicts this comparison of the theories.

Table 1 Comparison of the Theories

Key Features of the Theories				
Features	Social Structures of Accumulation	Regulation Theory	Techno-Economic Paradigm	Systemic Cycles of Accumulation
Authors	Gordon, Kotz, McDonough, Wolfson	Aglietta, Boyer, Lipietz, Jessop	Perez, Tylecote, Dosi	Arrighi, Silver, Moore
What distinguishes the phases of capitalism?	Institutional structures = Social structures of accumulation (stabilize the profit rate)	Mode of regulation (Mor) Accumulation regime (Ar)	Technological revolutions and techno-economic paradigms	Hegemons and the regime of accumulation
Main elements	State-economy relation Capital-capital relation Capital-Labor relation Labor-labor nexus Dominant ideology	Wage-labor nexus Form of competition Monetary and credit regimes Forms of state interventions State in the international system	New technologies Techno-economic paradigm (common sense) New, redefined industries and infrastructures Core countries	Accumulation process (M-C-M') Cost internalization Geographic expansion Organizational structures Cheap Nature
The cause of the change	Collapse of the institutional structure or shift to SSA obstructing accumulation (Financial and profit-squeeze crisis)	Contradictions between Mor and Ar	Technological revolutions Financial bubbles and the emergence of new techno-economic paradigm	Collapse of the hegemon Signal and terminal crisis
Launching mechanism of the new phase	Institutional and political innovation: depends on class contradictions	New opportunities of production: new regime of accumulation	Technological innovations, new branches, new infrastructures, new institutions	Emergence of a new hegemon Cost internalization Reproduction of Cheap Nature
Phases of capitalism	Liberal-Regulated	Extensive-Intensive/ Competitive-Monopolist	Installation-Deployment	Material-Financial

Source: Author's elaboration.

In the social structure of accumulation theory, the coherent institutional structure determines a phase of capitalism (McDonough 2011). On the contrary, the techno-economic paradigm approach (TEP) emphasizes that a coherent techno-economic paradigm determines a phase of capitalism (Perez 2010). However, this theory also highlights the importance of the socio-institutional framework which is a similar concept to social structures of accumulation. In regulation theory (RT) a distinct mode of regulation and an accumulation regime determine a phase of capitalism. In RT the institutional structures are represented by the mode of regulation. The concept of an accumulation regime contains the nature of accumulation and the demand conditions of the accumulation (Boyer 2018). “The systemic cycles of accumulation school” determines a phase of capitalism based on the hegemon. However, this perspective also uses the concept of a regime of accumulation like the regulation theory but in a different way. This concept incorporates the institutional and technical aspects of a phase of capitalism at the same time.

Relying on Wolfson and Kotz (2010) the social structure of accumulation theory analyzes five main elements in every phase of capitalism: role of the state in the economy, capital–labor relations, capital and capital relations, labor–labor nexus and dominant ideology. In regulation theory, there are also five important institutional aspects of every mode of regulation: wage–labor nexus, monetary and credit system, forms of competition, forms of state intervention and position of the state in the international system (Boyer and Saillard 2002; Boyer 2005; Westra 2019). As we can see the focus is a bit different, but the state and capital–labor relations are important factors in both theories. The techno-economic paradigm approach is a more business-oriented and innovation-focused theory and it analyzes other elements: the technological revolutions, techno-economic paradigms, new and redefined industries and infrastructures, and core countries of the technologies. Arrighi’s theory focuses on the accumulation process and the internalization of costs. This theory also examines the geographical extension of the capitalist world economy and the organizational structures of the hegemonic state. In Moore’s extension, Cheap Nature is also an analyzed element.

Based on Kotz (1994) and Kotz and Basu (2019) the cause of the change in the social structure of accumulation school is either the collapse of the key institutions or the continued survival of the dysfunctional SSA. The latter implies that the SSA in place can no longer support the accumulation process and becomes an obstacle to it, forcing a shift to a new social structure. Moreover, the theory distinguishes two kinds of crises. After a liberal phase, there is the underconsumption crisis, which is embodied in a financial bubble. After a regulated phase, there is a profit-squeeze crisis with a stagflation period (McDonough 2015). On the contrary, in the regulation theory, the contradictions between the mode of regulation and the accumulation regime cause the change. In this theory the exhaustion of the old or

emergence of the new accumulation regime has a crucial role in the change, which is why it is a more materialistic perspective than SSAT (Kotz 1994). Similarly, the techno-economic paradigm theory is also more materialistic because it claims that the emergence of the new techno-economic paradigm causes the crisis of the old one. The socio-institutional framework just follows this process (Perez 1983). Nevertheless, there are two types of crises in Perez's theory. The financial bubbles close the installation periods and maturity crises which close the deployment phases. In the systemic cycles of accumulation theory, the change is determined by the collapse of the hegemonic state. Similarly, there are also two kinds of crises in this theory. Following the material periods, there is a signal crisis, which starts the autumn of the hegemonic state. And following financial periods there is a financial crisis which represents the hegemonic transition. We have to point out that every theory claims that the change of the phase is accompanied by a crisis. However, the theories interpret these crises as structural crises which are much deeper than simple business fluctuations. The structural crisis represents the end of a phase of capitalism (Boyer 2018).

The launching mechanism of a new phase in SSA theory is the institutional and political innovation that results from the emergence of class conflicts. In this view, it seems that any new institutional form can emerge from these conflicts. However, in the new formulation of the theory, this kind of freedom is not found, because every liberal phase should be followed by a regulated one and vice versa. Unsurprisingly, Rey Araujo (2018) criticized this reformulation because of this historical determinism. On the contrary, in the techno-economic paradigm approach, technological innovations are needed for a new phase and a new techno-economic paradigm. Moreover, not just innovations, but a technological revolution is required which creates new or redefined industries and infrastructures, changes the relative cost structures and produces new business opportunities. In addition, Perez's theory also acknowledges the importance of institutional innovations which can frame the new techno-economic paradigm. Similarly, in regulation theory, new opportunities for production are required for a new accumulation regime and a new phase. From the SCA perspective, the financial phases are the periods of hegemonic transitions when a new hegemon and new regime of accumulation emerge. Furthermore, internalization of costs and renewing Cheap Nature are also necessary for a new phase of capitalism.

The launching mechanism of a new phase opens the debate on the endogeneity of the alternation of phases of capitalism. The endogenous approaches derive the change of phase from the internal mechanisms of capitalism. However, perspectives emphasizing exogeneity draw attention to factors that are autonomous and do not follow from the economic laws of capitalism, such as imperial competition, wars and revolutions. Mandel (1995), for example, argued clearly in favor of the

latter, rejecting Kondratieff's, Schumpeter's and Gordon's view of the long waves that originated in the phase shifts from the internal laws of capitalism. On the basis of Mandel's approach, we can include regulation theory, SSA theory and techno-economic paradigm theory among those theories that tend to emphasize endogenous factors. Arrighi's theory, especially Moore's extension, includes exogenous factors such as nature and conflicts among possible hegemons.

In SSA theory there are two kinds of phases: liberal and regulated ones. Similarly, regulation theory distinguishes competitive and monopolist modes of regulation. However, in regulation theory, there are also extensive and intensive accumulation regimes. So RT identifies two kinds of phases: competitive regulation with the extensive regime and monopolist regulation with the intensive regime. Nevertheless, the later formulation of regulation theory also defines finance-led and flexible accumulation regimes. Thus, the types of phases are not as clear as in SSA theory. In the other two theories, there are larger units of analysis. The techno-economic paradigm approach, for example, considers great surges of development as a period of capitalism, however, it divides it into installation and deployment periods. Arrighi's theory claims that a period of capitalism is a systemic cycle of accumulation or a hegemonic cycle. However, this theory also divides this unit into material and financial phases. Financial phases are similar to installation periods in techno-economic paradigm theory since Perez and Arrighi also emphasize the importance of the financial sector. Material periods resemble deployment phases since the two theories consider these golden ages. However, the fluctuation of techno-economic paradigms and hegemonic cycles are asymmetric. Installation and financial phases mean the start of the techno-economic paradigm, but they also represent the fall of the hegemon. Deployment and material phases are the starting phase of the hegemon, but the last phase of the techno-economic paradigm.

4. The Phases of Capitalism after the Second World War

This section presents how the four theories interpret the phases of capitalism after the Second World War which includes looking at the post-2008 crisis period.

According to the social structure of accumulation theory, there have been two distinct phases of capitalism after the Second World War. Wolfson and Kotz (2010) argued that firstly a regulated phase unfolded. This was the post-war SSA (Lippit 2010). They identified three distinct features of this SSA: Pax Americana, capital-labor accord, and capital-citizen accord (Bowles, Gordon, and Weisskopf 1986). Pax Americana means the US hegemony through the Bretton Woods system (O'Hara 1994). The capital-labor accord represents that the labor movements allowed the capitalists to control the production, but they expected wage increases

and job security in return (Lippit 2010). The third aspect is the capital–citizen accord which mainly denotes the Keynesian welfare state (O’Hara 1994). However, in the 1970s a stagflationary, profit-squeeze crisis brought the end of this period (McDonough 2015). In the 1980s, the emergence of neoliberalism led to a new phase of liberal capitalism, which they call neoliberal SSA (Kotz 2003; Wolfson and Kotz 2010). This era was represented by privatization, deregulation of the financial sector, marginalization of collective bargaining and unrestricted competition in the corporate sector (Kotz 2015). This neoliberal phase collapsed due to the great financial crisis, and therefore, we are witnessing a structural crisis with the possibility of a transition to a new regulated phase of capitalism (Kotz 2017). However, there are different perspectives about the characteristics of this new regulated phase. McDonough, McMahon and Kotz (2021) outline two basic options for the new social structure of accumulation. First, they raise the possibility of an authoritarian nationalist social structure of accumulation. They argue that this SSA can be regulated but in a different way than in the post-war period. The role of the state can strengthen and there can be a retreat from globalization. However, there would not be capital–labor compromise and the capital could continue to dominate labor. Nevertheless, there is a second option which they call green social democratic SSA which can create a new capital–labor compromise and a socially embedded phase of capitalism. Nölke and May (2019) reinforce the first possibility as they argue that a new illiberal phase of capitalism has been emerging. Nölke (2017) interprets regulated phases as organized periods. He argues that the notion of a regulated phase was appropriate for the post-war period but not for the post-crisis era. He claims that there is not any successful attempt to socially re-regulate capitalism. Therefore, this new phase will be rather an organized period with an increase in the role of the state but without social embedding. Moreover, Nölke (2012) started to connect this perspective with the varieties of capitalism theory. In line with that O’Hara (2010) argues that the rise of the post-neoliberal SSA is most visible in Asian countries. Furthermore, Jaffe (2019) emphasizes the persistence of neoliberalism after the 2008 crisis.

There is a great consensus in regulation theory that the post-war period was an intensive accumulation regime with mass consumption and the mode of regulation was monopolistic (Mavroudeas 1999). This is called Fordism. This concept is one of the most elaborated in regulation theory. Fordism can be characterized by increasing income of the wage earners, high and stable profit rates, limitation of inequality, and large-scale state interventions (Uemura 2019). Lipietz (2001) argues that the broad and stable middle class was the foundation of Fordism, he calls this the hot air balloon society. Mavroudeas (1999) highlights other important aspects like Fordist techniques in the organization of the labor process, collective bargaining, and restriction of the competition between capitalists and the

Keynesian welfare state. Moreover, Huber (2013) incorporates the importance of the ecological aspect in the framework, and his work interprets this era as petro-Fordism. The regulation theorists also acknowledge that this period entered a crisis in the 1970s (Lipietz 1988). However, their theory is less developed for the phase from the 1980s onwards (Nölke and May 2019).

There are different and sometimes controversial perspectives about this post-Fordist phase of capitalism. For example, Vidal (2013) interprets this post-Fordism as a dysfunctional accumulation regime. Meanwhile, Boyer (2005) has moved in the direction of spatial examination of capitalism and new institutional economics. This change is criticized by Neilson (2012), he interprets this era in a more Marxist formulation as a neoliberal model of development. However, Boyer (2018) argues that post-Fordism is characterized by a finance-driven accumulation regime and global competition as a mode of regulation. Nevertheless, there was another perspective in the literature. Some authors interpret post-Fordism as a flexible accumulation regime (Tickell and Peck 1995; Jessop 1996; Lipietz 2001). Lipietz (2001) argues that an important characteristic of post-Fordism is the flexibilization of the wage-labor nexus. It means a shift from the rigid labor system of Fordism and it globally weakened the position of the working and middle class. Jessop (1996) argues similarly. He states that post-Fordism can be defined as a flexible production process based on information and communication technologies. He explains that post-Fordism is a stable model of macroeconomic growth because it can restore the profit rates based on the global markets and also interprets post-Fordism as a flexible regulation based on supply-side policies. Tickell and Peck (1995) highlight that in post-Fordism the money form became dominated by globalized and flexible forms of credit. Furthermore, Jessop (1996) argues that after the Keynesian welfare state in the post-Fordist era the Schumpeterian workfare state emerged. It has three important characteristics. First, instead of sustaining full employment, the state aims to increase international competitiveness. Second, welfare policies are relegated to the background and a productivist social policy emerges. Thirdly, the global levels of governance become more important, and it decreases the role of the national state. In the regulation theory the post-2008 crisis era has not been identified yet as a coherent and new phase.

The techno-economic paradigm approach interprets the post-war period as the deployment period of the Fourth Industrial Revolution, i.e., the age of oil, automobile and mass production (Perez 2010). This lasted until the 1980s when the Fifth Industrial Revolution was triggered by the rise of information and communication technologies. This caused a new installation period with financialization. According to Perez (2009), the double bubble of 2001 and 2008 represents the end of the installation period. Perez (2016) argues that the post-crisis era is a

Table 2 Phases of Capitalism after the Second World War according to the Four Theories

	Social Structures of Accumulation	Regulation Theory	Techno-Economic Paradigm	Systemic Cycles of Accumulation Theory
1945–1970	Regulated Post-war SSA	Intensive with mass consumption— Monopolist Fordism	Deployment period Age of Oil, Automobile, Mass Production	US hegemony Material period
1970s	Structural crisis of regulated capitalism	Structural crisis of Fordism	Maturity of Age of Oil, Automobile, Mass Production	Signal crisis of US hegemony
1980–2008	Liberal Neoliberal SSA	Finance-led/ flexible accumulation— global competition Post-Fordism	Installation period Age of Information and Telecommunications	US hegemony Financialization period
2008–	Structural crisis of neoliberal capitalism Transition to a regulated or illiberal phase?	Structural crisis of Post-Fordism	Initial phase of deployment period Age of Information and Telecommunications	Terminal crisis of US hegemony New hegemony? Transition to a material period?

Source: Author's elaboration.

deployment period that can create the green golden age. However, she explains that the green golden age is not necessary. She points out how mass production as the previous techno-economic paradigm was used differently by Stalin, Hitler and Roosevelt. Thus, information and communication technologies can be used controversially too. Nevertheless, Perez (2016) advocates the use of these technologies within a green social and institutional framework.

According to the systemic cycles of accumulation theory, the post-war period was the era of the US hegemony (Arrighi 1994). This began in the 1940s with a material phase and a great expansion. In the 1970s, however, growth slowed down and the first signs of the crisis of US hegemony became visible. Then, after the “signal” stagflationary crisis, a financial phase unfolded, with the strengthening of financial capital. This finally led to the 2008 global crisis, which may mark the end of the cycle of US hegemony (Arrighi and Moore 2001). Chase-Dunn (2014) argues that after the crisis two options are possible: a systemic transformation to some form of socialism or a new systemic cycle of accumulation. He claims that the latter is more likely. But who will be the new hegemon? As Robinson (2011)

presents, Arrighi had already pointed out in the late 1990s that the US hegemonic cycle was over and another country would take over the leading role in the world capitalist economy. However, Arrighi and Moore (2001) argue that the military power remained concentrated in the hands of the US which makes this hegemonic transition more difficult. Nevertheless, we can make some predictions relying on the theory. As Arrighi and Moore (2001) explain the next cycle should be characterized by a cosmopolitan-imperial and extensive regime of accumulation and it should internalize the reproduction costs. Based on Moore (2015) we can also state that it should reformulate the Cheap Nature, which will not be an easy task in the era of global climate change.

Although the four approaches carry out the periodization of capitalism from different points of view, they distinguish similar periods. All in all, there were two distinct periods of capitalism after the Second World War. First, until the 1970s post-war Fordism with a regulated institutional structure, which was a material period of the US hegemony and the deployment period of the Fourth Industrial Revolution. Then after the 1980s the neoliberal post-Fordism with a liberal institutional structure. This period was the financial phase of the US hegemony and the installation period of the ICT revolution. Thus, relying on these theories the post-2008 crisis period is the beginning of a new phase. It follows from the theories that a new regulated period with the US's ending hegemony and the deployment period of the ICT revolution has been emerging. Table 2 presents the phases of capitalism after the Second World War according to the reviewed theories.

5. Conclusion

The results of the article are well summarized in Tables 1 and 2, so instead of repeating them, a brief synthesis of the theories will be given. Based on the theories one can interpret capitalism as a global accumulation process with distinct phases. For smooth accumulation and stable profit rates, three important elements are necessary. First, there is the supply side of the accumulation which has two parts. On the one hand, a distinct techno-economic paradigm represents the technical, economic and organizational common sense of the production based on TEP. On the other hand, a social and institutional structure can stabilize and embed the techno-economic paradigm. It can also secure profit expectations as SSA theory states. It is important to note that the development of technology and institutions can be understood as a series of interactions. Second, there is the demand side of the accumulation. The smooth accumulation is not working without sufficient demand. The demand factors are represented by the accumulation regime as Lipietz (2001) elaborated in regulation theory. Third, as the SCA theory suggests

a leader state is also necessary, which can organize the accumulation process at the global level. We may refer to it as a hegemonic state. Every phase of capitalism has four global layers: techno-economic paradigm, socio-institutional structures, demand regime and a hegemonic state. These four elements represent the global accumulation in a distinct period.

Finally, it is worth briefly considering what the future might hold. Of course, it is impossible to predict where the current processes will take us, but we can make some cautious observations based on the theories analyzed. SSA theory clearly points out that since the 2008 crisis we have been living through a structural crisis of neoliberal capitalism, which means that some kind of new social structure has to emerge. In this, the role of the state can certainly rise, as we see that since the 2008 crisis, the role of monetary policy and then, with COVID-19, the role of fiscal policy has steadily increased. We are also in the heyday of the hitherto forgotten industrial policy (Trautmann and Vida 2021), which is in many ways linked to green objectives. It is more questionable what changes will take place in the relationship between capital and labor, which is particularly important because inequalities have swelled considerably in the neoliberal period (Piketty 2014). While there have been important movements to empower labor in the last decade, illiberalism has also gained ground, which only increases the dominance of capital. Nevertheless, Perez's theory argues that the incipient golden age of information and communication technologies is capable of distributing wealth more widely in society, but this cannot be achieved without regulatory reform. However, we do not yet see a significant wave of regulation of the capital–labor nexus that can create a fairer distribution. We can only hope that the technological challenge of artificial intelligence will trigger regulatory changes that could turn the tide in the capital–labor relationship. As for hegemony, in line with Arrighi's theory, we are witnessing the end of US hegemony, which raises the question of a possible hegemonic shift. But in today's context, a shift toward a multipolar world order is more likely, which requires the rise of the idea of global partnership. The challenge of the current decade is nothing less than to create a regulatory reform that can harness new technologies to fight climate change, promote fair distribution and strengthen global partnership.

Notes

1. See, for example, Wallerstein (1984).
2. See, for example, Levien and Paret (2012) and Watkins (2017).
3. Aglietta (1979) simply calls this "regulation," but the later authors use the mode of regulation instead.

4. There is a third component, the industrial paradigm, which mainly denotes the organization and division of labor in a phase of capitalism (Jessop 1994). Nevertheless, this is part of the accumulation regime in the tradition led by Boyer (see Boyer and Saillard 2002).
5. The absolute surplus-value appropriation means that the capitalists increase surplus value (profit) by increasing the length of the working day or the intensity of work. The relative surplus-value appropriation represents that the capitalist increases surplus value (profit) by raising the productivity of work.
6. As Kotz (1994) points out, there are differences among the interpretations of different authors. In Aglietta's original version, there were only two types of regimes (predominantly extensive and predominantly intensive). In later versions of the theory, this threefold division appears, which reinterprets the original concepts. The paper builds on the later versions of the theory examined by Kotz (1994), Mavroudeas (1999) and Westra (2019).
7. See, for example, Stockhammer (2016).
8. Perez (1983) used the technological style expression, but due to Dosi's (1982) paper, she changed it to the technological paradigm (Perez 2010).
9. It is important to note that this is not the same concept as the accumulation regime in regulation theory.

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