#### THE WHOLE AND THE PARTS: MARX AND EMERGENTISM

Guilherme Nunes Pires<sup>1</sup>

#### Abstract

This paper aims to show that Marx's thought has the main elements of contemporary strong emergentism. Strong emergentism states that emergent proprieties need to be understood as ontological phenomena by producing discontinuities between nature and society. Besides, strong emergentism proposes that there is a downward causation between the parts and the whole. We argue that Marx's view of irreducible ontological levels between nature and society has the main elements of strong emergentism. We also provide a general account of the relationship between social structures and individual agency, and his methodological steps in the critique of political economy.

Keywords: Marx. Emergentism. Complexity.

## O TODO E AS PARTES: MARX E O EMERGENTISMO

### Resumo

Este artigo busca demonstrar que o pensamento de Marx contém os principais elementos do emergentismo forte contemporâneo. O emergentismo forte afirma que as propriedades emergentes devem ser compreendidas como fenômenos ontológicos, uma vez que produzem descontinuidades entre a natureza e a sociedade. Além disso, propõe que há uma causação descendente entre as partes e o todo. Argumentamos que a visão de Marx sobre níveis ontológicos irredutíveis entre natureza e sociedade incorpora os principais aspectos do emergentismo forte. Também fornecemos uma análise geral da relação entre estruturas sociais e agência individual, bem como dos passos metodológicos de Marx na crítica da economia política.

Palavras-chave: Marx. Emergentismo. Complexidade.

# 1. Introduction

In the last decades, we have seen the development of the so-called *complexity science*, which can be characterized as an internal movement in science that aims to reorient the ontological, epistemological, and methodological foundations for the scientific enterprise. One of the key features of these discussions tries to overcome the secular hegemony of reductionism in science, by comprehending that any kind of system cannot be decomposed and analyzed by its single parts, since new properties and qualities emerge from the interaction between the parts of the system that can't be found in the parts in isolation. That is, these systems produce emergent properties (Clayton 2004, 2006, Chalmers 2006, Elder-Vass 2005, Heylighen 2008).

Aside from a few scholars addressing the relationship between complexity, emergentism and Marxism, the major contemporary collections of Marxist debate appear to overlook it, including

<sup>&</sup>lt;sup>1</sup> Professor of Economics, Regional University of Cariri – URCA.

The Marx Revival: Key Concepts and New Interpretations, edited by Musto (2020), and the Routledge Handbook of Marxism and Post-Marxism, edited by Callinicos et al. (2021).

In recent years, we have seen some developments in arguments that can compare and fit Marx's thought with the contemporary discussions of complexity, such as the emergent phenomenon. Martins (2022), for example, tried to compare Marx's underlying ontological claims of levels of being with the emergentist thesis of the discontinuity between nature and society, where the latter has irreducible causal processes and properties<sup>2</sup>.

However, the author does not present us with the proper contemporary discussion of emergence, but just uses one definition found in one author and this definition has been criticized by many dealing with this issue. Besides, the author does not provide us with a general account of levels of being in Marx's terms. This paper aims to contribute to and complement this discussion, adding the question of Marx's method to propose a general account of how the Marxian view of social reality and how to investigate it can be fit as a form of emergentism.

There are two main positions underlying the problem of emergent phenomena: *weak emergence* and *strong emergence*. The first one affirms that emergent phenomena do not give rise to distinct causal processes, remaining explainable by the causal processes of the lower level. The latter proposes, supported by an ontological perspective, affirms the presence of progressively higher levels of organizational complexity in the evolution of nature. It argues that these distinct levels of the organization should be comprehended through their unique causal processes and laws of development. More than that, in this later view, the established whole has powers over the parts in a process of downward causation (Bunge 2014, Clayton 2004, 2006, Chalmers 2006, Elder-Vass 2005).

Following these discussions, this paper aims to propose that Marx's thought has the main elements of the contemporary view of strong emergence, by providing a general account of how Marx differentiates the ontological levels of being, arguing that society is a higher development of nature with irreducible properties and causal process to its lower level (nature). Also, we present Marx's view of human agency and social structures to overcome the holistic vision of his thought. In addition to that, we aim to provide a proper approximation between Marx's methodological discussions and contemporary emergentism.

This paper is divided into four sections. The first one provides a contemporary account of emergentism. The second section exposes the different levels of being present in Marx's thought. In the third section, we present labour as the key activity for the emergence of the social level and Marx's view of the relationship between social structures and individual agency. Finally, we discuss Marx's methodological steps as a form of emergentism.

<sup>&</sup>lt;sup>2</sup> We also can find a discussion about the connection between emergence and Marxism in Creaven (2007). However, the author does not focus on Marx himself, but on critical realism and its approximation with dialectical philosophy.

### 2. Complexity and the puzzle of emergence

Over the past few decades, a new paradigm has emerged in the field of science, encompassing changes in ontology, epistemology, and methodology. Referred to as Complexity Science, this fresh scientific approach aims to challenge the classical scientific framework established by renowned thinkers like Galileo Galilei, René Descartes, and Isaac Newton during the Scientific Revolution of the Modern Period. One of the fundamental principles of classical science lies in its atomistic and reductionist viewpoint, which involves breaking down a system into its components, analyzing them in isolation, and subsequently aggregating their outcomes to understand the overall dynamics.

The classical approach to science perceives reality as consisting of autonomous and independent entities, each possessing fixed qualities that remain unchanged regardless of their interactions with other entities. These entities are seen as static components, with their individual properties and qualities serving as the building blocks that collectively explain the entire system. In physics, this perspective entails reducing any system to the different combinations and movements of elements characterized by permanent and homogeneous properties. Similarly, from a social standpoint, society is viewed as a collection of independent individuals with enduring and unchangeable properties and qualities that only relate externally to one another (Hodgson 1993, Prado 2011).

Reductionism, or methodological individualism in Economics, is another fundamental principle that supports this scientific approach. It is understood that a system is composed of self-governing components that combine to explain phenomena through aggregation. In other words, it is possible to explain macroscopic phenomena by analyzing their microscopic constituents. Ulanowicz (2009, p. 22) argues that "this assumption not only implies the existence of fundamental and unchanging smallest units of matter, but also suggests that these units can be assembled and disassembled".

Complexity Science, on the other hand, proposes a movement that seeks to reorient the foundations of scientific analysis. It is precisely this recognition of new foundations for scientific inquiry that Arthur, one of the pioneers in the intersection of Complexity and Economics, highlights when he states that "Complexity is not a theory but a movement in the sciences that studies how the interacting elements in a system create overall patterns, and how these overall patterns, in turn, cause the interacting elements to change or adapt" (Arthur 2015, p. 3).

If reality is not a collection of independent parts that can be analyzed in isolated compartments, but rather systems formed by subsystems that interact and mutually influence each other in their development, the problem that arises is how to understand the new phenomena that emerge from this interplay.

By overcoming reductionism, it is understood that the interaction between parts or subsystems produces new phenomena that possess irreducible (absent) properties when considered in isolation. In other words, they give rise to emergent phenomena, "those that arise out of some subsystem but are not reducible to that system" (Clayton 2004, p. 39) when isolated.

According to Elder-Vass (2005, p. 317), "[a]n 'emergent property' is one that is not possessed by any of the parts of the entity individually, nor when they are aggregated, without a structuring set of relations between them." Emergent properties can be found in all domains of reality. From the interaction between hydrogen and oxygen molecules, the properties found in water emerge. The properties found in water as a whole are not found in the properties of the molecules that compose it as individual parts.

Similarly, from lifeless molecules, cellular life emerges, the latter being irreducible to the former. From synaptic interactions, consciousness emerges. From the interaction between human beings in a specific period, certain economic, institutional, and cultural relationships emerge, which are not simply reducible to individual actions. Therefore, emergent phenomena pertain to how the parts are organized and interconnected.

It is possible to identify two major trends that seek to understand emergent phenomena. On one hand, some advocate for *strong emergence*, arguing the existence of genuinely new causal phenomena, in reality, resulting from the interaction of subsystems that cannot be deduced from lower levels.

On the other hand, some advocate for *weak emergence*, arguing the existence of new phenomena and processes resulting from the interaction of subsystems, but which do not give rise to distinct causal processes and can still be explained by causal processes at the lower level (Clayton 2004, 2006). A clear example of this is the explanation of biological processes through physical processes.

Chalmers (2006, p. 244) distinguishes the two main perspectives as follows:

We can say that a high-level phenomenon is strongly emergent with respect to a low-level domain when the high-level phenomenon arises (in some sense) from the low-level domain, but truths concerning that phenomenon are not deducible even in principle from truths in the low-level domain. (...) We can say that a high-level phenomenon is weakly emergent with respect to a low-level domain when the high-level phenomenon arises from the low-level domain, but truths concerning that phenomenon are unexpected given the principles governing the low-level domain.

In weak emergence, it is asserted that the emergent phenomenon does not create distinct causal processes but remains explainable by the causal processes at the lower level: "weak emergentists insist that, as new patterns emerge, the fundamental causal processes remain, ultimately, physical" (Clayton 2006, p. 7). Weak emergentism also states that ontological discontinuities are regarded as obscure or lacking knowledge due to the current state of scientific understanding: "For this reason, weak emergence is sometimes called 'epistemological emergence,' in contrast to strong or 'ontological' emergence" (Clayton 2006, p. 8).

Weak emergentism, however, by not regarding emergence as an ontological novelty of reality, "conceives the novelties that arise in the course of the development of nature as occurrences that emerge through ordinary causal chains, and can, in principle, be described theoretically through strictly deductive constructions" (Prado 2011, p. 21).

Furthermore, even within the perspectives of weak emergentism that seek to distinguish "levels of increasing complexity in the real world, these are understood as structures that emerge indirectly through the interactions of component elements, which can still be described mechanically" (Prado 2011, p. 21). Therefore, there are no ontologically distinguishable leaps, but only discontinuities that give rise to new structures and organizations.

It is for this reason that this perspective does not conceive emergent properties as ontologically distinguishable. The increasing levels of organization in reality are regarded as epiphenomena causally reducible to lower levels. "The explanatory force behind the emergent pattern resides solely in the local processes and hence is ontologically reducible to these local processes" (Witherington 2011, p. 70).

This position "stands closer to the 'unity of science' perspective" (Clayton 2004, p. 10). This is because "it places a stronger stress on the continuities between physics and subsequent levels" (Clayton 2004, p. 10). Another consequence of this position is that ontological leaps "are considered as false appearances, products of lack of knowledge, enigmas that can be resolved through the inexorable development of positive science" (Prado 2011, p. 22).

On the other hand, strong emergentism maintains that genuinely new causal agents or causal processes come into existence over the course of evolutionary history (Clayton 2006, 7). Supported by an ontological perspective, strong emergentism affirms the existence of levels of increasing organizational complexity in the process of nature's evolution. It argues that these differentiated levels of organization should be understood through their causal processes and laws of development.

The existence of genuine ontological leaps between the strata of inorganic, organic, and social nature is admitted. This means that each of these levels has its constitution, is subject to characteristic laws, and exhibits differentiated properties. "[E]mergent processes are ontologically distinguishable leaps" (Prado 2011, p. 21).

On the other hand, according to Witherington (2011), strong emergentism seeks to affirm the causal irreducibility of the lower level that gave rise to the emergent property. It emphasizes causal powers at both the microscopic and macroscopic levels, distinguishing itself by asserting that *downward causation* is an active component. Or, as Hodgson (2003) defines in the social level, *reconstitutive downward causation*.

One attempt to understand emergent phenomena from an ontological (strong) perspective that is compatible with their scientific explanation can be found in Bunge (2014). Firstly, it identifies strata of increasing complexity in nature that possess their laws, properties, and developmental tendencies.

According to Bunge (2014), physics is not sufficient to explain evolutionary processes, and neither are physical or biological processes sufficient to explain the properties and processes that occur in society. "Evolutionary biology, born in 1859, killed physicalism in showing that bio-evolution fits no physical laws – although it does not violate any either. The same holds for the social sciences. The only physical law that this need is that of energy conservation" (Bunge 2014, p. 142).

In the second place, Bunge argues that understanding emergence, as an ontological novelty, as an obscure and inexplicable phenomenon, is to abandon the principle of rationality. Explaining emergence in the levels of the increasing complexity of reality is scientifically possible and does not present itself as an indecipherable enigma.

Therefore, contrary to a widespread opinion, it has nothing to do with the possibility or impossibility of explaining qualitative novelty. Hence, it is mistaken to define an emergent property as a feature of a whole that cannot be explained in terms of the properties of its parts. Emergence is often intriguing but not mysterious: explained emergence is still emergence (Bunge 2014, p. 32).

Initially, Bunge argues that emergent properties pertain to wholes whose properties are not found in their parts. It means that "then, wholes possess properties that their parts lack. Such global properties are said to be *emergent*" (Bunge 2014, p. 23, emphasis in the original). However, although not reducible to the parts, they originate from their interrelationships and forms of organization. In other words, "These global (systemic) properties originate in the interrelations among the constituents of the systems concerned" (Bunge 2014, p. 23).

Bunge argues that it is necessary to dispel the confusion surrounding emergent phenomena. Such phenomena should be regarded as ontologically distinguishable novelties, but not as fully inexplicable or unpredictable. He also argues that this confusion has been embraced by eminent thinkers but needs to be overcome. Thus, he establishes his definition of emergence as follows: "To say that P is an emergent property of systems of kind K is short for 'P is a global [or collective or non-distributive] property of a system of kind K, none of whose components or precursors possesses P''' (Bunge 2014, p. 25).

Given this ontological characterization by Bunge, it is possible to scientifically understand emergent properties through the investigation of the parts and their interrelationships. The qualitatively new properties "*can* be explained, at least in principle, in terms of the parts and their interactions" (Wan 2011, p. 70, emphasis in the original). Bunge's perspective "maintains that the aim of science is not only to acknowledge the ontological status of emergence but also to integrate it into theories in such a way that makes it comprehensible and occasionally predictable" (Wan 2011, p. 70).

A fundamental objection to the strong view of emergentism raised by some authors is the alleged paradox found in the notion of downward causation. How can the established whole *cause* the parts at the lower level if these parts are necessary components for the existence of the whole? In other words, how can the whole cause the parts if it is the parts that constitute the whole?

The problem, therefore, lies in the interpretation of causation in modern science. "The reason why downward causation is paradoxical derives from the fact that such causation contradicts one of the central beliefs regarding causation, which is that the cause precedes its effect" (Hulswit 2006, p. 283). Taking this into account, it becomes evident that the term "causation" does not refer to the traditional cause-and-effect relationship, but rather to imposing limits on the actions of the parts.

The macroscopic pattern formed by the interaction, organization, and bonds between the parts establishes itself as an organizational structure with high synergy. This organization, as stated by Heylighen (2008, p. 9), imposes a limitation on the autonomy of the parts: "they have lost the freedom to visit states outside the attractor, i.e., states with lower fitness or higher friction. They have to obey new 'rules,' determining which actions are allowed and which are not. They have lost some of their autonomy." The interdependence of the parts "has turned the collection of initially independent agents into an organization, i.e., a cohesive whole that is more than the sum of its parts. The goal of this 'superagent' is to maximize overall synergy rather than individual utility" (Heylighen, 2008, p. 9).

Therefore, we have seen that strong emergentism argues in favor of increasing levels of organizational complexity in reality. These different levels are characterized by their own causal processes that are not purely and simply reducible to the causal processes of the lower level. For example, the causal processes that occur in society are not reducible to the causal processes that permeate pure nature. There is an ontological distinction between these levels of natural and social organization. On the other hand, the fundamental point for the analysis of emergent phenomena is to

understand the different levels of relationships between the parts, without disregarding them as a moment of the whole. Let's see how this relates to Marx's thought.

### 3. Marx and the ontological levels of being

To understand the close relationship between Marx's thought and emergentism, it is necessary to discuss Marx's general understanding of nature as a historical process with distinct ontological levels of existence in its strata of increasing complexity. This allows us, at a higher level of abstraction, to visualize how the German author conceives reality as strata of increasing organizational complexity, with their own laws and causal processes.

Initially, it is necessary to emphasize Marx's rejection of establishing a complete separation between nature and human society. In the traditions of thought up until that point in the modern period, the spheres of nature and society were understood as separate. This naturally had an obvious reason for the time: the theory of evolution of species would only be established as an explanation for the emergence of life in the second half of the 19th century.

But Marx, it is important to emphasize, already understood in the 1840s that there was a historical process of the constitution of nature, even if only logically, in which humanity would be a late development of this same process. Therefore, from the standpoint of "natural philosophy, he always took a clear position against the traditional separation of nature and society (...), and always considered the problem of nature predominantly from the standpoint of its interaction with society" (Lukács 1978, p. 5).

This view is manifested in a unified conception of history, where society is a higher organizational form that emerges from a natural foundation. In a classic passage in *The German Ideology* of 1845-6, this is made explicit: "We know only a single science, the science of history. One can look at history from two sides and divide it into the history of nature and the history of men. The two sides are, however, inseparable" (Marx; Engels 1976, p. 28).

This is because nature, for Marx, and it is important to make it clear to avoid misunderstandings, is fundamentally historical. This means that the developments of higher forms of life are necessarily constituted at their foundation by lower forms in a historical process of constitution. There is an articulation of ruptures and continuities between the natural and social spheres, with the lower forms being inseparable from the foundation of higher forms (Marx 1975; Marx; Engels 1976).

According to Marx (1975 p. 337, emphasis in the original) in the *Economic and Philosophic* Manuscripts of 1844: "And as everything natural has to *come into being, man* too has his act of origin—*history*—which, however, is for him a known history, and hence as an act of origin it is a conscious self-transcending act of origin. History is the true natural history of man".

The inorganic sphere is the fundamental basis for the emergence of the organic sphere, which presupposes it to emerge as a higher level of organization of matter. Or, in other words, social life depends on the level of the organic sphere to arise and perpetuate itself. That is, "historically, social being arises out of the inorganic and organic world, and it is ontologically impossible for it to leave this basis behind" (Lukács 1978, p. 93).

Although these statements may seem trivial, they are fundamental and were of utmost importance in a time marked by attempts to deduce the higher forms of life organization purely and simply from the lower forms, without differentiating their traits of rupture and the emergence of new properties, as well as the causal principles and developmental tendencies specific to each sphere."The old materialism brought the path 'from below' into intellectual disrepute, by seeking to derive the more highly structured and complicated phenomena directly from the lower, as simply the products of these" (Lukács 1980, p. 74).

When rejecting and criticizing this standpoint, Marx does acknowledge the natural foundation of human existence as an unavoidable basis. However, he does so intending to seek an additional motive to elucidate the distinctive social nature of those categories that emerge from the ontological separation of nature and society, precisely in terms of their social characteristics (Lukács 1980).

In other words, Marx constantly seeks to understand the phenomena and causal processes specific to the social sphere, which differentiates it from nature (other species), even though it has emerged from this foundation. In essence, Marx is interested in comprehending the qualitatively distinct properties of the social level that cannot simply be deduced from the level of organization found in nature as a whole.

As an illustrative example, in *Capital*, when analyzing the specificity of the labour process in capitalism, Marx explains that it is purely social, lacking any analogous correspondence in nature.

From the inorganic sphere emerged life, and from life emerged a superior form known as the social being. The emergence of life marks a process of rupture with the inorganic realm, as it brings about biological reproduction. However, it also signifies a process of continuity because life depends on the inorganic sphere. In other words, biological reproduction cannot be reduced to the properties and causal processes of the inorganic realm. Similarly, from the organic sphere arises the social being. The social sphere represents a rupture with the organic realm through the emergence of social reproduction, yet it also signifies a process of continuity because the social being depends on the organic sphere.

Social reproduction indicates that human beings act and develop beyond mere biologically determined reproduction, unlike other animals. In summary, the causal processes of the organic sphere are irreducible to the inorganic realm, and the causal processes of the social sphere are irreducible to the organic realm. This ontological differentiation between the organic and social spheres arises from the unique way in which the social being acts and responds to the environment through labour.

With this horizon in mind, in a highly significant note in *Capital*, Marx (1990 p. 493) recalls the ontological differentiation between the natural and social spheres by referencing a famous passage from the work of Giambattista Vico (1668-1744). Marx remarks on the relationship between social and natural history: "And would not such a history be easier to compile, since, as Vico says, human history differs from natural history in that we have made the former, but not the latter?".

Indeed, this differentiation between the natural and social levels is almost self-evident for Marx, and that is why he considers it a given. However, the purpose of these statements is to establish that the different spheres possess their irreducible laws at each level: the social being is not reducible to nature, although it is part of it.

For this very reason, Marx consistently endeavors to elucidate the true meaning of categories, properties, and purely social causal processes in his work, emphasizing that they cannot be understood merely as natural phenomena. As a result, Marx's thought explicitly rejects the simplistic and crude materialistic transposition of natural laws onto society, which was fashionable at the time (Lukács, 1978).

In the *Grundrisse*, this position becomes evident when compared to the perspective of the political economy of the period, particularly in terms of analyzing the production of a specific period. One of the key foundations of this perspective is the lack of proper differentiation between nature and society, even though the latter is a part of the former:

The determinations which apply to production, in general, must rather be set apart in order not to allow the unity which stems from the very fact that the subject, mankind, and the object, nature, are the same—to obscure the essential difference. On failure to perceive this difference rests, for instance, the entire wisdom of modern economists who are trying to prove the eternity and harmony of the existing social relations. (Marx 1986, p. 23).

This necessary distinction between the spheres of the natural and social world occurs to the extent that it is understood that reality is constituted by hierarchical levels of organization, and the actual birth of a more complex form involves a leap in any case; this more complex form is something qualitatively new, whose genesis can never be simply deduced from the simplest form or the lower level.

The organization of matter that constitutes the specificity social domain is superior and more complex than the domain of other animals within nature. However, it is worth noting that this perspective was already present in G. W. F. Hegel (1770-1831), albeit only logically: "It is well known that based on the concepts of mechanism, chemistry, and organism, Hegel treated natural reality as a hierarchy formed by increasingly complex structures" (Prado 2011, p. 32).

Note that, until then, a historical, evolutionary, and processual view of nature and society could only be conceived logically. Only after Darwin's discoveries and the publication of *On the Origin of Species* did concrete evidence for a historical and processual view of nature become effectively possible.

In a letter to Engels in 1860, Marx stated that he had read Darwin's work and that it would provide the scientific foundation for his already established historical conception of societies, based on a natural history. "In the course of my ordeal - during the past 4 weeks - I have read all manner of things. *Inter alia* Darwin's book on *Natural Selection*. (...) [T]his is the book which, *in the field of natural history*, provides the basis for our views" (Marx 1985, 232, emphasis added).

It is important to emphasize that Marx directly points to a historical conception of nature with differentiated levels of organization, but he does not suggest that the history of society can be deduced from it. He simply states that what was previously only possible logically - to understand that the organic sphere emerges from the inorganic sphere, and from that, society emerges, i.e., a historical conception of nature - is scientifically substantiated by the discoveries of evolution through the mechanism of natural selection.

It seems possible now to make an initial approximation with a strong emergentist perspective: the levels of organizational complexity in the inorganic, organic, and social realms differ from each other and possess their properties and causal processes, not reducible to the lower level, even though they are interconnected and interdependent.

Interestingly, during the period in which Marx conducted his reflections, there prevailed a conception that sought to transpose the laws governing nature onto society. However, according to Marx, this differentiation is present in society due to the unique and primary capacity of the social being that sets it apart from other animals: labour.

# 4. Social being and social structures

It has been seen that Marx understands nature as historical, through a unified conception. This means that nature develops historically from the inorganic to the organic sphere, and finally to the social sphere. Such development occurs through processes of rupture and continuity that signify a qualitative leap, marking the genesis of a superior sphere with its properties and causal processes, but one that relies on its original foundation.

Life depends on the inorganic sphere, but it is not reducible to it. Similarly, the social being emerges from the organic sphere but is irreducible to its causal laws. In other words, each sphere or level of organization possesses its properties, and this should be a fundamental principle for scientifically analyzing society. With this in mind, Marx sought to understand the specificities of the social being and society.

In the Manuscripts, Marx makes this position clear. Firstly:

*Man* is directly a *natural being*. As a natural being and as a living natural being he is on the one hand endowed with *natural powers*, *vital powers*—he is an *active* natural being. These forces exist in him as tendencies and abilities—as *instincts*. On the other hand, as a natural, corporeal, sensuous, objective being he is a *suffering*, conditioned, and limited creature, like animals and plants. (Marx 1975, p. 336, emphasis in the original).

In the same sense, "Man *lives* on nature—means that nature is his *body*, with which he must remain in continuous interchange if he is not to die" (Marx 1975, p. 276, emphasis in the original). The social being is, therefore, dependent on and limited to nature. However, this also means that it is interconnected with nature, being a higher form of development within nature itself. "That man's physical and spiritual life is linked to nature means simply that nature is linked to itself, for man is a part of nature" (MARX 1975, p. 276).

The fundamental question, however, is that this connection cannot be mistaken for an equivalence of causal processes in each sphere. The specificity of the social sphere emerges from the peculiar and qualitatively differentiated way in which human beings interact with nature. Through intentional acts of transforming their environment, the social being carries out their metabolism with nature, ontologically distinguishing themselves from it. It is labour, the activity of material exchange with nature, that underlies the basic human activity and sets it apart from other species. What characterizes this activity is teleology, i.e., consciously intentional action to transform reality. And it is from this original basic activity that other forms of human activity originate.

Marx's treatment of labour aims to establish an ontological distinction between human activity and that of other animals. However, he does so to explain the specificity of labour in capitalist society. To do this, it was necessary to specify the general characteristics of labour that can be found in all existing societies. In other words, Marx needed to establish the universal differentiation of labour in the particular analysis of capitalist society.

From an ontological perspective (in general), labour is the conscious human activity of exchange with nature that is directed towards the "production of use-values." It is the appropriation of what exists in nature for human needs. It is the universal condition for the metabolic interaction

[*Stoffwechsel*] between human beings and nature (Marx 1990, p. 290). Therefore, labour, as a general organic exchange with nature, is an "everlasting nature-imposed condition of human existence, and it is therefore independent of every form of that existence, or rather it is common to all forms of society in which human beings live" (Marx 1990, p. 290). Additionally, labour "is a condition of human existence which is independent of all forms of society; it is an eternal natural necessity which mediates the metabolism between man and nature, and therefore human life itself" (Marx 1990, p. 133).

In contrast to other forms of animal activity in nature, one of the elements that characterize the unique and peculiar nature of human activity is teleology. This does not mean, you see, that higher animals do not possess consciousness. Consciousness is recognized in various species. However, the actions of these animals in their environment lack intentionality in the sense of going beyond biological reproduction. "It is only in the activity of the human species that consciousness becomes the directing and central moment of a truly teleological process, in which the outcome of the action is mentally anticipated and carried out in practice" (Medeiros, 2016, p. 174). The form of human activity is, therefore, qualitatively different.

This primary activity, therefore, is the genesis of the social being and the process of constituting the social sphere as a level of differentiated organization. From this activity, other social complexes emerge that have no equivalence in nature. According to Lukács (1978, p. 80), in Marx, "labour is particularly from a genetic point of view the starting-point of the humanization of man, for the extension of his abilities, among which self-mastery is something that can never be forgotten". It is through this primary activity that the social being distances itself from the determinations that govern the organic sphere and positions itself as a social sphere with its properties and causal processes. This means that labour presents itself as the primary activity that gives rise to other human activities.

According to Marx, therefore, the social being is, first and foremost, a natural being because it belongs to nature. It is also evident now that it differentiates itself primarily from the organic sphere through teleologically oriented action through labour. That is, human action is qualitatively different from that of other animals. However, the social being can only individualize itself among other members of the human species, i.e., other human beings. Although Marx does not extensively use the term "individual" itself, in this sense, he always refers to the singular members of the human species, i.e., individuals.

In the *Manuscripts*, Marx (1975, p. 299, emphasis in the original) affirms that "[t]*he individual is the social being*. His manifestations of life (...) *are* therefore an expression and confirmation of *social life*.". And further, he affirms that "[m]an, much as he may therefore be a

*particular* individual (and it is precisely his particularity which makes him an individual, and a real *individual* social being), is just as much the *totality*" (Marx 1975, p. 299, emphasis in the original).

That is, the individual is a social being only to the extent that they are in relation with others in the constitution of society. However, this perception cannot be understood in isolation, as if it were an abstraction of young Marx. In the *Grundrisse*, it is possible to identify an almost identical position. According to Marx (1986, p. 18), the social being is not just a "political animal", in reference to Aristotle, but "he is not only a social animal, but an animal that can isolate itself only within society".

Marx's position is to distinguish himself from an atomistic conception of society - which was hegemonically established at the time - that understands society merely as an aggregate of autonomous and independent individuals. Marx consistently criticizes the so-called "Robinsonades," where individuals are isolated and devoid of social determinations, much like the character Robinson Crusoe in Daniel Defoe's (1660-1731) novel.

In the *Grundrisse*, Marx states that this is the starting position of the classical political economists in the analysis of society: "The individual and isolated hunter and fisherman, who serves Adam Smith and Ricardo as a starting point, is one of the unimaginative fantasies of the 18th century" (Marx 1986, p. 17). That is why Marx (1990), in *Capital*, states that political economy loves Robinsonades<sup>3</sup>.

Labour cannot be understood in isolation and chronologically before other complexes of social life, but rather it is labour, as the primary activity of transforming nature, that establishes the social being. However, the social being already emerges, in Lukács' terms, as a complex of complexes, i.e., a whole of relations. Therefore, the social being is not reducible to a single one of the many human activities, although labour is the primary activity. It is, in fact, a relational totality.

It is from this perspective that, for Marx, it is inconceivable, even for the sake of analytical simplification, to conceive the individual or the social structures of a particular period as elements that do not mutually determine each other. "Production by an isolated individual outside society (...) is just as preposterous as the development of language without individuals who live *together* and speak to one another" (Marx, 1986, p. 18, emphasis in the original).

The production of these social structures by individuals, once again, does not occur in an existential and material vacuum. On the contrary, individuals do not choose the social structures in which they will be embedded, let alone the material conditions that limit their activity and the level of material development (productive forces) of the period in which they will live. This means that

<sup>&</sup>lt;sup>3</sup> "The idea of the isolated man without social determinations first emerges in the political philosophy of Hobbes and Locke and is absorbed by Political Economy, becoming its cornerstone. Furthermore, Economics increasingly becomes the stronghold of the conception of the isolated man, free from social determinations" (Augusto 2016, p. 302).

the social structures in which individuals are inserted are independent of their will and deliberate choice because they are constructs of past generations, limiting their actions to the real possibilities of transforming these same structures they will encounter.

It is essential, therefore, to recall the famous passage in which Marx (1979, p. 103), in *The Eighteenth Brumaire of Louis Napoleon*, makes it clear that "Men make their own history, but they do not make it just as they please; they do not make it under circumstances chosen by themselves, but under circumstances directly encountered, given and transmitted from the past".

The social structures constructed by preceding individuals limit the activity of present individuals. "The tradition of all the dead generations weighs like a nightmare on the brain of the living" (Marx 1979, p. 103). Society, then, is constituted by the relationship between the actions of individuals and the social structures in which they are embedded (created by the social relations of past generations).

Individuals, in these attributions, are the components that bring forth social structures through their relationships. Collectively, these individuals can alter reality, but not in a deliberate manner, as they do not choose the social structures into which they are born. The social structure, in this sense, conditions the actions of individuals. Once the social structure is established through the relationships between individuals, it escapes the control of singular individuals. This is because the totality of intentional acts creates social structures with qualitatively different properties that are irreducible to isolated individuals. Arguing about the unintentional nature of the outcome of individual actions in capitalism, Marx (1986, p. 132) states in the Grundrisse that "[t]heir own interaction [appears] as a process and force independent of them."

First and foremost, however, this does not pertain to the idea of a unidirectional determination of the social structure over the individual, but rather to the limits imposed on human agency. The very common argument in this regard is the interpretation of certain passages in Marx's work where he argues, for example, that "material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness" (Marx 1987, p. 263).

In this attribution, there would be an implicit view of unidirectional determination between the material base and "spiritual" life. It is important to emphasize that this pertains exclusively to a materialist standpoint. And when Marx uses the word *condition*, he is simply referring to limiting/directing the activity of individuals or social complexes in a particular period.

This means, in the language of strong emergentism, it is simply a process of downward causation. In other words, the established whole limits enable or block the actions of the parts that compose it in a specific context. Or, as Marx and Engels (1976, p. 54) state in *The German Ideology*, that "[i]t shows that circumstances make men just as much as men make circumstances".

This means that society is constituted by individuals in social relations, but it is in no way imbued with intentionality, which is a characteristic solely attributed to the individuals comprising it. Commenting on the fetishistic character of commodities in capitalism, Marx remarks that human actions, as a whole, produce relations that do not result in collective intentionality. Thus, they create unconscious social structures.

The outcome of the clash of various intentional actions of individuals produces unintended social structures that escape their deliberate control. In the *Grundrisse*, Marx asserts that teleology resides exclusively with singular human beings and can never be transferred to the social structure.:

Though the whole of this movement may well appear as a social process, and though the individual elements of this movement originate from the conscious will and particular purposes of individuals, nevertheless the totality of the process appears as an objective relationship arising spontaneously; a relationship which results from the interaction of conscious individuals, but which is neither part of their consciousness nor as a whole subsumed under them. Their own collisions give rise to an *alien* social power standing above them. Their own interaction [appears] as a process and force independent of them. (Marx 1986, pp. 131-132, emphasis in the original).

Marx, therefore, constructs "a conception of society as a set of relations between individuals and relations between these relations (and not, to repeat, as a group of individuals or, more precisely, individual practices)" (Medeiros 2016, p. 185). Such emphasis on social relations appears to us that Marx already had a clear feature of a strong emergentism position in establishing a relational stance of society.

Social structures are emergent properties resulting from the interaction of human activities with one another, i.e., "Marx explicitly advocates for what he would later call a relational conception of society" (Medeiros 2016, p. 185, emphasis in the original). For Marx, therefore, relations always involve subjects. There are, in fact, no individuals who exist independently of these relations, nor are there relations that hold meaning without the individuals who occupy positions that only make sense when interconnected (Medeiros 2016).

On one hand, social structures depend on human activity, meaning they cannot reproduce in the absence of human actions, although they are not the intentional result of these activities. However, the individual's action is influenced by the structural conditions of the activity, which can facilitate or limit it. Nevertheless, this action is not solely determined by structural conditions, as it still maintains its teleological nature, meaning its purposes, alternative choices, values, and the role of subjectivity are preserved (Medeiros 2016).

# 5. "The correct scientific method"

To understand the relationship between part and whole in Marx's thinking, it is necessary to evoke the category of totality. Starting from atomism and reductionism, the whole is a mere aggregate of parts that are autonomous from one another. On the other hand, in the holistic view, the whole takes precedence over the parts, defining them as functions of the whole<sup>4</sup>. In contrast to atomism and holism, Marx's thought "regards the whole and the parts as ontologically reflexive determinations. The isolated parts of the whole are 'dead' abstractions, and likewise, the whole conceived only as a whole is an abstraction lacking concreteness" (Prado 2011, p. 34).

In Marx, the parts define themselves as such, insofar as they also present themselves as a moment of the whole. Or rather, "the part, while defining itself as a part, also defines the whole. The whole, to the same extent, only defines itself when it also defines the parts. It is equally a moment of the parts" (Prado 2011, p. 34).

In *The German Ideology*, Marx and Engels oppose the abstract view of empiricism and reductionism by asserting that the analysis of history should not be carried out as aggregates of autonomous facts analyzed through immediate empiricism. According to them, it is necessary to comprehend the broader framework of totality in the historical analysis of society. In other words, it is crucial to go beyond immediate appearance and find the essential connections that enable the analysis of the historical process in its complexity. It is from this analytical framework that "history ceases to be a collection of dead facts, as it is with the empiricists (themselves still abstract), or an imagined activity of imagined subjects, as with the idealists." (Marx; Engels 1976, p. 37).

How to correctly grasp the wealth of reality? Although Marx did not leave a methodological treatise, it is possible to perceive his precursor exposition of the analysis of society throughout his work. However, in the section *The Method of Political Economy* in the famous *1857 Introduction*, Marx exposes the methodological limits of the perspective of political economy, which is clearly empiricist and reductionist and argues in favor of what he calls the "correct scientific method" (Marx 1986, p. 38), whose foundations we believe complement a position close to the general elements of emergentism.

The fragmentary notes found in the *1857 Introduction* were made to counter Marx's position regarding the method found in political economy, which he sought to critique. In the pursuit of scientifically analyzing society, it is natural to begin with immediate appearance: "we begin with its population, the division of the population into classes, town and country, sea, the different branches of production, export and import, annual production and consumption, commodity prices, etc." (Marx 1986, p. 37).

<sup>&</sup>lt;sup>4</sup> Many authors claimed that Marx had a holistic view of reality. Just as an example, Bunge (2000, p. 141) insists that "Marx was a holist". That is, Marx's thought is based on an "obsolete holism" (Bunge 2000, p. 147). Popper (2011) follows the same line of reasoning by stating that "Marx was the last of the great holistic system builders. "Holism "is the thesis that the whole precedes and dominates its parts, and must therefore be studied independently of the later" (Bunge 2012, p. 86).

Analyzing society through immediate empiricism and reductionist methods provides a false understanding of the whole. "It would seem right to start with the real and concrete, with the actual presupposition, e.g. in political economy to start with the population, which forms the basis and the subject of the whole social act of production." (Marx 1986, p. 37).

From the perspective of the scientific rigor required to analyze society, this approach proves to be inadequate, as it would result in a chaotic representation of the whole simply because the essential relationships that form specific structures like "population" are not revealed in such analysis.

According to Marx, it is always necessary to start from this immediate appearance, but it is essential to go beyond it to unveil the relationships, categories, and properties that constitute the internal connections of the analyzed object. The wealth of reality, or rather, concreteness, presents itself as the synthesis of multiple relationships and properties and cannot be exhausted by analyzing the surface of isolated phenomena. "The concrete is concrete because it is a synthesis of many determinations, thus a unity of the diverse." (Marx 1986, p. 38).

This observation has a dual consequence. Firstly, it is impossible to analyze society, from Marx's theoretical perspective, based on the isolated individual without social determinations (a la Robinson Crusoe). The individual is not an atom or an isolated monad. Therefore, reductionism, as an analytical principle, is incompatible with Marx's perspective of totality. In other words, it is impossible to adequately grasp the macroscopic properties (society) by simply aggregating the microscopic properties (individuals).

Secondly, the multiple determinations and relationships arising from the different levels of reality that exist in society impose serious limits on any attempt to synthesize the real through immediate empiricism. The multiple determinations and relationships that permeate reality require that scientific analysis unveils the internal properties that are not captured by empiricism and the principle of reduction. These properties only emerge from the relationships in reality:

Population is an abstraction if, for instance, one disregards the classes of which it is composed. These classes in turn remain an empty phrase if one does not know the elements on which they are based, e.g. wage labour, capital, etc. These presuppose exchange, division of labour, prices, etc. For example, capital is nothing without wage labour, without value, money, price, etc. If one were to start with population, it would be a chaotic conception of the whole, and through closer definition one would arrive analytically at increasingly simple concepts; from the imagined concrete, one would move to more and more tenuous abstractions until one arrived at the simplest determinations. From there it would be necessary to make a return journey until one finally arrived once more at population, which this time would be not a chaotic conception of a whole, but a rich totality of many determinations and relations (Marx 1986, p. 37).

Concrete is both the final destination of the investigation and the initial starting point. "In thinking, it therefore appears as a process of summing-up, as a result, not as the starting point,

although it is the real starting point, and thus also the starting point of perception and conception" (Marx 1986, p. 38).

According to Marx's perspective, science always begins its journey from the appearance of phenomena, "but through successive and in-depth investigations and analyses, it seeks the most abstract and general foundations that supposedly govern the phenomena, to then explain the concrete that appears as concrete thought" (Prado 2014, p. 132). It is necessary to undertake this dual journey that moves from the whole to the parts and from the parts to the whole, from the abstract to the concrete and from the concrete to the abstract, in search of the connections, relationships, and properties that exist at different levels of relations.

Dussel summarizes the dual journey in scientific investigation in Marx as follows:

On the one hand, it handles determinations (clearly defined as "concepts," themselves "constructed" as thought essence with internal determinations) and relates them to each other (e.g., production-consumption), mutually co-determining one another. In this way, the "opposites" co-define each other. In a second moment, a new totality is synthetically constituted with them, acquiring autonomy (it is the totality articulated with multiple determinations). At this concrete level, what appeared as opposites before (production and consumption) now become part of a "unity" that encompasses and explains them. The concrete totality is the complex. The simple is the determination (which can reach the level of concept), such as labour, division of labour, necessity, exchange value. (Dussel 2010, pp. 71-72).

In Marx, the multiple determinations of reality do not appear through direct experience and analysis of immediate empiricism. It is necessary to unveil the relationships between the parts that culminate in diverse properties and qualities. "But they are the result of a thought movement, (...) which progressively exposes, starting from the simplest and most abstract determinations of the content, its increasingly rich, complex, and intense determinations" (Müller 1982, pp. 19).

The task of science, therefore, is to reproduce the concrete ideally and find the internal connections that permeate reality. It is through this journey (from the simple to the complex, from the complex to the simple) that it is possible to unveil the fundamental connections for explaining the object under analysis, as its properties are not petrified but are constantly evolving through new relationships.

Contrary to classical political economy, which takes its categories directly from the empirical and employs them as descriptive concepts of economic forms in their immediate appearance without being able to penetrate their essential relationships, for Marx:

The true concreteness of capitalist reality is not given by the direct experience of commodity circulation and price movement, that is, by the categories of circulation, but is the result of a thought process that reconstructs the systematic constitution of capital starting from the simplest, most abstract, and apparent determinations of capitalist production (commodity, value, money, circulation) to arrive at the richer, concrete, and

essential ones through the explication of production categories based on the law of valorization (surplus value, exploitation, labour time, necessary and surplus labour, absolute and relative surplus value, cooperation, division of labour, machinery, wage labour, reproduction, and accumulation, to name some of the main categories in Volume I of Capital) (Müller 1982, p. 19).

Furthermore, the scientific investigation by Marx does not adhere to the principle of reductionism. It is not a mere summation of concepts based on a fixed and final foundation. Instead, it is crucial to recognize that the interconnectedness and interplay among the parts and the whole go beyond static abstractions. The whole is not separate from its constituent parts but emerges through their dynamic interaction (Kosik 1976).

Seen from another perspective, we arrive at a false totality, a chaotic representation of the whole, where facts, relations, and properties appear as a disconnected aggregate. Marx's viewpoint of totality seeks to overcome this understanding. The whole, therefore, is not simply an aggregate filled with properties of the parts, but it establishes itself as a totality insofar as the interrelationships among the parts, with their specific properties, generates qualitatively distinct new properties. It is through the recognition that totality is a structured whole.

The simplest categories already carry within themselves the determinations of intrinsic relationships of the more complex forms, as part and whole are constituted reflectively. The simplest categorical forms "express relations in which the less developed concrete may have realized itself without as yet having posited the more complex connection or relation which is conceptually expressed in the more concrete category" (Marx 1986, p. 39).

On the other hand, the analysis of the "more developed concrete retains the same category as a subordinate relation" (Marx 1986, p. 39). The ascent from the abstract to the concrete, from the simple to the complex, is a method that allows for the identification of the mediating forms of relationships and properties that are not captured by empiricism and the principle of reduction, i.e., the emergent phenomena.

Categories and relationships are constantly articulating themselves in differentiated ways through new configurations of relations. In Marx's framework, there are no petrified categories and relationships; rather, they exist in an ongoing processuality. This means that as they interact as distinct relations, they acquire new properties and qualities. Therefore, for Marx, the analysis of bourgeois society must be based on the understanding that the established relationships are always undergoing transformation, gaining or losing properties and qualities in specific circumstances.

In *Capital*, at each moment when confronted with a new dimension of the object, the category of value reveals new contents and assumes new forms. Thus, when faced with the commodity character of the labour form, value reveals its determination as a process of valorisation,

of capital. When confronted with commodities as products of capital and the movement of capital in pursuit of profit, value reveals its determination as production price (Augusto 1999).

The foundation of Marx's analytical approach is precisely opposed to any form of empiricism and reductionism. The central question is to uncover the relationships that exist among the processes that constitute society in its diversity. As evident throughout Marx's work, and as he emphasizes, these established relationships are not direct, as they are always mediated by the different levels of complexity within each social complex that corresponds to modern society (Netto 2020).

Marx understands everything that exists as an intrinsic connection of relations, as a structured reality in constant transformation. That is why he does not investigate reality based on empiricism and reductionism. He examines the parts not in isolation from each other, but in their internal connections, which he sees as constitutive of both the parts and the whole. In investigating reality, he seeks to uncover the abstract determinations of phenomena, as well as the formative nexuses of all things (Prado 2011).

#### Conclusions

The outcome of contemporary developments in science has been referred to as complexity, as it reorients the foundations of modern scientific analysis. An essential aspect of the scientific reorientation towards complexity is the rejection of reductionism and the establishment of an emergentist position. In contrast to reductionism, the emergentist perspective recognizes that it is not possible to scientifically investigate an object by analyzing its isolated simplest parts and explaining the object solely based on the properties of its parts. On the contrary, emergentist perspectives argue that the relationships and organization of the parts that constitute an object or system produce qualities and properties that are irreducible to them in isolation.

In direct alignment with strong emergentist approaches, we find that Marx also conceives reality as layers of increasing complexity, characterized by laws and developmental tendencies that do not exist at lower levels. Therefore, the understanding that organic life cannot be reduced to the properties and laws governing the inorganic realm and that society transcends the natural sphere, are contemporary non-reductionist elements already present in Marx's work. Although society is part of nature, it cannot be simply reduced to natural processes. The social sphere possesses properties and qualities that are not present in nature due to its higher level of development.

Furthermore, in clear anticipation of emergentist elements, Marx's methodological approach to uncovering the principal properties and developmental tendencies of modern capitalist society relies on explicitly anti-reductionist and empiricist positions. As we have seen, Marx acknowledges the complexity of capitalist reality, with its various levels of relations and properties, which leads him to traverse a path starting from immediate empirical observations but requiring an investigation into relations and properties that are not directly evident at that level of analysis.

This is why Marx emphasizes that the real categories of capitalist reality are in a continuous process of change. Through new social relations and confrontations, economic categories acquire new properties, qualities, and meanings. While these are social properties since Marx's object of study is modern society, the internal relations within these categories impose significant limitations on empiricist and reductionist analyses of society, and by rejecting them, Marx was one of the pioneers in transcending the prevailing views of his time.

Another important point that aligns Marx with the strong emergentist perspective is the view that the established whole exercises power over the degrees of freedom of its constituent parts in a process of downward causation. The ontological position of emergentism posits that once the system's dynamics are established, its parts lose individual autonomy. The relative autonomy of subsystem behavior to the system is determined by this causal power that constrains their behaviors. From a social standpoint, an individual's behavior is constrained by the social structure of the particular society they are part of.

We have seen that this is precisely Marx's position when describing the general characteristics of the relationship between individuals and the social structure of a given historical period. Although individuals are the intentional actors in the construction of society, the social structure that emerges from social relations always imposes a particular mode of action on individuals. Individual action and structural limitations on action are two sides of the same coin.

As Marx consistently argues, individuals make history, but not in a deliberate manner, as they are always embedded within a social structure whose dynamics are already established. This social structure, as we have seen, eludes the control of singular individuals. Therefore, human agency has relative autonomy, as the established social structure exercises power over individual behavior.

Marx also distances himself from holistic and fatalistic positions. He emphasizes that although the social structure automatizes itself concerning individual wills and exerts power over them, imposing a certain mode of action, it is always possible, through the conscious organization of individuals, to transform this social structure. This is why Marx appears to have surpassed many problematic positions regarding the relationship between parts and wholes or human agency and social structures that prevailed in his time, as his political horizon establishes that the social structure is always subject to transformation, even if it exerts an almost mystical power over individual behavior. Views like these serve as an antidote to interpretations that dominated Marxist debates in the 20th century, especially those traditions that claimed there is a unidirectional structuring from the whole to the parts, from social structures to individuals. While we cannot assert that Marx anticipated emergentism, as that would be a pure anachronism, we can say that his thought carries several contemporary elements of emergentism, making it highly relevant today and an important *starting point* for understanding social reality.

# References

Arthur, W. B. (2015): Complexity and the Economy. Oxford: Oxford University Press.

Augusto, A. G. (1999): Ontologia e crítica: o método em Marx [Ontology and critique: Marx's method]. *Econômica*, Niterói, v. 1, n.2, p. 131-142.

Augusto, A. G. (2016): Marx e as "robinsonadas" da Economia Política [Marx and the Robinsonades od Political Economy]. *Nova Economia*, v.26, n.1, p. 301-327.

Bronowski, J. (2011): The Ascent of Man. 4 ed. London: BBC Books.

Bunge, M. (2000): Systemism: the alternative to individualism and holism. *Journal of Socio-Economics*, Vol. 29, p. 147-157.

Bunge, M. (2012): Evaluating Philosophies. Boston: Springer.

Bunge, M. (2014): *Emergence and Convergence: Qualitative Novelty and the Unity of Knowledge*. Toronto: University of Toronto Press.

Callinicos, A.; Kouvelakis, S.; Pradella, L. (Eds.) (2021): Routledge Handbook of Marxism and Post-Marxism. London: Routledge.

Chalmers, D. J. (2006): Strong and Weak Emergence. In Clayton, P.; Davies, P. (Eds.). *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science to Religion*. New York: Oxford University Press, p. 244-254.

Clayton, P. (2004): *Mind and Emergence: from Quantum to Consciousness*. New York: Oxford University Press.

Clayton, P. (2006): Conceptual Foundations of Emergence Theory. In Clayton, P.; Davies, P. (Eds.). *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science to Religion*. New York: Oxford University Press, p. 1-34.

Creaven, S. (2007): *Emergentist Marxism: Dialectical philosophy and social theory*. London: Routledge.

Dussel, E. (2010): La producción teórica de Marx: Un comentario a los Grundrisse [The theoretical production of Marx: A commentary on the Grundrisse]. Caracas: Fundación Editorial El perro y la rana.

Elder-Vass, D. (2005): Emergence and The Realist Account of Cause. *Journal of Critical Realism*, 4(2), p. 315–338.

Elder-Vass, D. (2010): *The Causal Power of Social Structures: Emergence, Structure and Agency*. New York: Cambridge University Press.

Heylighen, F. (2008): Complexity and Self-organization. In: Bates, M. J.; Maack, M. N. (Eds.) *Encyclopedia of library and information sciences*. United Kingdom: Taylor & Francis.

Hodgson, G. (1993): Why the Problem of Reductionism in Biology Has Implications for Economics. *World Futures*, Vol. 37. p. 69-90.

Hodgson, G. (2000): From micro to macro: the concept of emergence and the role of institutions. In: Burlamaqui, L.; Castro, A. C.; Chang, H. J. (Eds.) *Institutions and the Role of the State*. UK: Edward Elgar, p. 103-126.

Hodgson, G. (2003): Reconstitutive downward causation: Social structure and the development of individual agency. In Fullbrook, E. (Ed.). *Intersubjectivity in economics: agents and structures*. London: Routledge, p. 159-180.

Hulswit, M. (2006): How Causal Is Downward Causation?. *Journal for General Philosophy of Science*, Vol. 36, No. 2, p. 261-287.

Kim, G. (1999): Making sense of emergence. Philosophical Studies, 95, p. 3-36.

Kim, G. (2000): Making sense of downward Causation. In Andersen, P. B.; Emmeche, C; Finnemann, N. O.; Christiansen, P. V. (Eds.). *Downward Causation*. Aarhus: University of Aarhus Press, p. 305-321.

Kosik, K. (1976): Dialectics of the concrete. Dordretch: D. Reidel Publishing Company.

LAWSON, T. (2019): The Nature of Social Reality: Issues in Social Ontology. London: Routledge.

Lessa, S. (2012): *Mundo dos Homens: Trabalho e Ser Social [World of Men: Labour and Social Being].* 3ª ed. São Paulo: Instituto Lukács.

Lukács, G. (1978): The ontology of social being: Marx. London: Merlin Press.

Lukács, G. (1980): The ontology of social being: Labour. London: Merlin Press.

Martins, M. V. (2022): *Marx, Spinoza and Darwin: Materialism, Subjectivity and Critique of Religion*. London: Palgrave Macmillan.

Marx, K. (1975): Economic and Philosophic Manuscripts of 1844. In: Marx, K.; Engels, F. *Collected Work (MECW)*. Nova York: International Publisher, v. 5, p. 229-326.

Marx, K. (1979): The Eighteenth Brumaire of Louis Napoleon. In Marx, K.; Engels, F. Collected Works. New York: International Publishers. v. 11. p. 103-181.

Marx, K. (1985): Marx to Engels. In Marx, K.; Engels, F. Collected Works. New York: International Publishers, v. 41, p. 231-233

Marx, K. (1986): Economic Manuscripts of 1857-58. In: Marx, K.; Engels, F. Collected Work (MECW). Nova York: International Publisher, v. 28.

Marx, K. (1990): Capital: A critique of political economy. Volume 1. London: Penguin Books.

Marx, K.; Engels, F. (1975): The Holy Family. In: Marx, K.; Engels, F. *Collected Work (MECW)*. Nova York: International Publisher, v. 4, p. 05-211.

Marx, K.; Engels, F. (1976): The German Ideology. In: Marx, K.; Engels, F. Collected Work (MECW). Nova York: International Publisher, v. 5, p. 19-530.

Mclaughlin, B. P. (2008): The Rise and Fall of British Emergentism. In Bedau, M. A.; Humphreys, P. (Eds.). Emergence: Contemporary readings in philosophy and science. Massachusetts, MIT Press, p. 19–59.

Medeiros, J. L. (2016): Se Marx tivesse escrito uma ontologia da sociedade, quais seriam seus elementos fundamentais? [If Marx had written an ontology of society, what would be its fundamental elements?]. *Revista Outubro*, n. 26.

Musto, M. (2020): *The Marx Revival: Key Concepts and New Interpretations*. Cambridge: Cambridge University Press.

Müller, M. L. (1982): Exposição e método dialético em 'O Capital' [Exposition and dialectical method in *Capital*]. *Boletim da Sociedade de Estudos e Atividades Filosóficas Seaf*, Belo Horizonte, v. 2, p. 15-41.

Netto, J. P. (2020): Marx: Uma Biografia [Marx: a biography]. São Paulo: Boitempo.

Paniagua, P. (2023): Complexity defying macroeconomics. *Cambridge Journal of Economics*. p. 1-18.

Popper, K. (2011): The Open Society and Its Enemies. New Jersey: Princeton University Press.

Prado, E. (2011): Complexidade e Práxis [Complexity and praxis]. São Paulo: Editora Plêiade.

Prado, E. (2014): Lei de Marx: Pura lógica? Lei empírica? [Marx's law: Pure logic? Empirical law?]. *Revista da Sociedade Brasileira de Economia Política*, n. 37, p. 119-142, São Paulo.

Ulanowicz, R. E. (2009): *A third window: natural life beyond Newton and Darwin*. Pennsylvania: Templeton Foundation Press.

Wan, P. Y-Z. (2011): *Reframing the Social: Emergentist Systemism and Social Theory*. England: Ashgate Publishing Limited.

Witherington, D. C. (2011): Taking Emergence Seriously: The Centrality of Circular Causality for Dynamic Systems Approaches to Development. *Human Development*, 67 (54), p. 66-92.