Research Article

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Rethinking the Theoretical Foundation of Economics II: Core Themes of the Multilevel Paradigm

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Abstract: This article introduces the core themes of the multilevel economic paradigm. This paradigm extends Darwin's evolutionary framework of thought (concerned with living things) to economics, in contrast to the neoclassical paradigm, which is modeled after Newtonian mechanics (applicable primarily to inanimate objects). The central theme of the multilevel paradigm is functional organization, which refers to the way in which economic agents (individuals and groups) and systems are structured to achieve economic objectives. The multilevel paradigm recognizes that people are engaged in multiple levels of functional organization, and thus, agency is distributed between individuals and groups. These levels are flexible through time and across domains (economic, political, social, and environmental), so that the economy is understood as embedded in the polity, society, and the natural world. Flexible levels of functional organization are both a cause of and response to radical uncertainty. This flexibility of functional organization implies multilevel economic decision-making and multilevel flourishing.

Keywords: functional organization, uncertainty, social economics, externalities, agency, evolution, paradigm

1 Introduction

The multilevel paradigm introduces a way of thinking about economic activity that is quite different from that of neoclassical economics. To begin with, neoclassical economics is modeled after machines – inspired, as noted in the first article of this series, by a "physics of social behavior" – whereas multilevel economics is modeled after living things.

In neoclassical economics, decision-making is located in individual entities – consumers, workers, firms, financial institutions, government – that are viewed as rational agents who seek to maximize their utility or profits, given constraints such as budgets, time, and resources. This optimization process resembles a machine functioning with a clear objective, input, and output, where each part of the system operates predictably to achieve the objective. Firms are modeled as entities that transform inputs (capital, labor, materials) into outputs (goods and services) through production functions. Households are conceived as entities that transform labor into consumption. The optimization of inputs to achieve the highest output (profit or utility) mimics mechanical processes where inputs are systematically transformed according to a formula. Economic markets are assumed to move toward a state of equilibrium where supply equals demand, much like how physical systems reach a state of balance or rest. Changes in the economic environment (new technology, policy swings, changes in resource availability) are viewed as exogenous shocks that perturb the system. The economy then "adjusts" to a new equilibrium, much like a machine responding to external force or stress.

The multilevel economic paradigm, by contrast, is modeled after living things. After all, economies are populated by people. Living things are continually adapting to their ever-changing environments and evolving – biologically and socially – as they do so. This evolutionary process is governed by the Darwinian triad of (1) variation (differences among individuals in a population), (2) selection (the process whereby traits, group structures and knowledge become more or less common in a population due to their survival and reproduction) and (3) replication (of genetic information in biology), whose counterpart in economics is transmission (of information, beliefs and knowledge). The

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people engaged in economic activities face selection pressures in their various individual and collective economic roles (e.g., as households or as managers or workers in firms). Just as biological selection pressures occur at multiple levels of organization within biological hierarchies (genes, individuals, groups, and ecosystems), economic selection pressures also occur at multiple levels. Some types of knowledge, skills, preferences, identities, and economic group affiliations survive and get transmitted, while others fail to do so. These selection pressures reflect a fundamental tradeoff between within-group competition (favoring selfish behaviors) and between-group competition (favoring cooperative traits that enhance group success).

Multilevel economics explores how selection pressures operate at different levels (individuals, social groups, markets, and economies) and domains (economy, polity, society and the natural world). Accordingly, economic activity is analyzed primarily in terms of context-dependent collective action. This collective action depends on the tug-of-war between individual and collective welfare. The result manifests itself in cooperation or competition. Cooperation can occur within economic groups (such as firms, cooperatives, communities, and governmental organizations) or among groups (such as business alliances or public–private infrastructure initiatives). Similarly, competition can occur within groups (with group members pursuing self-interested objectives) or among groups (such as competition among firms in an industry). In the process, institutions as well as social norms and values evolve. Behavioral economics, game theory and evolutionary economics have explored isolated elements of the interplay between competitive and cooperative forces (e.g., Bowles & Gintis, 2011; Nelson & Winter, 1982; Ostrom, 1990). The multilevel economic paradigm brings these and other elements together into a coherent framework of thought.

This article focuses on the core features of the multilevel paradigm. We explain how the multilevel paradigm provides a different integrative framework of ideas from the neoclassical paradigm and we show how the various features of the multilevel paradigm hang together, providing a distinct vision of how economies function.

The first – and central – feature that distinguishes the multilevel paradigm is ***functional organization***. In biology, functional organization refers to the way biological structures (like organs, cells, and molecules) are arranged to serve a specific role or purpose. In economics, functional organization refers to the way economic agents – individuals, groups (such as households or firms), institutions (such as government departments and banks), and economic systems – are structured to achieve economic objectives.

Firms and organizations can be viewed as higher-level units of selection in which employees (individual-level units) work together within a structured, functionally organized environment. The goal of this organization is to enhance the collective productivity and profitability of the firm (Simon, 1991). Markets themselves exhibit functional organization when rules, norms, and institutions align the behavior of individual participants in ways that enhance market efficiency or stability. Market participants operate within structures (e.g., regulatory frameworks and cultural norms) that can coordinate behavior and achieve collective economic outcomes (North, 1990). Higher-level units such as communities, industries, and economies can display emergent properties like resilience, innovation capacity, or inequality. These properties emerge from the interactions and functional organization of smaller economic actors (e.g., firms and households). For instance, an industry cluster (e.g., Silicon Valley's tech sector) may emerge as a functionally organized unit characterized by collaborative innovation, knowledge sharing, and competition, which boosts collective growth and competitiveness. Analogously to biological systems, economic systems can face trade-offs between levels of selection. For example, individual firms may seek to maximize profits in ways that could undermine collective market stability (e.g., excessive risk-taking in financial markets).

Functional organization is important because it helps define the *target of selection*. In biology, the target of selection refers to the level at which natural selection operates. In economics, the target of selection refers to the level at which cooperative and competitive forces operate. Individual workers, for example, face selection pressures as they compete for jobs. Individuals with better skills, education, or entrepreneurial acumen are often "selected" for success in the labor market (Becker, 1964). Groups of people organized into firms compete for market share, technological advantage, and survival in competitive markets. Firms that innovate, reduce costs, or offer better products survive, while others fail (Nelson & Winter, 1982). Markets themselves can be seen as subject to selection. Financial markets, for instance, reward innovative firms, thereby affecting the survival of markets for goods and services. The concept of "creative destruction" proposed by Schumpeter (1942) focuses on how markets evolve over time.

In biology, multilevel selection analyzes how natural selection operates multiple levels of biological functional organization – ranging from genes and cells to individuals, groups, and populations (e.g., Okasha, 2006; Wilson & Sober, 1994, Wilson, 2015). The concept of functional organization within this framework refers to the arrangement and interaction of elements (e.g., genes, individuals, or groups) in such a way that they contribute to a collective function that enhances the survival and reproductive success of a higher-level unit. In economics, multilevel selection

can be effectively applied to economics by examining how social groups, firms, markets, societies, and economies can exhibit structures and behaviors that contribute to collective outcomes.

Whereas the level of functional organization is assumed fixed in the neoclassical paradigm (focused on entities such as households, firms, and government, whose nature and composition are assumed unchanged through time), the multilevel paradigm covers multiple, flexible levels of functional organization. Individuals participate simultaneously in many different groups and the salience of their group affiliations is flexible, varying through time and in relation to one another. This flexibility may involve variations in the pursuit of self-interest versus collective interest, variations in the pursuit of lower-level versus higher-level collective interest, or variations in the nature of groups with which individuals are affiliated.

This has far-reaching implications for economics. It means that economic agency can be distributed between individual decision-makers and the social groups to which they belong. Accordingly, ***distributed agency*** is the second theme of the multilevel paradigm. The resulting multilevel decision-making requires the analysis of economic decisions that result from the interaction between individuals and their social groups.

Since agency is exercised simultaneously in the economic, political, and social domains and since decisions in these domains are interdependent, economies can no longer be seen as a domain that is separate from the polity and society. Instead, economic activities are embedded in the polities that define the distribution of power and the societies that define the social relationships among evolving economic agents. The notion of the ***embedded economy*** is the third theme of the multilevel paradigm

Flexible functional organization and distributed agency enable people to adapt to ever-changing, unpredictable circumstances in the embedded economy. Some of the unpredictability comes from the flexibility of functional organization itself. Forgoing the pursuit of one's self-interest to collaborate with others in the pursuit of collective goals is fraught with uncertainty. After all, collaborating only makes sense if one's partners are inclined to collaborate as well and these partners are in the same position. Furthermore, the groups within which the collaboration is supposed to take place are emergent entities that come into existence when enough people become committed to the pursuit of their collective goals. Novel forms of collective agency emerge in response to novel environmental stimuli. In this context, collaboration is fragile and uncertain. Flexible functional organization and distributed agency offer vitally useful responses to this uncertainty.

The prevalence of ***uncertainty***, as distinguished from risk (under which the probability distributions of random variables are known), is the fourth theme of the multilevel paradigm. The recognition of prevalent uncertainty calls for a new approach to economic analysis, involving what we call ***cognidiversity***, that is, a diversity of perspectives associated with common purposes – the fifth theme of the multilevel paradigm.

The flexible functional organization operating under uncertainty is associated with ***multilevel decision-making*** – the sixth theme of the multilevel paradigm. Depending on their economic, political, and social contexts, people sometimes make decisions in their capacity as individuals and sometimes as members of their groups.

Multiple, flexible levels of functional organization also imply that human flourishing takes place at multiple levels, as people derive their well-being both as individuals and as participants in their collectives. Accordingly, ***multilevel flourishing*** is the seventh (and final) theme of the multilevel paradigm. This framework of ideas calls for a reassessment of the purpose of economics.

Table 1: Comparison of the multilevel and neoclassical paradigms

Core theme	Multilevel paradigm	Neoclassical paradigm
1. Functional organization	Flexible, multiple levels of functional organization	Unchanging levels of functional organization
2. Agency	Distributed, evolving agency	Predetermined, fixed agents
3. Domain interconnectedness	The Embedded Economy	Economy as separate domain, described through the circular flow of income and product
4. Imperfect knowledge	Uncertainty	Risk
5. Approach to theory	Cognidiversity	Correspondence theory of truth
6. Economic decision making	Context-dependent multilevel decision-making	Constrained utility maximization
7. Welfare	Multilevel drivers of flourishing	Utility as well-being
Purpose of economics	The study of how economic means are mobilized in the embedded economy and how they could be mobilized to promote human flourishing	The study of the relationship between given ends and scarce means, which have alternative uses

The seven themes of the multilevel paradigm, juxtaposed with the corresponding ones of the neoclassical paradigm, are summarized in Table 1. The difference between the multilevel paradigm (grounded in Darwin's theory of evolution) and the neoclassical paradigm (grounded in Newtonian physics) is so great that the combination of assumptions required by one would not be made by the other.

Part 2 highlights the central role of functional organization in bringing these themes into relation with one another. On this foundation, Part 3 then examines the workings of multiple, flexible levels of functional organization in economic activity. It describes the internal and external mechanisms generating these levels of functional organization and surveys alternative interpretations of functional organization in economics.

Next, Part 4 of the series explores the six core themes implied by multiple, flexible levels of functional organization: distributed agency, the embedded economy, radical uncertainty, cognidiversity, multilevel decision making, and multilevel flourishing. These themes call for a reappraisal of the purpose of economics. Finally, Part 5 focuses on practical applications.

1.1 The Multilevel Paradigm and the Darwinian Triad

The Darwinian triad of variation, selection, and transmission[1] – originally conceptualized in the context of biological evolution – can be effectively applied to economics to understand how economic systems evolve over time.

In economics, *variation* refers to the diversity of behaviors, strategies, products, and institutions that emerge within the economy. This variation is crucial for innovation and adaptation, as it introduces new possibilities for economic development (Schumpeter, 1942). Variation encompasses not only specialization but also the emergence of new ideas, behaviors, and technologies that may not yet be specialized but are vital for innovation and adaptation. Consider for example the variation in business models during the early stages of the internet. Companies experimented with different approaches to e-commerce, social networking, and online content delivery. This variation eventually led to specialized business models, like Amazon's e-commerce platform or Google's search engine, which became dominant.

Selection in economics involves the process by which certain economic behaviors, strategies, products, or institutions are favored over others. This process can occur at multiple levels, including individual firms, industries, and entire economies. Selection is a broader concept than economic competition, since it also covers non-market processes such as regulatory changes, technological adoption, and cultural shifts that influence which economic behaviors or institutions are retained or discarded. For instance, the transition from coal to renewable energy sources is not solely a result of market competition but also a selection process driven by environmental regulations, technological advancements, and societal preferences for sustainability. Selection in the context of knowledge involves the process by which certain ideas, practices, or innovations are favored and proliferate, while others are discarded. This process operates at multiple levels – individual, group, and societal – reflecting the multilevel selection seen in evolutionary biology.

Finally, *transmission* includes not just learning but also covers the broader dissemination of knowledge, norms, and institutions across generations and societies. For example, the global spread of manufacturing techniques from Japan's Toyota Production System (lean manufacturing) illustrates transmission. This system, once confined to Toyota, was adapted by various industries, influencing manufacturing practices worldwide. Knowledge transmission occurs through cognitive and affective processes, as well as through cultural artifacts like books, tools, and symbols.

1.2 The Neoclassical Paradigm as Dominant Integrative Framework of Economic Thought

Neoclassical economics remains the dominant framework for economic analysis, largely due to its rigorous mathematical foundation, emphasis on individual choice, and ability to integrate a wide range of economic phenomena into a cohesive model. This framework is built around key principles such as rational choice theory, utility maximization, and market equilibrium. Even with the advent of behavioral economics, which introduces psychological insights into economic decision-making, the core of economic analysis remains grounded in neoclassical principles.

1 The words "replication" and "transmission" are both used to describe the third factor of the Darwinian triad. Replication invokes high-fidelity copying, such as genetic replication, the replication of sacred texts, or the pages produced by a copying machine. Transmission invokes a looser form of copying, such as when one person infers and copies the intent of another person's actions rather than blindly copying the actions. Both replication and transmission provide enough heritability for Darwinian evolution to take place.

At the heart of neoclassical economics is the assumption that individuals make rational choices to maximize their utility, which is internally consistent and exhibits substantial temporal stability. These choices are made in a probabilistically known environment. These assumptions allow economists to build models that predict how individuals will respond to changes in prices, income, and other economic variables.

Though many economists acknowledge that utility functions may be context-dependent, neoclassical economics assumes stable, context-independent preferences for analytical convenience. Behavioral economics acknowledges context dependence but typically does so through specific, *ad hoc* adjustments rather than a unified theory. For instance, behavioral models incorporate phenomena like status quo bias (where individuals disproportionately prefer options that maintain the current situation, e.g., Samuelson & Zeckhauser, 1988) or reference-dependent preferences (where utility is influenced by comparisons to a reference point, e.g., Kahneman & Tversky, 1979). These adjustments are useful for explaining certain observed behaviors, but they lack a comprehensive framework for understanding how different contexts systematically affect utility across various situations.

The multilevel paradigm, by contrast, offers a promising framework for developing a general theory of how contexts affect utility. This paradigm suggests that selection occurs at multiple levels – such as individuals, groups, and societies – each with its own selective pressures. These different levels generate different contexts that shape individuals' preferences and behaviors.

While behavioral economics introduces psychological realism into economic models by relaxing some of the assumptions of perfect rationality, it still largely operates within the neoclassical framework. Behavioral models often adjust the utility functions or introduce heuristics, but do not consider that individuals' responses to incentives are the outcome of the interaction between individual and social objectives within individual and social contexts. For example, the prospect theory of Kahneman and Tversky (1979) introduced utility functions with cognitive biases and the "bounded rationality" of Simon (1956) introduced the notion of decision-making that is constrained by cognitive limitations, environmental context, and limited time, leading people to make "satisficing" choices – decisions that are good enough rather than optimal. Behavioral economics, by incorporating such insights, extends rather than replaces the neoclassical framework. In the words of Richard Thaler, "Behavioral economics increases the explanatory power of economics by providing it with more realistic psychological foundations" (Thaler, 2015).

Economics was not always thus. Classical economists, such as Adam Smith, David Ricardo, and Karl Marx, had a broader understanding of economics that encompassed not only market mechanisms but also social, moral, and historical dimensions. They viewed economics as a moral science, deeply intertwined with political and social institutions. Adam Smith viewed economics as a branch of moral philosophy, concerned with the welfare of society and the ethical implications of economic activity. Smith's concept of the "invisible hand" is often misinterpreted as advocating laissez-faire capitalism. In fact, Smith was deeply concerned with issues of justice, equity, and the role of the state in providing public goods and regulating markets. In this vein, Smith wrote, "No society can surely be flourishing and happy, of which the far greater part of the members is poor and miserable" (Smith, 1776).

Classical economists understood that economic systems evolved over time and that understanding these changes required looking beyond pure economic factors to consider social and political contexts. For example, Karl Marx's *Das Kapital* (1867) examines how the economic base of society influenced the superstructure of laws, politics, and ideology. Marx argued that "The history of all hitherto existing society is the history of class struggles" (Marx & Engels, 1848). However, much of this broader understanding has been sidelined in mainstream economic analysis.

Classical economics also paid significant attention to the role of institutions, social norms, and power relations in shaping economic outcomes. David Ricardo's theory of comparative advantage is often cited in discussions of free trade. However, Ricardo also recognized the importance of institutional factors, such as the distribution of income between landlords, workers, and capitalists, in determining economic outcomes. In Ricardo's words, "The interest of the landlord is always opposed to the interests of every other class in the community" (Ricardo, 1817). This broader perspective has largely been narrowed in mainstream neoclassical economics, which tends to focus more on individual decision-making and market outcomes.

Adam Smith is widely known for his exploration of the division of labor in *The Wealth of Nations* (1776). While his analysis primarily focused on the economic benefits of dividing tasks among workers to increase productivity, Smith was also concerned with how the division of labor contributes to the creation and accumulation of knowledge. Smith noted that specialization often leads to the invention of tools and machines to make processes more efficient (Book 1, Ch. 1, *The Wealth of Nations*). By having multiple specialized fields, knowledge generated in one area can influence and transform others through

collaboration and exchange, fostering a dynamic environment where new ideas can flourish.

At the same time, the division of labor creates uncertainty by creating webs of interdependencies among specialized units (see also Loasby, 1999; Nelson & Winter, 1982; Schumpeter, 1942). Disruptions in one area can have unpredictable ripple effects across the entire system. As individuals and firms specialize, the broader understanding of interconnected processes can diminish, making it difficult to predict how different sectors will respond to new innovations, shocks, or policy changes. In Smith's *History of Astronomy*, he notes that as human knowledge progresses, "the inhabitants of the world became daily less capable of comprehending the whole extent of it; their attention was daily more confined to some narrow part of it, and they became daily more ignorant of everything besides that particular part." (Smith, 1795, p. 73) These important insights fell by the wayside in the development of neoclassical economics, but play an important role in the multilevel paradigm.

Neoclassical economics nowadays has been conceived as an integrative framework of economic thought that is the counterpart to Newtonian physics. By contrast, multilevel economics is the counterpart to Darwinian evolution. The former framework applies to inanimate objects, whereas the latter applies to living things. There is a fundamental difference between living and non-living systems. Whereas non-living physical systems can be studied mechanistically, living systems must be understood as *adaptive* and adaptation can take place at various levels of functional organization (e.g., Cosmides & Tooby, 1994; Noble & Noble, 2020; Wilson 2015; Wilson & Wilson 2007). The humans that populate economies are living things in the process of adaptation. The selection of adaptive behavior patterns – as well as adaptive psycho-social mechanisms generating these behavior patterns – can take place at the level of individuals or social groups. Since humans are social creatures, most of our behavior patterns are in fact shaped by our group allegiances. As noted in Part 1 of this article series, we humans have never lived alone, and consequently, we have always had social capacities to draw on. The economy is a living system populated by social beings.

To fulfill their function, living systems evolve – often in unpredictable ways, since their environments change unpredictably as well. Non-living systems do not. By evolving, living systems change their environment (often unpredictably), calling for further adaptation (often unpredictable). Non-living systems do not. Living things, such as human beings, exercise agency, responding to unexpected changes in their environment through internal change (adjustments in the scale and domain of functional organization) and external change (adjustment to our environment). Nonliving things do not; they run their course, which can often be predicted probabilistically. This is why it is easy to predict the orbits of planets around the sun, but it is difficult to predict the trajectory of a person walking through a city. Living systems can be studied through Darwinian analysis of variation, selection, and transmission. Non-living systems – at least those that are not minutely small or astronomically large – can be studied along the lines of Newtonian mechanics.

The multilevel paradigm analyzes economic activity in an extended Darwinian sense, where variation, selection, and transmission apply not just to genes, but also to organisms and groups of organisms and, beyond that, to the entities that shape the evolution of human groups: ideas, identities, moral values, and narratives. The multilevel paradigm treats economic activity as the product of economic transactions generated by decisions shaped by individuals and their evolving social groups.

2 Core Themes of the Multilevel Paradigm

The core themes of the multilevel paradigm are all tied together through the notion of functional organization.

2.1 Functional Organization

The first – and central – theme concerns multiple, flexible levels of functional organization. This focus gives economics a different starting point from the one implicit in neoclassical economics.

Homo sapiens differ from other animals in terms of the extraordinary flexibility of our functional groupings (e.g., Bavel & Packer 2021; Henrich & Boyd, 1998; Melis et al., 2006). This is based on the distinctive human flexibility in several domains. Humans exhibit a remarkable degree of cognitive flexibility, allowing them to adapt their thinking, behavior, and problem-solving strategies across a wide range of contexts. This flexibility is largely attributed to the complexity of the human brain, particularly the prefrontal cortex, which is involved in higher-order functions such as reasoning, planning, and decision-making (Suddendorf & Corballis, 2007). This enables humans not only to use a wide variety of tools but also to invent new ones to solve novel problems. While some animals, like chimpanzees and crows, use tools, their ability to innovate and adapt these tools is limited.

Humans also display extraordinary flexibility in social organization and culture. Unlike most other animals, whose social structures tend to be rigid and largely dictated by biology, human societies are characterized by diverse and dynamic social institutions, norms, and cultural practices (Richerson & Boyd, 2005). Social structures in other animals are often fixed and less adaptable. For example, the hierarchical organization of a wolf pack or the caste system of ants is relatively rigid, with little variation or change in response to new conditions.

Another key area of flexibility in humans is their use of language and symbolic thought. Language allows humans to communicate complex ideas, share knowledge, and coordinate activities in ways that no other species can (Deacon, 1997). This flexibility in communication is closely linked to humans' ability to think abstractly and engage in symbolic reasoning. While some animals have communication systems (e.g., the complex vocalizations of dolphins or the dance language of bees), these systems are limited in scope and are typically tied to specific, immediate contexts such as mating or food location. They do not exhibit the same level of abstraction or flexibility as human language.

Finally, humans use their distinctive behavioral flexibility to innovate and thereby adapt to new challenges (Henrich, 2016). Humans are capable of devising novel solutions to problems, often using creativity and abstract reasoning. For example, during the COVID-19 pandemic, scientists rapidly developed vaccines using new technologies like mRNA, demonstrating an unprecedented level of problem-solving innovation. While some animals show problem-solving abilities, these are often limited to specific contexts and do not generalize across different types of challenges. For example, octopuses can solve puzzles to obtain food, but they do not apply this problem-solving ability to other aspects of their lives in the same way humans can.

We are able pliant creatures, able to switch our allegiances and our understanding of ourselves, as individual agents and as members of social groups. On this account, we can belong simultaneously to a plethora of social groups, within each of which we have different functions, defined by our distinctive social roles in these groups (e.g., McBrearty & Brooks, 2000). We have used this flexibility to our evolutionary advantage. Our levels of functional organization may be understood as solutions to problems of cooperation. Our flexibility in functional organization has enabled us to populate all corners of the earth and adapt to a plethora of challenges, many of which we have created ourselves in the process of niche construction (e.g., Boyd et al., 2011; Odling-Smee et al., 2003).

The multilevel paradigm is an integrative framework of economic thought that focuses on the evolution of functional organization in response to contextual challenges (such as climate change, pandemics, or food insecurity) arising from an ever-changing, uncertain environment.

There is variation in functional organization, along with the associated behavioral responses to contextual challenges (such as adoption of renewable energy sources or climate change denial). This variation in functional organization is characteristically generated by variation in the underlying psycho-social and institutional mechanisms of collaboration. There is a process of selection whereby some units of functional organization, along with the associated behavioral responses, are preferentially selected as successful in addressing the contextual challenges. And there is a transmission of the selected responses (along with the underlying mechanisms) across people and time. A key way to adapt to an ever-changing environment – as individuals or as groups of individuals – is through their functional organization.

While we confront some of our challenges as individuals, many of our challenges are collective, requiring collective action. Because individuals differ in their propensity to cooperate and to free ride, the requisite collective action usually rests not only on both internal mechanisms (such as psychological motives and social norms), but also on external mechanisms (such as laws and institutional rules). The internal mechanisms arise from people's capacities not only to derive well-being from their individual payoffs, but also to participate in the well-being of social collectives. The external mechanisms maintain social collectives through rules, rewards for rule observation, and punishments for rule violation.

Human cooperation can take place at many different scales (from families to nations to international organizations) and across many different domains (the economy, polity, and society). In other words, we cooperate at multiple "levels" of functional organization, where "levels" refer to both scales and domains. We inhabit a dazzling variety of cooperative groupings across these domains – families, friendship groups, work colleagues, professions, religions, nations, genders, classes, ethnicities, and so on. Some of our affiliations can be changed at short notice (such as friends and colleagues), whereas others are more stable (such as nationality and gender).

Our multiple levels of functional organization are flexible. In response to our evolving collective challenges, the nature and composition of the cooperative groupings – duration, membership criteria, dispersal patterns, etc. – evolves through time and the relations among these groupings evolve as well. Unpredictable changes in the environment give rise to unpredictable changes in functional organization.

In the neoclassical economic paradigm, functional organization is strictly ossified. Each household, firm, and government are commonly treated either as a cohesive unit or as a collection of bargaining partners. Whatever the level of functional organization, it remains invariant through time. In Becker's unitary model of the household (Becker, 1981), for example, the household maximizes the utility of an altruistic member. In Chiappori's collective model (Chiappori, 1992), household decisions are either cooperative (efficient with regard to its individual members) or noncooperative (resulting from a Nash equilibrium in which the members first share their nonlabor income in accordance with a predetermined sharing rule and then make their own labor supply and consumption decisions). In these and other conventional models of household behavior, there is no flexibility of functional organization: the household members operate as individuals, who may be altruistic or bargain individualistically with one another.

The same lack of flexibility in the levels of functional organization is to be found in the conventional theories of the firm, from the transactions cost models (e.g., Coase, 1937; Williamson, 1975) to the principal-agent models (e.g., Spence & Zeckhauser, 1971) to the satisficing models (e.g., Cyert & March, 1963) to the contract models (e.g., Grossman & Hart, 1986; Hart & Moore, 1990). In these models, managers dictate the behavior of the firm, subject to transactional, informational, cognitive, and contractual constraints.

Even the "social preferences" of behavioral economics (e.g., Drouvelis, 2021) lack flexibility in functional organization, since these preferences are viewed as located solely within the individual.

In the multilevel economic paradigm, by contrast, functional organization is a major instrument of adaptation. Social preferences are understood as emergent phenomena in response to collective challenges. The nature of what we mean by an "economic agent" – whether an individual or a social group – is subject to change in response to external changes. The transformations of economic agents – so that decision-making agency shifts between individuals and groups, as well as between groups – do not take place over time scales that are longer than the frequency of the economic variables that matter in economics. On the contrary, cooperative groupings can change precipitously.

Each level of functional organization is vulnerable to being undermined by selfish behavior at lower levels of functional organization. For example, cancer cells undermine the coordination required at the level of the organism; free-riding individuals may undermine the cohesiveness of their social groups. In the analysis of labor markets, Lindbeck and Snower (1989) show how labor turnover costs enable "insiders" (workers whose positions are protected by such costs) to undermine economic efficiency and equity at the economy-wide level.

Beyond households, firms, and governments, people form a wide variety of other groups that are engaged in the allocation of resources and the production of goods and services. These include religious, environmental, sports, cultural, and countless other groups. The importance of households, firms, and governments – rather than these other groups – as shapers of economic activities should be an empirical matter, not a methodological predilection. In practice, each individual belongs to multiple groups, performing different social roles in different groups. Though these roles – as consumer, employee, congregant, activist, etc. – are often quite distinct from one another, the psychological need for personal integration (see, for example, Reid & Deaux, 1996) (self-representation that includes both personal and social identities) often requires coordination among these roles. The degree of coordination depends, among other things, on social norms, values, and information flows. The growing number of environmentally and socially conscious consumers (who, for instance, are willing to pay more than the prevailing prices for fairtrade products) are an example of such coordination (in this case, between consumers and producers). These issues have traditionally been ignored in orthodox economics but are gaining increasing attention in more recent contributions to cultural and social economics (e.g., Young, 2015).

It would be seriously misguided to imagine that the members of any functionally coordinated group are alike. Usually, groups contain members who do different things, fulfill different roles, and have different skills and knowledge. The usual reason for forming and maintaining group affiliation is to solve a common problem. Collective challenges call for collective action. In most cases, collective challenges can be met effectively through specialization and the division of labor. The reason is that specialization and the division of labor enable groups to create new knowledge and skills to solve complex problems far more efficiently and effectively than individuals acting alone. The benefits are far-reaching. First, specialization allows individuals to become highly skilled in specific tasks, reducing time and effort to achieve a particular outcome. Second, specialized individuals can experiment and innovate within their domain, leading to technological and procedural advancements that benefit the entire group. (For example, software engineers, hardware developers, and data scientists all contribute to the development of artificial intelligence systems.) Third, by dividing tasks among specialized actors, large-scale projects can be accomplished that would be impossible for individuals or unspecialized groups to undertake. (For instance, highways require the

coordinated effort of specialized professions, including architects, engineers, construction workers, and urban planners.) In short, functionally organized groups are most straightforwardly characterized by their collective challenges, not the tasks, skills, and information sets of their members.

With regard to economic groups such as firms, Adam Smith argued that the division of labor is the foundation of economic progress (Smith, 1776). For social groups, Émile Durkheim introduced the notion of "organic solidarity" in modern societies, where role specialization makes cooperation possible on large scales, with different individuals (such as farmers, teachers, and doctors) depending on others for the goods and services they cannot provide for themselves (Durkheim, 1893). In political groups, the division of labor creates specialized roles within governance structures, allowing for more organized and effective decision-making. For instance, Max Weber argued that bureaucracies, characterized by hierarchies of roles, are necessary for the efficient administration of large, complex societies (Weber, 1947).

The case for specialization and division of labor is particularly strong, especially with regard to skills and knowledge, in the presence of radical uncertainty. In situations when future events and challenges are unpredictable, skill specialization and knowledge sharing may be understood as primary adaptive responses, helping societies not only cope with evolving complexity, reduce individual vulnerability, and create a more resilient decision-making system, but also thrive through uncertainty. Specialization allows individuals and groups to focus on specific areas of expertise and innovate in these areas, which mitigates vulnerabilities associated with attempting to master all domains. Innovation is not just a way of mitigating uncertainties, but also a process that drives human progress. For example, during the COVID-19 pandemic, the specialization of virologists, epidemiologists, healthcare professionals, and logistical experts allowed governments and organizations to respond more effectively to the pandemic and improve our prospects of improving human health in other areas (Kitcher, 2021). Specialization also enables the development of collective knowledge pools, allowing faster, more targeted responses to uncertainties and promoting human creativity. The Intergovernmental Panel on Climate Change assesses climate change uncertainties by dividing the labor of climate research among scientists specializing in atmospheric science, oceanography, ecology, economics, and other fields (IPCC, 2024).

In short, people's levels of functional organization can vary in scale (from the individual to communities to nations to religions and other supranational entities), scope (across tasks, skills and knowledge systems) and domains (the economy, polity and society). In so doing, they not only pursue their individual payoffs, but also participate in the collective purposes of the groups to which they belong. Since the modes of functional organization are context-dependent, people's participation in collective purposes is context-dependent as well. This ubiquitous context dependence calls for an approach to decision-making that differs from that of the neoclassical paradigm, which rests on temporally stable, internally consistent utility functions.

Framing economic activity in terms of functional organization provides a perspective that is quite distinct from the neoclassical economic one. It merits being considered a cornerstone of a multilevel economic paradigm.

2.2 Agency

The concept of agency is closely related to functional organization. For our purposes, agency refers to the exercise of individuals' or groups' capacity to make choices based on goals, desires, and intentions, and then to act upon them to influence outcomes that are relevant to these individuals or groups (Bandura, 1977). This sense of agency involves the perception that one's actions are causally connected to concrete outcomes (Haggard & Chambon, 2012). The concept of agency is also closely related to the relation between motivation and goal-directed behavior (Locke & Latham, 2002).

People's capacity for multiple levels of functional organization rests on the exercise of individual and social agency. To move from the individual to the group level of functional organization, it is necessary for individual agency to become consonant with the social agency.

Individual agency refers to an individual's capacity to make independent decisions, act autonomously, and influence one's own life outcomes. It emphasizes the autonomy, intentionality, and self-determination of a single person. From a psychological perspective, individual agency involves not just responses to stimuli, but directs action towards goals, attending to ever-changing, unpredictable situations. Guiding the direction of action toward goals is automatic feedback control mechanisms (whereby actions reduce the gap between goals and perceptions of the current state) and an "executive tier" of decision-making, in which action plans are simulated before the actions are performed and evaluated afterwards. The executive tier also involves rational reflection and self-regulation in order to enable people to adapt flexibly to ongoing challenges (Bandura, 2006; Tomasello, 2022). This executive direction of action guides perceptions, which feed into knowledge and beliefs.

By contrast, ***social agency*** encompasses the collective decisions and actions of groups. From a psychological perspective, these decisions are meant to connect shared goals with joint action. The joint action is driven by joint perceptions, joint intentionality, and joint attention, generating joint knowledge, values, norms, and beliefs (Tomasello, 2014, 2022). Social agency involves the ways in which people, as members of communities or larger groups, engage in collaborative efforts that shape both individual lives and collective social structures. (For instance, a group of employees working collaboratively on a project demonstrates social agency, as they share common goals and engage in coordinated efforts to achieve them.)[2]

Understanding the roles of personal and social agency in different domains provides insight into how people respond to challenges to achieve their goals. The sociological domain examines how groups or communities act collectively to influence social systems and norms. Individual agency refers to the capacity of individuals (or groups) to act independently of "structure," the recurrent patterned arrangements that influence or limit choices and opportunities. For example, Giddens' theory of structuration suggests that social structures (rules, norms, and institutions) both constrain and enable agency (Giddens, 1984). Individuals possess agency when they navigate, resist, or transform these structures through their actions, even while being shaped by them.

Social agency in the sociological domain is examined in social movements, community organizations, and collective responses to social problems, reflecting the capacity of groups to mobilize and shape societal change (Emirbayer & Mische, 1998; Giddens, 1984; Tilly, 2005). For example, the Civil Rights Movement in the United States illustrates social agency, where individuals united to demand social justice, shaping laws and social norms to promote racial equality. Social psychology explores the role of social agency in social contexts, including phenomena such as conformity, obedience, and resistance to authority (e.g., Milgram, 1963).

In the political domain, individual agency refers to a person's ability to participate in political activities and influence political outcomes based on personal convictions, beliefs, or preferences. This may include voting, advocating for policy change, or joining political campaigns (Sabatier, 2007; Tilly, 2004; Verba et al., 1995). Political leadership agency involves setting agendas, making decisions, and shaping policy directions (Greenstein, 2009).

Social agency in the political domain encompasses collective political action by groups who mobilize to influence policy, governance, and political structures. This includes collective lobbying efforts, social movements, political organizations, and party dynamics. Institutional agency is concerned with the exercise of agency in political institutions, such as legislatures and bureaucracies, with regard to the implementation of policies (Shepsle & Weingast, 1987). Political agency in international relations concerns how states assert their interests and navigate the international political system through diplomacy and negotiations (Keohane & Nye, 1977).

In ethics, moral agency concerns an individual's capacity to make moral judgments, act in accordance with moral principles, and take responsibility for one's moral actions (Fischer & Ravizza, 1998). Moral agency involves moral deliberation, whereby individuals weigh competing moral values, consider the implications of their choices, and make normative decisions (Korsgaard, 1996; Rawls, 1971). Moral agency generally involves moral autonomy, i.e., the capacity to make moral choices freely and independently, guided by one's own values and principles (Dworkin, 1988).

In anthropology, agency is studied to investigate how people navigate their relationships and social networks. From this perspective, symbolic agency concerns how individuals use symbols and rituals to communicate and assert their intentions, beliefs, and identities (Turner, 1967). Social agency encompasses the ways in which individuals and groups exercise influence over social structures and how they negotiate interpersonal relations, power dynamics, and social hierarchies (Bordieu, 1990). Cultural agency refers to the capacity of individuals and groups to shape their cultural practices (Ortner, 2006).

Environmental agency concerns the capacity of individuals, communities, or societies to act in ways that positively or negatively affect the natural environment. It also reflects the power humans have to alter ecosystems and the recognition of responsibility to make choices that support the health and sustainability of the environment (Gardiner et al., 2010; Leopold, 1949; Shiva, 2005).

Narrative agency involves the construction of one's narrative identity. Individuals shape their identities through the stories they tell about themselves, emphasizing their agency in self-narratives (Ricoeur, 1992). Practical agency highlights an individual's capacity to make practical decisions and act in ways that achieve one's goals, often involving instrumental rationality (Bratman, 1987). The philosophical notion of epistemic agency concerns an individual's ability to

2 Tomasello (2022) distinguishes between four types of psychological agency: goal-directed agency (whereby an agent makes informed decisions to reach its goals in dynamically unfolding contexts), intentional agency (whereby cognitive action plans are simulated cognitively before before goal-directed action takes place), rational agency (involving logically and reflectively), and socially normative agency (involving cooperation through collective, shared agency).

acquire knowledge, form beliefs, and engage in cognitive processes. It involves critical thinking, reasoning, and the pursuit of truth (Fricker, 2007). The notion of existential agency relates to the individuals' freedom and responsibility for creating meaning and purpose in their lives. It reflects the existentialist idea that humans have the agency to define their own existence (Sartre, 1943).

In the multilevel paradigm, these various perspectives of the agency are all relevant for economic decision-making for a simple reason, to be elaborated in the following section: economies are embedded in people's psycho-social, political, and environmental contexts. The psycho-social mechanisms whereby people construct communities and societies are the same as those whereby they construct economies. The political institutions and practices governing the distribution of power also govern economic activities. The natural world not only provides what economists term "ecosystem services," but also shapes our cognitive and affective faculties, provides a sense of interdependence with the natural world, and generates responsibility for its care – all aspects that also shape economic decisions.

This expansive conception of agency above needs to be brought into relation with an associated conception of what an "agent" is. For our purposes, an agent is an entity with the capacity to make choices and act on them to promote the entity's goals. The exercise of human agency generates a sense of identity. Individual identity is derived from individual agency in the following ways: (i) *Self-Definition through action*: Individuals define who they are through their actions and decisions. By making choices – whether in career paths, moral beliefs, or hobbies – people develop a sense of themselves as unique agents capable of influencing their own lives (Bandura, 2001). (ii) *Empowerment and authenticity*: When people feel they have control over their choices and lives, their sense of individual agency reinforces a stable and authentic self-identity. Conversely, experiences of constrained agency (e.g., due to social structures or discrimination) may lead to a fragmented or diminished sense of individual identity. (iii) *Reflexivity and self-understanding*: Giddens (1991) argues that modern individuals engage in reflexive self-monitoring – they reflect on and revise their identities based on their goals, values, and experiences.

Furthermore, social identity derives from social agency in the following senses: (i) *Belonging and group membership*: Social identity theory (Tajfel & Turner, 1979) emphasizes that people derive part of their self-concept from membership in social groups. Acting collectively as part of a group allows individuals to identify with that group and internalize its norms and values, forming a "social self." (ii) *Social roles and expectations*: Social identity is also influenced by the roles we play in society (e.g., parent, leader, and activist). Our ability to fulfil these roles effectively and to act in accordance with social expectations and norms demonstrates social agency, shaping how we and others perceive our social identity (Mead, 1934). (iii) *Collective action and identity formation*: When groups engage in collective agency, the actions and goals of the group shape the identity of its members. As people engage with social movements or communities, they develop a social identity tied to the shared beliefs, history, and goals of the group (Melucci, 1996).

Since functional organization extends across levels (from the individual to groups) and domains (the economy, polity, and society), agency can be distributed across levels and domains and agents can be analogously distributed. The notion of distributed agency posits that agency can be spread across multiple agents – whether individuals, groups, or non-human entities (such as institutions) – acting in a coordinated manner to achieve outcomes. Such coordination may arise from external mechanisms (such as economic incentives, practices, rules, and laws) or internal mechanisms (such as social affiliations arising from social norms, values, and identities). Through these mechanisms, agency becomes distributed among various actors, with distinct roles, responsibilities, and influence. The resulting collective actions are emergent phenomena. For example, a social movement may arise from the combined efforts of leaders, groups, and grassroots participants. Organizations such as companies and labor unions gain decision-making power through the collective actions of their members, who may be driven by self-interest or by the goals of their groups.

Distributed agency has been explored through Actor-Network Theory, according to which both human and non-human actors form networks through which agency is distributed (Callon, 1986; Latour, 2005). This theory challenges traditional notions of agency by emphasizing the interdependence of actors within a network. Gilbert (1989) explores the sources of collective intentionality and how groups can be understood as agents. Pettit (2001) examines how collective entities can possess agency, particularly in political contexts. Identity economics (Akerlof & Kranton, 2000, 2010) can be interpreted in terms of distributed agency, since it portrays how individuals' decisions arise from a combination of their self-interest and the influence of their social groups. "Distributed cognition" examines how cognitive processes are not confined to individual minds but are distributed across people, tools, and environments. Hutchins (1995) provides an in-depth analysis of distributed cognition by studying how navigational tasks are carried out collectively on a naval ship. Hollan et al. (2000) examine how cognition is distributed in human–computer interaction, illustrating the broader implications for the distributed agency.

Most economic decisions are collective decisions, requiring not only cooperation (working with others to achieve one's own goals) but also collaboration (working with others to achieve the common goals of the group). In a household, for example, family members collaborate on financial planning (budgeting, savings, and investment decisions) to ensure the financial well-being of the entire household; parents collaborate on decisions related to their children's education and extracurricular activities; household chores are shared among family members to ensure a smoothly functioning home; family members collaborate on healthcare decisions; major lifetime decisions such as moving, retirement, and elderly care also require collaboration; and so on. Businesses often rely on collaboration, where employees work together for the collective benefit of the team of the organization. This can happen in project teams, where team members contribute their unique skills and knowledge to achieve project goals, even if it means going beyond their individual job descriptions; employees in customer service, sales, and product development may collaborate to understand customer needs and provide comprehensive business solutions; organizational learning requires collaboration, with employees sharing knowledge, best practices and lessons learned; in quality improvement teams, members actively contribute ideas to enhance overall product or service quality; employees work together to create an inclusive workplace by valuing diverse perspectives and fostering a culture of equality; and so on.

In the neoclassical paradigm's well-known depiction of the simplest circular flow of income and product, households are portrayed as cohesive entities that make decisions on labor supply and consumption demand, whereas businesses are depicted as cohesive entities deciding on labor demand and commodity supply. The implicit assumption underlying this depiction is that these households and firms are unchanging decision-making units, each responsible for particular demand and supply choices. This implicit assumption is rarely challenged. In practice, however, the degree of social cohesion in a household varies over time, often over the same time spans in which the demand and supply decisions are made. Furthermore, it is generally not true that the preferences underlying individual consumption choices are determined exclusively by the households to which an individual belongs; these preferences can just as well be shaped by friendship groups and one's neighborhood, as well as workplace, ethnic, gender, cultural, religious and other affiliations. The degree of employee collaboration in a business also varies over time, also over time spans relevant to the business's demand and supply decisions. The social cohesion underlying employee collaboration in a business depends on the business culture, workplace practices, personality compatibilities, the existence and nature of union activities, and so on. In short, the circular flow depiction of economic activity – providing the building blocks from which the rest of the neoclassical paradigm is constructed – rests on assumptions about functional organization that are often flouted in practice.

The assumptions concerning economic agency – where it resides and how it changes through time – are fundamental for the rest of economic theory. The multilevel paradigm differs radically in its approach to economic agency from the neoclassical paradigm. In the neoclassical paradigm, the identities of economic agents – such as households or firms – are fixed and the supply and demand decisions associated with these agents are fixed as well. In the multilevel paradigm, by contrast, the identities of economic agents are understood as crucial economic variables that adapt to their economic, social, political, and natural environment. The determination of economic agency is recognized as the critical issue on which the rest of economic activity rests. It is on this account that the level of functional organization plays such a prominent role in the multilevel paradigm.

From the perspective of the multilevel paradigm, it is far from clear that economic activity needs to be portrayed in terms of demands and supplies flowing between households and businesses or, in more detailed depictions of the circular flow, including government and financial institutions as well. Which social groups are responsible for which supply and demand decisions depend on people's levels of functional organization. Households, businesses, government, and financial institutions need not necessarily be the most important entities responsible for the demand and supply decisions that power an economy. Whereas mainstream economics acknowledges the influence of labor unions and business associations in labor and product markets, there are other sources of economic agency that may be equally or more important in shaping demand and supply decisions in economic markets: environmental groups, religious communities, philanthropic organizations, faith-based social services, professional associations, cultural organizations and communities, educational organizations, and so on. Which of these groups are most salient in identity formation for particular population groups depends on the determinants of functional organization – the external challenges to which people seek to adapt, as well as the internal and external mechanisms of functional organization. These determinants thereby become central for explanations of economic activity.

To understand the nature of economic agency, it is important to understand the social relations that shape cohesive communities of economic interest and purpose,

as well as the political institutions and environmental constraints within which these communities operate. This is the profound sense in which economic decisions are "embedded" in society, polity, and environment. Accordingly, the "embedded economy" is one of the core themes of the multilevel paradigm.

2.3 The Embedded Economy

The second theme of our paradigm, implied by the core theme, is the "embedded economy." People's economic relations are embedded in their political, social, and environmental relations. The natural environment is the physical space in which all human interactions take place. Society is the realm of persistent interactions among a set of people. Polity is the subset of human interactions that determines the distribution of power among this set of people. The economy is the subset of social and political interactions that involve the production, distribution, consumption, and exchange of goods and services.

Economic activity cannot be understood as divorced from its environmental, social, and political settings. The environment shapes all economic decisions, which are invariably context-dependent, with a view to promoting their cultural evolutionary success. Society generates the norms, values, identities, and narratives that shape both the goals and constraints of economic agents. Polity sets the rules whereby economic transactions take place.

The levels of functional organization refer not just to *scale* (from the micro level of individuals to the meso level of social and political groups to the macro level of nations) but also to the *domains* where economic activities are embedded (the polity, society, and natural environment). In this sense, a multilevel functional organization intrinsically implies an embedded economy. Economic activity in an embedded economy can be understood in terms of polycentric governance, which refers to a system of decision-making and governance involving multiple, overlapping, and interacting centers of authority operating at different scales. Unlike monocentric systems, where power is centralized in a single entity, polycentric systems distribute decision-making across a range of actors who collectively manage shared resources (Ostrom, 2010). Such systems leverage diverse perspectives, local knowledge, and adaptive responses to changing conditions, across the economic, political, social, and environmental domains (Aligica, 2018). These domains are interconnected realms in which people simultaneously engage to achieve their ends. For example, tackling climate change and pandemics requires collective action that spans the economic domain (such as monetary incentives), the political domain (such as laws and regulations) and the social domain (norms and values), all of which take place in the environmental domain that can be shaped appropriately (such as through agricultural practices and nature preserves).

People's behavior patterns across these domains can be understood as strategies of adaptation to ever-changing physical, social, political, and economic contexts. The evolution of these behavior patterns is shaped by selection processes that operate across these domains. Different cross-domain packages of strategies (such as the Chinese and American ways of organizing social, political, and economic activities) are differentially successful in delivering targeted human outcomes (such as well-being or profitability) in their particular contexts. The strategies best suited to their contexts will be selected (such as gaining market share) and be replicated with relatively greater frequency in the future. Changing contexts (demographic changes, geopolitical shifts, economic alliances, technological changes) call for new cross-domain strategies that, in turn, give rise to new contexts.

2.4 Uncertainty

The third theme of the multilevel paradigm recognizes the prevalence of uncertainty, as distinguished from risk (covering events with known probabilities). Uncertainty concerns situations where the possible outcomes are unknown and the probabilities of these outcomes cannot be calculated, due to lack of relevant information or inability to foresee all factors influencing the situation.

In the absence of uncertainty, there would be no need for people's levels of functional organization to be flexible. The flexibility of functional organization becomes an adaptive strategy when people cannot predict the situations that they will face. Then, the flexibility allows them to align their individual and collective efforts with unexpected challenges.

Ontological uncertainty exists when the "unknowns" cannot be fully conceptualized or mapped out within existing knowledge frameworks. It involves situations in which the underlying structure or nature of a problem is itself unknown or unknowable. Conceptually, ontological uncertainty entails the recognition that the world is inherently unpredictable and may be unknowable, even in principle. In particular, it arises when agents are uncertain about what kins of entities inhabit their experiential world, how these entities interact, and how the entities and interactions change through time (Lane & Maxfield, 2005).

Epistemological uncertainty refers to the uncertainty that arises due to limitations in our knowledge, understanding, or information about a system, situation, or problem. It centers on what can, in principle, be known but is currently unknown, incomplete, or imprecise due to data, measurement, or theoretical limitations. In this sense, it emphasizes the gaps in human understanding.

Ontological and epistemological uncertainty are distinguished in terms of whether the requisite knowledge is knowable or possibly unknowable. We can further distinguish types of uncertainty in terms of their sources: *Chance uncertainty* occurs when the domain of events are known, but their probability distributions are not. *Domain uncertainty* occurs when the domain of events and the relationships between them is unknown. *Conceptual uncertainty* arises when the appropriate categorizations of events and relationships (for the purpose of navigating the world) are unknown.

Chance uncertainty may be illustrated in a new technology market by a company that understands the potential range of consumer adoption rates (low, medium, high) but may not have enough data or insight to assign accurate probabilities to these outcomes. This type of uncertainty is typically an aspect of epistemological uncertainty, but if the underlying probability distributions change through time and the underlying distribution generating mechanism is unknown, chance uncertainty may become an aspect of ontological uncertainty.

Domain uncertainty arises when, for example, a technological innovation (e.g., artificial intelligence) emerges for which the full range of potential applications, societal impacts, and ethical challenges are not known. Then, it is impossible to formulate probability distributions, even in principle. Domain uncertainty is a form of ontological uncertainty.

Conceptual uncertainty is also a form of ontological uncertainty. It arises when there is uncertainty about whether the conceptual and analytical tools we are using to study a phenomenon are even appropriate or valid. It questions whether the theoretical frameworks, models, and constructs being applied are capable of capturing the nature of the system or process under consideration for the purpose of effectively directing our actions. Conceptual uncertainty exists, for example, when we suspect that our existing economic models are fundamentally incapable of describing emergent phenomena such as systemic crises or disruptive technological changes.

Recognition of uncertainty puts us into a radically different framework of thought from that appropriate to risk. Under risk, perceptions to not need to be interpreted, since the probability distributions associated with events and their relationships are already known. Thus, perceptions directly generate information. Under uncertainty, by contrast, perceptions do not inherently provide actionable insights because the relationships between variables and potential outcomes are unclear or non-existent. Therefore, interpretation – understanding and contextualizing information based on experience, intuition, and judgment – becomes critical. For example, in a volatile financial market, investors cannot depend solely on past performance data to predict future returns. They must interpret signals within the broader economic context, including subjective insights from political developments or changes in consumer sentiment, which may not be quantifiable (Keynes, 1937).

Through this interpretative process, our perceptions are filtered through our attentional field, allowing us to focus on those perceptions that are implicitly considered useful to guiding behavior. The filtered perceptions are assembled into heuristics and narratives that constitute our "beliefs." There are typically multiple beliefs that are consistent with any given set of filtered perceptions. It is the beliefs that guide our decisions.

In this world of uncertainty, more information is not necessarily better for guiding our behaviors. Accumulating more information can complicate rather than clarify decisions. Increasing the amount of information can overwhelm decision-makers, leading to information overload and diminishing their ability to discern which data points are relevant. Since no reliable patterns or probabilities guide the interpretation, having more data can amplify confusion, increase decision-making complexity, and lead to delays or errors. Excessive information may also lead to false confidence, where decision-makers assume that greater data volume equates to greater predictive power, even though radical uncertainty inherently defies such forecasts (Gigerenzer & Gaissmaier, 2011; Knight, 1921). For instance, during the COVID-19 pandemic, an excess of information about potential virus transmission patterns, treatments, and economic impacts created conflicting signals, which hindered clear decision-making for both policymakers and the public.

Flexible, multiple levels of functional organization are (i) a response to uncertainty, (ii) a source of uncertainty, and (iii) coextensive with uncertainty. They are a response, because it is often more productive to face uncertainty as a group than as an individual. Many minds can comprehend more than an individual mind when dealing with uncertain events. That is why groups of scientists formed to design vaccines in response to the COVID-19 pandemic and groups of companies collaborated in the production of these vaccines. Since uncertainties arise at multiple levels – from global (as for pandemics) to national (as for

political conflicts) to regional (as for natural disasters) to local (as for technological discoveries made by a firm) – different levels of functional organization are required in response. Furthermore, since there is often uncertainty concerning the levels at which challenges occur (e.g., whether an infectious disease will turn out to be a pandemic), it is eminently useful to have levels of functional organization adjust to the scale and domain of functional organization to suit the challenges as they unfold.

Flexible, multiple levels of functional organization can also be a source of uncertainty, because when levels of functional organization change, new interactions among people and between people and their environment emerge. This creates new, socially generated, levels of uncertainty. For example, the advent of social media platforms and online forums has led to the formation of new, virtual communities that generated novel social uncertainties: new opportunities for sharing interests and beliefs along with unprecedented social dangers, such as new online echo chambers and new patterns of polarization and misinformation that continue to evolve unpredictably. Human interactions are complex and often unpredictable, as they are influenced by many factors, including emotions, norms, and values, which arise from ever-changing, rarely repeated social settings. Variability in people's psychological states introduces more uncertainty, as does miscommunication and misinterpretation in the signals people and their groups send to one another.

Flexible, multiple levels of functional organization can also foster creativity, which can lead to breakthroughs that bring unpredictable, significant benefits to societies. As noted below, when diverse individuals come together to share different perspectives, experiences, and expertise, the resulting decision-making rests on cognitive diversity, which can generate unexpected innovations that no single individual could have conceived on their own. The development of the internet is a classic case of creative innovation (Berners-Lee & Fischetti, 1999). The internet was not conceived as a response to dangers arising from identified uncertainties. On the contrary, it emerged as the outcome of the creative efforts of countless individuals working on technological advancements (packet switching and the ARPANET), management of a complex, global operational infrastructure, social networking, and commercialization that enabled the transition from research to a broadly used information infrastructure.

Groups that operate in flexible organizational structures are often better equipped to adapt, iterate and refine ideas collectively, leading to creative insights. In the technology sector, for example, companies like Google and Apple are known for their flexible organizational structures that promote both individual creativity and group collaboration (Amabile, 1996).

While the multilevel paradigm highlights the significance of uncertainty for economic decision-making at variable levels of functional organization, the neoclassical paradigm focuses on risk and its implications for static levels of functional organization (such as households and firms). The neoclassical paradigm is based on the "correspondence theory of truth," which is generally associated with the view that there is an independent reality "out there" (independent of our minds) and that an idea is true if it corresponds to this independent reality. The rational expectations hypothesis, a cornerstone of neoclassical theory, is usually interpreted as meaning that individuals make unbiased predictions based on all the information available to them and that these predictions are correct on average. The multilevel paradigm, by contrast, rests on the premise that our reality is constructed from "small world" mental models that are meant to guide our actions toward our goals. The small-world models need to recognize their "small-worldedness," namely, their role in guiding decisions under conditions of uncertainty. This view is compatible with pragmatist, verificationist, coherentist, and other epistemic theories of truth.

The multilevel paradigm recognizes that uncertainty is are nearly ubiquitous phenomenon in economies (as well as in the polities, societies, and natural environments in which the economies are embedded). The prevalence of uncertainty arises from several important sources. First, economies can be understood as complex adaptive systems, where agents interact in ways that give rise to collective behaviors and patterns, which are not simply the sum of individual actions, but are emergent phenomena that result from the system's overall dynamics and are difficult if not impossible to predict (Arthur, 1999). Second, these systems also often exhibit nonlinear dynamics, where small changes in one part of the system can lead to disproportionate effects elsewhere. This nonlinearity is a hallmark of emergent properties and contributes to the openness and unpredictability of the system (Beinhocker, 2006).

Third, flexible, multiple levels of functional organization are coextensive with uncertainty. Throughout our lives we gain new experiences, new information, and new insights, these new understandings of the world cannot be undone, and they change the nature of our beliefs, practices, and interactions with others, in the economic and other domains. This process is inherently unpredictable: if we could have predicted a new insight, we would have had it before. Thus, human beings are continually learning, reshaping their understanding of

reality, and adapting to changing circumstances. This is a creative process, which is inherently unpredictable.

Fourth, economies are open systems due to their continuous interactions and exchanges with other systems, both internally (within their own structure) and externally (with other economies and global contexts). Unlike closed systems, which are isolated and can be analyzed with relatively fixed assumptions, open systems are characterized by dynamic feedback loops, complex dependencies, and diverse agents making decisions under changing conditions. This openness arises, first and foremost, from the system's emergent properties, due to the complex, dynamic interactions between the system's various components. For example, the rise of the internet and digital technologies created new industries, and led to social fragmentation, privacy concerns, and the concentration of market power in a few large technology firms, which use their power to gain political influence (Brynjolfsson & McAfee, 2014).

Second, economic decisions are influenced by political processes and institutions, which themselves evolve in non-repeatable ways. (Rodrik, 2011). The economy is also open to social influences, which are often unpredictable and can lead to emergent phenomena (e.g., Granovetter, 1985). Third, the economy's openness to environmental factors, such as climate change or resource depletion, introduces significant uncertainty in economic planning and decision-making (e.g., Stern, 2007). Building on Keynes's insights, Post-Keynesians have explored how the openness of the economic system to social, political, and environmental factors generates uncertainty. For example, Minsky's "Financial Instability Hypothesis" explores how the openness of the financial system to speculative bubbles, influenced by social and political factors, leads to systemic uncertainty (Minsky, 1986).

Fourth, innovations – central to economic growth – are events that are unknowable in advance. If they could have been predicted, then they would have occurred earlier. The accumulation of knowledge is a succession of unique events, whereas probabilities can be assessed only through repeated events drawn from a stationary distribution of random perturbations or events that can in principle be repeated from such a stationary distribution.

Finally, economic events are virtually never replications of the past. Various features of these events – including the knowledge base, social networks and political contingencies – change from one occurrence to the next and we are in no position to assess whether and to what degree these changed features are relevant to the probabilistic occurrence of the outcomes. Empirical regularities, specified probabilistically, are "identified" only in the sense that they are hypothesized. It is commonplace to believe that if no tests have disproved a hypothesis so far, this does not mean that the hypothesis is correct, but rather only that the hypothesis is not disproven. However, if we have good reason to believe that the events under consideration are uncertain, then the probabilistic identification is probabilities is simply misguided – there is no hypothesis to be disproven.

The prevalence of uncertainty highlights the importance of adaptability in decision-making to address ever-changing challenges. Uncertainty requires adapting our perceptions, attentional fields, beliefs to achieve our goals under new circumstances and adapting our goals to our changing understanding of human flourishing. This approach is radically different from the neoclassical approach, in which people's utility objectives and their economic constraints are probabilistically known, and thus, decision-making is reduced to identifying efficient ways of matching means and ends.

2.5 Cognidiversity

The prevalence of uncertainty implies the need for "cognidiversity" – the fifth theme of the multilevel paradigm – by which we mean perspectival and epistemic diversity within a context of shared purposes. Addressing collective challenges under uncertainty requires a collaboration that draws diverse perspectives and knowledge bases. Without diverse perspectives and knowledge bases, we are depriving ourselves of the intellectual resources necessary for action in a world that we do not properly understand. Without collaboration drawing on these resources, we raise the chances of cooperating on misguided premises.

Cognidiveristy refers to the variety of ways in which people perceive, interpret, and solve problems based on differences in knowledge, experiences, beliefs, and thought processes. It encompasses diversity of perspectives (emphasizing differing viewpoints or ways of framing issues) and epistemic diversity (focusing on the different sources and systems of knowledge and methods for understanding the world). These dimensions combine to shape how groups approach complex problems, innovate, and make decisions.

Perspective diversity enriches collective decision-making and problem-solving because it increases the range of potential solutions and critical scrutiny. Diverse groups are better able to avoid groupthink, anticipate challenges, and generate innovative ideas (Nemeth, 1986; Page, 2007). This diversity can improve creativity and adaptability in teams, leading to more effective responses to complex challenges.

Unlike diversity of perspectives, which deals with differences in framing and interpretation, epistemic diversity focuses on distinct ways of knowing and generating knowledge. It includes variations in methodologies, cultural epistemologies, theoretical frameworks, and disciplinary approaches (Longino, 2002). Epistemic diversity challenges dominant paradigms and expands the scope of inquiry, often leading to more inclusive and rigorous exploration of complex phenomena (Kitcher, 1993).

When diverse perspectives and knowledge systems converge around a common purpose, they bring a range of insights, experiences, and strategies to the table. Cognitive diversity has been shown to improve problem-solving and innovation because different viewpoints allow for critical examination and novel solutions (Page, 2007). This collective intelligence is particularly effective when goals align, as group members work toward common outcomes, ensuring collaboration rather than conflict.

Moreover, shared goals foster unity and inclusion, as participants see themselves as part of a greater whole. Cultural and perspectival diversity within this context allows individuals from varied backgrounds to feel valued and heard, strengthening bonds of trust and solidarity. Inclusivity promotes greater engagement, commitment, and resilience, helping groups overcome challenges (Putnam, 2007).

Diversity under a shared goal increases the resilience of groups, as it provides a broader array of resources and strategies for adapting to change or overcoming crises. Epistemic diversity helps identify potential blind spots, prevents groupthink, and encourages adaptability to changing circumstances (Holling, 2001).

Diverse epistemologies often lead to the cross-pollination of ideas, blending different cultural norms, disciplines, and ways of knowing (Nisbett, 2003). When these diverse elements are aligned under a common purpose, they can create breakthroughs and new paradigms that might not emerge from a single perspective alone. For example, interdisciplinary research initiatives and cross-cultural coalitions often lead to pioneering approaches in fields like sustainability, public health, and technology.

Cognidiversity is analogous to biodiversity in ecological systems. Just as biodiversity allows ecosystems to adapt to disturbances through multiple pathways and compensatory mechanisms, cognidiversity in human systems enables groups to confront challenges and uncertainties with a wide range of approaches and perspectives, thereby enhancing their resilience. Just as biodiversity enhances resilience through redundancy and functional specialization, cognidiversity reduces the fragility of our cognitive systems by ensuring multiple pathways for solving problems and maintaining function. Just as ecosystems with a diverse array of species can evolve to survive changing conditions, human systems with cognitive diversity can adapt and innovate in response to new challenges.

Cognidiversity stands in contrast to the "diffuse pluralism," addressed in Part 1. Under diffuse pluralism, there are no shared purposes for bringing the diverse perspectives and methodologies into creative working relationships. For example, heterodox economics is a broad umbrella term encompassing a range of economic theories and approaches that challenge or go beyond the neoclassical economic paradigm. It encompasses Marxian economics (e.g., Mandel, 1962), institutional economics (e.g., Hodgson, 2001), Post-Keynesian economics (e.g., Davidson, 1994), feminist economics (e.g. Folbre, 1994), ecological economics (Daly, 1991), Austrian economics (e.g., Rothbard, 1962) and overlaps with aspects of behavioral economics.

In the absence of shared purposes, diffuse pluralism can lead to intellectual fragmentation, which may hinder collective efforts to address challenges, as the lack of consensus leads to inaction or conflicting priorities (Rorty, 1989). Diffuse pluralism can also undermine common standards of reasoning and evidence needed for decision-making. This can hinder efforts to tackle collective challenges, as it becomes difficult to evaluate the merits of different arguments or build consensus around a solution (Boghossian, 2006). Without shared purposes to anchor collaboration, diversity can devolve into conflict and polarization, as differing perspectives compete without a unifying purpose. Cultural and epistemological divides may deepen, leading to misunderstandings, mistrust, and conflict over resource allocation, social norms, or policy priorities (Sandel, 1998).

In contrast, the shared purposes underlying cognidiversity encourage dialogue, negotiation, and mutual understanding, channeling diverse viewpoints constructively.

2.6 Multilevel Decision-Making

The fifth theme is multilevel economic decision-making. In neoclassical economics, such decision-making is portrayed in terms of (i) agents with predetermined identities, (ii) maximizing a unique objective (e.g., a household's utility, a firm's profit, a government's social welfare function) and (iii) subject to constraints (e.g., a household's budget constraint, a firm's production function, a government's budget constraint). In behavioral economics, agents with predetermined identities may follow heuristics. In the multilevel paradigm, by contrast, the "agents" are not

predetermined, since agency depends on the levels of functional organization at which people operate. The chosen levels of functional organization are context-specific.

Contexts affect people's psychological motives (understood as forces that give direction and energy to people's behavior) and these motives guide people's choices concerning their levels of functional organization. In particular, different contexts – such as positive-sum competitive, zero-sum competitive, positive-sum affiliative, achievement-oriented, and so on – affect the propensities for different motives to become active. Different motives, in turn, are linked to distinctive action objectives, beliefs, and perceptions. For example, the care motive (involving compassion and lovingkindness) is associated with a propensity toward prosocial objectives, cooperative beliefs (such as trust), and prosocial perceptions (such as sensitivity to means toward prosocial ends). By contrast, the status seeking motive is associated with positional objectives, competitive beliefs (such as zero-sum thinking), and positional perceptions (such as sensitivity to rankings). By influencing the activation of motives, contexts can induce different packages of objectives, beliefs, and perceptions.

People act in their capacity as individuals in some contexts, but as members of families, political parties, workforce teams, religious organizations, etc., in other contexts. This is how contextual changes elicit changes in people's chosen levels of functional organization, which in turn shape people's contexts. The evolution of economic activity may be understood in terms of the reflexive relation between changing contexts and changing multilevel economic decision-making. Contexts may change abruptly, leading to abrupt changes in functional organization.

Naturally, these changes can occur in the institutional domain as well. For example, firms adapt their organizational structures in response to changing market conditions, consumer preferences, and technological changes. Alliances among firms adapt to these events as well.

This understanding multilevel economic decision-making differs clearly from the neoclassical approach, where objectives (in terms of utility functions), beliefs, and perceptions are assumed independent of one another and where the utility functions are assumed to be temporally stable, so that revealed preference analysis can be conducted. In the multilevel paradigm, by contrast, temporal stability is assumed with regard to the relation between contexts and motives and between motives and packages of objectives–beliefs–perceptions. For example, some empirical evidence suggests that contexts characterized by strategic complementarities are associated with prosocial motives, whereas contexts featuring strategic substitutabilities are associated with competitive motives (e.g., Bosworth et al., 2016). Part 3 explains how motives and perceived contexts are shaped through moral values and narratives, which thereby are given a quite different role play in the multilevel paradigm than in the taste-oriented neoclassical one.

2.7 Multilevel Flourishing

The seventh theme is "multilevel flourishing," which refers to well-being based on personal needs and wants as well as well-being derived from participation in social groups – along with the contexts within which this individual and social well-being arises. The relationship between multilevel flourishing and multilevel selection theory (on which the multilevel economic paradigm is based) lies in the interaction of individual and group interests. Selection operating at multiple levels provides a framework for understanding how different aspects of human well-being (individual and group-focused) evolve and interact. Multilevel flourishing emphasizes the need to balance personal goals and social group benefits. The multilevel paradigm provides a theoretical explanation for this duality by showing that evolution can favor traits that maximize individual well-being, group cohesion, or both, depending on context. Multilevel selection theory suggests that groups with cooperative norms and behaviors can sometimes outcompete less cooperative groups. Such selection can explain why many aspects of human well-being are derived from social interactions, trust, and communal bonds.

Human well-being is heavily influenced by cultural norms and institutions that evolve over time. Multilevel selection theory suggests that cultures and groups with norms that promote cooperative behaviors may have a selective advantage. As these norms spread, they shape individual well-being, often aligning personal desires with group objectives. Participation in social groups provides individuals with a sense of identity, belonging, and purpose, directly enhancing their well-being. Multilevel selection theory explains the evolution of social identities as mechanisms to enhance group cohesion and collective action. These evolved social bonds increase individual well-being through improved social status, access to resources, and protection against external threats.

Human flourishing in the multilevel paradigm goes well beyond "well-being" in the conventional senses of happiness and life satisfaction. Flourishing involves living a fulfilling life by satisfying one's individual and collective needs through the exercise of one's individual and collective capabilities.

Obviously, individual needs – e.g., food and shelter – arise from the individual level of functional organization, while collective needs – e.g., security for one's family, approval of one's friends – come from higher levels of functional organization (participation in some form of public interest). Alongside needs, capabilities are also elicited at various levels of functional organization. For instance, one's knowledge and skills can be understood as partly one's own (residing in one's own head and body) and partly in one's groups (residing in one's interactions with others).

Flourishing arises when one addresses one's individual and collective challenges (such as climate change, biodiversity loss, financial instability, and water shortage) by living at the appropriate levels of functional organization. This involves aligning one's individual and collective capabilities to satisfy one's individual and collective needs. Human societies flourish when they address their collective challenges at the appropriate scale and scope through collective action, which requires adapting the levels of functional organization to the complexity and magnitude of the problem. Different challenges require different scales of organization (ranging from individual decision-making to global governance) and domains of organization (economic, social, and political). Collective challenges can range from local (e.g., community safety and sanitation) to global (e.g., climate change and pandemic response). Each type of problem demands a specific level of functional organization – associated with coordination, resource allocation, and strategic planning – that matches its scale and complexity.

There is of course no assurance that human affairs have a tendency toward this "best of all worlds." As we have seen in Part 1, there are conditions that promote such a tendency, such as those specified by Ostrom's Core Design Principles: (1) shared identity and purpose, (2) equitable distribution of contributions and benefits, (3) fair and inclusive decision making, (4) monitoring of agreed behaviors, (5) graduated reward and sanctions for helpful and unhelpful behaviors, respectively, (6) fast and fair conflict resolution, (7) recognition of the authority to self-govern in accordance with the principle of subsidiarity, and (8) polycentric governance.

Large-scale, complex, high-stakes challenges sometimes promote such multilevel coordination, where local, national, and international organizations contribute their expertise and resources. For example, the 2008 global financial crisis triggered rapid coordination among central banks, national governments, and international financial institutions to stabilize the economy. But even in this case, the functional adaptation was not entirely appropriate, as evidenced in the United States when the costs of risk mismanagement fell primarily on poor homeowners rather than corporate CEOs responsible for the problem. The interconnectedness of global supply chains, information flows, and communication technology may also promote appropriate functional adaptation. For example, some cybersecurity threats are managed through cooperation among individual companies, national governments, and international regulatory bodies.

Functional organization can be undermined when lower levels either fail to coordinate with higher levels of governance or actively resist necessary changes. This happens under a variety of commonplace circumstances. First, those with significant economic power – corporations, wealthy individuals, or financial institutions – can manipulate the functional organization of economies and societies to serve their own interests. For example, the fossil fuel industry exerts enormous economic power, often through lobbying and political contributions, to influence public policy in ways that delay or block climate change mitigation efforts.

Second, social power – exerted by shaping public norms, opinions, and behaviors – is exercised by social elites, media conglomerates, or cultural leaders to influence collective action by shaping what is considered socially acceptable or desirable, even when this goes against the interests of the broader population or undermines effective governance structures. For example, during the Covid-19 pandemic, influential figures and organizations spread misinformation through social media, which led to lower vaccination rates, hampering the efforts of global and national health organizations to control the virus.

Third, when political power is concentrated in the hands of a few, it can lead to dysfunctions in governance, especially when political actors prioritize their own interests over the collective good. In many countries, for instance, political elites maintain power by engaging in corrupt practices, siphoning off public funds, and weakening institutions meant to serve collective needs.

Fourth, fragmentation of authority can undermine collective efforts at larger scales. During the last pandemic, some local governments resisted national lockdown or mask mandates, undermining broader public health efforts. Fifth, excessive administrative decentralization, without proper oversight or coordination, can weaken high-level functional organization, leading to inefficiency and duplication of efforts. For instance, certain regions may prioritize economic development (e.g., allowing deforestation or mining) over environmental protection, contradicting national or international commitments to climate

goals. Sixth, resource constraints at lower levels can prevent higher-level functional adaptation. Disaster relief efforts can be hampered when local governments are overwhelmed and fail to seek timely support from national or international aid agencies.

These problems become serve when (a) different levels of functional organization have conflicting interests, leading to competition rather than collaboration, (b) poor communication between lower and higher levels of organization leads to information silos, and (c) lower levels of organization resist change due to institutional inertia. In short, human flourishing through appropriate functional adaptation is far from assured. It requires ongoing management, experimentation, learning, sensitivity to context and, where appropriate, upscaling successful experiments.

Human flourishing is pursued at multiple levels, in scale and domain. Scale: flourishing can be derived from both the pursuit of individual payoffs (benefiting individuals in their capacity as individuals) and the participation in social groups (benefiting individuals in their capacity as group members). Domain: flourishing is generated in the economic, political, social, and environmental domains – often in interaction with one another.

There are multiple drivers of flourishing. To fix ideas, Part 3 focuses on four important ones: (i) solidarity: social belonging, and group affiliation, enabling us to operate at higher levels of functional organization; (ii) agency: influence and control over our lives through our own efforts, both at an individual and collective level; (iii) material gain, in terms of the consumption of goods and services, the focus of the neoclassical paradigm; and (iv) environmental sustainability, generated by a sense of belonging in nature and inducing participation at a level of functional organization that includes the natural world.

These drivers of flourishing promote living through flexible, multiple levels of functional organization, addressing the multiple levels of challenges that we face. Accordingly, changes in our environmental, social, political, and economic contexts give rise to ever-new challenges, associated with ever-new needs. By mobilizing solidarity and agency, as well as generating material gain and environmental sustainability, we flourish by aligning our ever-changing needs with our ever-changing capabilities.

As the evolution of our needs and capabilities is uncertain, human flourishing also requires people to cope with uncertainty and navigate it appropriately. Theory pluralism has a potentially important role to play in this regard. Flexible, multiple levels of functional organization provide a broad basis for confronting radical uncertainty, since members of social groups can support one another in response to unexpected events.

We argue that it is inappropriate to combine the drivers of flourishing into one overall utility measure, much as a pilot cannot combine the speed and altitude of a plane into one measure of aeronautical success. Each of the drivers is qualitatively different. Each is essential for flourishing. The drivers cannot be substituted for one another to a significant degree. Each must stand in a particular, culturally determined, relation to the others. This relation evolves in the process of cultural variation, selection, and transmission. Thereby the multilevel paradigm's conception of human success is quite distinct from the time-invariant social welfare function of neoclassical economics.

Needless to say, multilevel economic decision-making need not necessarily lead to human flourishing. People may become stuck in contexts that are conducive to decisions leading to inappropriate levels of functional organization. Selfish individuals may undermine the public spiritedness of others, thwarting collective efforts to achieve collective gains. Nationalistic politicians may undermine global collaboration to stop climate change. Policy-makers and business leaders may fail to arrest biodiversity loss when they behave non-cooperatively with regard to one another. Human flourishing requires the alignment of collective capabilities with collective needs through both internal mechanisms (such as moral values and narratives) and external mechanisms (such as laws and policy incentives). In short, human flourishing calls for appropriately managed cultural evolution.

2.8 The Purpose of Economics

The themes above suggest a new approach to the purpose of economics, which is our final theme. Whereas the neoclassical paradigm understands economics to be "the science that studies human behavior as a relationship between ends and scarce means which have alternative uses" (Robbins, 1932, p. 15), the multilevel paradigm sees the meaning and purpose of economics *to study how economic means are mobilized in relation to how they could be mobilized to promote human flourishing, individually and collectively, now and in the future.*

While the neoclassical paradigm takes the ends to be given (in terms of stable utility functions), the multilevel paradigm recognizes that the drivers of human flourishing evolve along with the collective and individual challenges that people face. In Darwinian terms, the drivers of flourishing are "proximate causes" of economic activity, and the selection and transmission of these drivers in the process of cultural evolution are "ultimate causes." While the

neoclassical paradigm views the ends of economic activity as consumption, the multilevel paradigm understands flourishing to be a holistic phenomenon, described above. While the ends of economic activities are ascribed to individual economic agents with unchanged identities in the neoclassical paradigm, these ends are associated with flexible, multiple levels of functional organization in the multilevel paradigm.

In the multilevel paradigm, both the means and the ends of economic activity evolve in response to people's ever-changing individual and collective challenges. National security threats often strengthen national identities, making collective national ends more salient in a population, which may promote support for increased defense expenditures as a means toward the new national ends. Low growth and rising inequality may encourage populism, which may lead to fragmented national ends and support for protectionism and immigration controls as means for protecting those who have been left behind. The arrival of a pandemic gives rise to new collaborations among scientists and entrepreneurs, reshuffling the collective means toward a newly defined end.

Changes in the levels of functional organization are an important engine of this evolutionary process, since they shape both the means (the mobilization of collective capacities) and the ends of economic activity (the objectives of the functionally organized entities). Economic activity may be understood in terms of the survival and propagation of the strategies generated at the various levels of functional organization (theme 1), extending across the domains of the embedded economy (theme 2) under conditions of uncertainty (theme 3). The context-dependent, multilevel decision-making (theme 5) that takes place in the embedded economy does not necessarily lead to human flourishing, since there is no automatic mechanism (such as an Invisible Hand) to ensure that people choose the levels of functional organization that will automatically enable them to address their collective challenges by aligning their collective needs with their collective capabilities. To promote flourishing (theme 6), people must manage their environmental, social, political, and economic evolution through the appropriate strategies (such as social norms, political institutions, and economic policy) at the appropriate levels of functional organization. In recognition of ever-present uncertainty, such management should involve experimentation and theory pluralism (theme 4), so that it is possible to explore alternative strategic options from which the most successful can be selected and transmitted.

In this way, the purpose of economics involves all the other themes of the multilevel paradigm. The descriptive purpose of economics is to examine the evolutionary process driving economic decision-making, whereby the environmental, social, political, and economic systems preferentially select particular decision strategies and transmit them across population groups and through time. The prescriptive purpose of economics is to explore how this evolutionary process can be managed to promote human flourishing.

3 Conclusion: Beyond the Machine

In moving from the neoclassical to the multilevel paradigm, we move beyond the machine into the world of living things, beyond Newtonian mechanics into multilevel selection. While the neoclassical paradigm treats economic systems as analogous to physical systems governed by deterministic, probabilistic laws, the multilevel paradigm understands economic behavior and institutions as adaptive, evolving phenomena subject to pressures at multiple levels – ranging from individual to group to societal. While the neoclassical paradigm emphasizes actors with predetermined roles and objectives, operating in a world of stable, predictable forces (analogous to gravity and inertia) acting on economic markets and economies, the multilevel paradigm emphasizes functional organization, emergent economic phenomena, and endless adaptation.

The functional organization of economic agents evolves over time through selection pressures that favor arrangements that are advantageous to the survival and competitiveness of individuals, social groups, ideas, and institutions. Emergent economic phenomena are the complex patterns of behavior that arise from the interactions of their components, in the form of technologies, social groups, political affiliations, economic alliances, and so on. These phenomena are not reducible to the properties of individual elements but instead reflect the collective dynamics of the systems to which they belong. Adaptation operates at multiple levels. Individuals may adapt their behavior in response to market signals, while firms may adjust to industry dynamics, and economies may evolve new regulatory frameworks. Multilevel paradigm recognizes that successful adaptations at one level can influence outcomes at other levels, leading to co-evolutionary dynamics between agents, technologies, and institutions.

While the neoclassical paradigm assumes that economies can be studied largely in isolation from societies, polities, and the natural world, the multilevel paradigm recognizes that economic activity is embedded within

societies, polities and the natural environment and cannot be understood without reference to these contexts. While the world of machines is characterized by risk, the world of living things involves uncertainty, as living agents continually adapt to unforeseen circumstances. In a world of risk, the goal is to find the "best" model that describes the "true" state of the world; but in a world of uncertainty, the goal is cognidiversity. While neoclassical agents maximize predetermined objectives under well-understood constraints and derive their well-being from the achievement of these objectives, the identities of agents in the multilevel world evolve and people derive their well-being both in their capacity as individuals and as participants in their groups.

Taking the main themes of the multilevel paradigm into account emphatically does *not* require reinventing economics. Each theme has received some isolated attention in the economic literature, but these contributions are currently on the periphery of economic analysis. Despite wide-ranging critiques of neoclassical economics and the flowering of modifications and extensions in recent years, the neoclassic paradigm remains a widely used reference point for economic thinking. The implications of each modification and extension tend to be considered in isolation, within the context of an otherwise unchanged neoclassical framework of analysis. In this sense, neoclassical theory has been an integrative framework of thought.

The multilevel paradigm is meant to articulate a new integrative framework for economics, to be understood as a configuration of ideas that provides a foundation around which further insights can be developed. By bringing the themes of the multilevel paradigm together within one integrative framework of thought, many important contributions that are currently on the periphery of economics become central. Much of what follows involves identifying these contributions and bringing them together within the new framework. We argue that Darwin's theory of evolution, which already provides the integrative framework for the biological sciences, is a compelling choice for economics and all other branches of the human social sciences.

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