Chapter Two

Value and Why It Matters

> The voyage of discovery lies not in finding new landscapes, but in having new eyes.
>
> MARCEL PROUST (1871–1922)

VALUE, IN THE SIMPLEST sense, is the human perception of what is important. As such, it is subjective and context dependent. Value is experienced in many forms, from the physiological—food, water, shelter—to the experiential—music, art, sport—to the psychological desires for social position, freedom, creativity, and love. The individual and group choices we make to organize and collectively maximize value are the major concerns of the economics field.

Economic value starts with basic physical needs. Food keeps you alive, clothing keeps you warm, and shelter keeps you safe. These things provide functional physiological value, and are found at the base of psychologist Abraham Maslow's hierarchy of human needs, shown in figure 2.1.

As one moves up Maslow's hierarchy, the sources of human value become less physiological and get more abstract, subjective, and personal. Many of the higher needs, such as confidence, creativity, and acceptance, sound like brand attributes. This isn't surprising. Companies create product origin stories and promote brand attributes in an attempt to satisfy our higher-level

FIGURE 2.1 Maslow's Hierarchy of Needs and Value

needs. Drink Hennessy Cognac, the message may say, because you want to feel like a person of good taste and sensibility. If the advertising is effective, drinkers will seek out Hennessy because they believe it is a way of satisfying or publicly signalling these esteem needs and values.

As Maslow's hierarchy illustrates, we perceive, assign, and ascribe value to goods and service experiences based on real and imagined contexts that go far beyond their mere physical functions. The flexible, subjective, and contextual nature of economic value has confounded fixed absolute models of economic value from Karl Marx to John Maynard Keynes. There is no economic value other than that beheld and experienced. It is all relative experience. This subjectivity poses challenges when it comes to defining, measuring, and managing true or intrinsic value.

Many economic artifacts, such as shares, bonds, paper money, and gold, don't have value in themselves, but rather represent value within their respective social and legal systems. The representational value of these cultural artifacts is equal to what others will pay or trade for them. They are economically valueless outside of their social context. Imagine, for instance, trying to use Icelandic Krona to buy a drink at a bar in New York. Without an Icelandic context, the Krona won't be believable or useful as payment for your martini.

Ice serves as a good example of the flexibility and chimeric nature of value. In the nineteenth century, the Boston merchant Frederic Tudor—known as the Ice King—built a fortune by cutting ice out of frozen Massachusetts lakes, storing the ice in caves, and shipping it to summer hot spots around the world. As the first Boston ice shipment arrived in London, Tudor had a bar set up at the harbor to show off the benefits of his Boston ice. Soon, Tudor's ships were voyaging from Boston to Bombay as the luxury ice trend spread. This was no mean feat. Even with technological advances like stronger wooden hulls, clocks, and riggings, ship journeys were expensive and dangerous. This may sound like a ridiculous extravagance, given the extreme cost and effort. But the 3,000-mile journey made financial sense because the luxury value of ice as perceived by Tudor's customers exceeded the cost of his efforts. Indeed, although the danger and effort involved made the ice very costly, expensive luxury ice was rare and exclusive, and thus all the more appealing and valued. Being seen at the right English gentleman's club drinking the right cocktail with the right kind of ice cube became de rigueur for the Victorian smart set. The nineteenth century social cache of luxury ice disappeared as prices declined due to the innovation of twentieth century refrigeration. Ice lost its perceived luxury value as it stopped being an expensive object that had traveled long journeys across foreign lands.

Social prestige signaled visually with money spent still delivers value today—think designer handbags or expensive sports cars. Premium ice and exotic forms of water are still with us; premium ice made a resurgence in Japan during the 1980s, when fine old single malt whiskey was considered best paired with naturally blue ice cubes freshly harvested from Alaskan glaciers.

The journey of ice in the nineteenth century shows how the economy adapts extreme capabilities to deliver value. The ice journey uses an enormous amount of energy and resources, converting them into value. The rest of this book explores mechanisms like these, showing how the economy works as an adaptive system that takes in low value inputs and processes them with energy and knowledge into higher value forms.

Fundamentally, the economy is adaptive, and this creative and destructive process of adaptive evolution is the best-known and most effective mechanism for creating societal wealth and human well-being. This book explores a number of questions surrounding this idea of economic evolution. For instance, how does this process create value? And how can one make money out of it? Understanding this mystery can help capital allocators, investors, and managers stay ahead of capital-destroying forces while contributing profitably to the thriving stages of value and knowledge creation for us all.

Ecology as a Model for Economy

Life and the economy follow a similar adaptive process. According to ecologists Daniel R. Brooks and E. O. Wiley, life has:[1]

1. Increasing self-organization
2. Increasing entropy that is irreversible
3. Increasing specialization

These are traits of economic systems as well.

Some other aspects of life and ecosystems:

- Ecosystems strive to grow and capture all available resources.
- Ecosystems compete with other ecosystems at their boundaries.

Evolutionary change is expressed over time as phylogeny. Each species (actor) or evolved form has embodied within it the survival information and knowledge from past successful structures and behaviors.

Economies, again, also go through these adaptive processes.

Linking nature and economy is well-trodden intellectual ground. Charles Darwin's *On the Origin of Species* was published in 1859,[2] and by 1873 Walter Bagehot, editor of *The Economist*, had published *Physics and Politics*, linking political economy with Darwin's theories. It was generally well received:

> "Physics and Politics" has been written to show that the noble field of political thought and activity is not necessarily the chaos it is generally supposed, but that it involves great natural laws, which it is the destiny of science to trace out and formulate, just as it has done with other branches of knowledge which have been made scientific by modern inquiry.[3]

In 1890, Alfred Marshall, founder of the economics department at Cambridge University, again linked biology and economics in his *Principles of Economics*. He argued, among other things, that "like trees in the forest, there would be large and small firms but sooner or later age tells on them all."[4] In the 1930s, Friedrich Hayek stressed the importance of the evolutionary processes of creative birth and destruction in economics.

Linking the economy and nature's process can also lead to misunderstandings, however. Marx had a negative and incorrect perception of competition as a wealth and value destroyer. Marx's linear and mechanical view of economic history was deeply flawed. He understood history to be on a human-guided, predictable trajectory, contradictory to nature's more discursive path. Karl Popper effectively critiqued Marx in his book *The Poverty of Historicism*. Popper pointed to the unpredictable shifts seen in both the economy and nature, between utter chaos and fully mechanical determinism.

In the 1950s, Joseph Schumpeter redefined competition in positive evolutionary terms with the concept of "creative destruction," highlighting the adaptive selective process as socially and therefore economically value creating, rather than value destroying, in the long term. From the 1930s to 1950s, Ludwig von Mises supported arguments for open non-interventionist economics, and emphasized the value of the consumer price feedback signaling mechanism. Today, evolutionary economic thinking is found in various universities and think tanks such as the Santa Fe Institute. In addition, economic thinkers like Reiner Kümmel[5] and Robert U. Ayres[6] have pushed the boundaries of economic thinking into the field of evolutionary dynamics.

Not all twentieth century economists embraced the evolutionary model of economy. Keynes and other economists ignored, dismissed, or seriously misunderstood growth, innovation, value, and adaptive economic processes. Economists' mathematic models treated the economy like a linear or simple probabilistic machine. They focused on point solutions and mechanistic equilibrium models, using linear capital and labor flows suspended in false clouds of implausible assumptions and caveats. But adaptive system growth, by definition, is adaptive and can't be linear mechanistic. According to Ayres, Keynes disregarded growth as neither an important or enduring phenomenon. Keynes, working in 1930, expected growth to come to an end within two to three generations, and the economy to plateau. He referred to this imagined state of equilibrium as "bliss."[7]

Ultimately, Keynes's historical determinist state of "bliss" proved as deeply flawed as Marx's dreams of the equilibrium-perfected state associated with the utopian proletariat. Both these mechanical theories still have adherents, however, and can be dangerous if pursued aggressively using monetary or political force. The only economic systems found today that are truly at or close to equilibrium are nearly dead economies. A cow that achieves equilibrium is called a steak, and the economy closest to achieving equilibrium today is probably North Korea circa 2013.

According to Ayres, Keynes's models were relatively static, and—sadly similar to today's economic models—use simple linear inputs and outputs. Keynes wrongly believed in homothetic growth—growth without structural change. Keynes was wrong on a lot of things due to this flawed assumption of a fixed, finite economic structure. The homothetic model approach is the opposite of an evolving open system like the economy.

In the 1920s, Frank Knight—most well known for his economic work differentiating risk from uncertainty—was closer to a dynamic model of the economy, looking for a series of accelerators and multipliers to explain the varying rates of change across an economic system over time. As we shall see, evolutionary systems flow, change, and adapt structurally in order to increase their capability to create, maintain, and grow economic value.

Variations of Keynes's linear savings-led input models and static structures from 1928 are still abused today. Many economists would rather apply bad models than admit to having none at all, and so like pre-Copernican astronomers they add epicycles to fantastic mechanistic universes. At best this reflects ineptitude, and at worst intellectual fraud, which can do actual harm when governments and central banks rely on these models to justify policies affecting millions of people.

Mainstream economic models deal with structural adaptive change, wealth (expected value), and innovation poorly—although there are useful exceptions to this, such as experience curves, which are examined later. Mainstream macroeconomics focuses on static equilibrium or steady states. By contrast, the nature of value approach seeks to generally explain why and how economies grow and adapt. Like ecology, the nature of value approach focuses on generic processes and trends versus precise deterministic prediction.

In order to understand this growth perspective, it's important to understand that life and value aren't *things*; they're *processes*. Take a flower, for instance. We can think of it as a thing in itself, but we can also consider it as a process that has been optimized to create more flowers. The flower is itself alive, but it also spreads life over time and space. Life "flows" from the soil, to the flower, to the bees that suck its nectar; life also flows from one flower to the next that grows from its seeds. Flowers thus adapt to increase not only life but the flow of life.

Value, in the form of products and services, is much the same. The flower evolves to increase its ecological viability, and thus encourage the spread of flowers and the flow of life. A valued product or service adapts using innovative knowledge, and in doing so increases its economic viability and encourages the creation of more applied value creation. The continual and increasingly efficient creation of a product allows more and more value to flow through the economy. One of the key ideas of this book is that we should look not just at life and at value as static entities, but at life and value as continuous flows through a system that adapts for greater and greater flow capacities.[8]

Adaptive Flow Creates Complexity and Efficiency

Adaptive, selective processes work the same in economy and ecology. In both cases the process is more nuanced and interesting than naturalist Herbert Spencer's 1864 catch phrase "survival of the fittest," which he used to refer to both biological and economic processes, and which for our purposes is quite telling. (The phrase was first adopted and used by Darwin in the fifth edition of *On the Origin of Species* in 1869.)

Darwin had three conditions necessary for what he referred to as "adaptation by natural selection:"

There must be a struggle for existence so that not all individuals survive.

There must be variation such that some types are more likely to survive than others.

The variation must be heritable so that the advantage can be passed on.

The three preceding rules hold for economically valued goods and services.

We shall see that species and niches in economies and ecologies don't have exactly predictable trajectories. Ecologies and economies optimize themselves for conditions and possibilities at given moments in time. There is no fixed equilibrium point for an economy or ecology; rather there is constant adaptation that attempts to increase the flow of life and value.

Just as the economy and the ecological domains undergo continuous adaptation, they also grow increasingly complex. Both systems, in fact, can be described as "complex adaptive systems"—a concept visited throughout this book and one that informs much of the discussion about these two domains. As systems adapt, their very structures change in order to allow for a continually increasing flow of life or value, respectively. One flower species evolves into three; a first generation iPod evolves into an iPod Nano, iPod Shuffle, and iPod Touch. These structural flow splits are called "bifurcations." Bifurcating systems become more complex while gaining the capacity for increased throughput (the quantity of raw material or information that moves through a system) and efficiency.

Figure 2.2 shows a simple bifurcation, or spread of variation in form, over time. The diagram starts from an original organism or value-creating form on the left, and begins to split as time goes on.

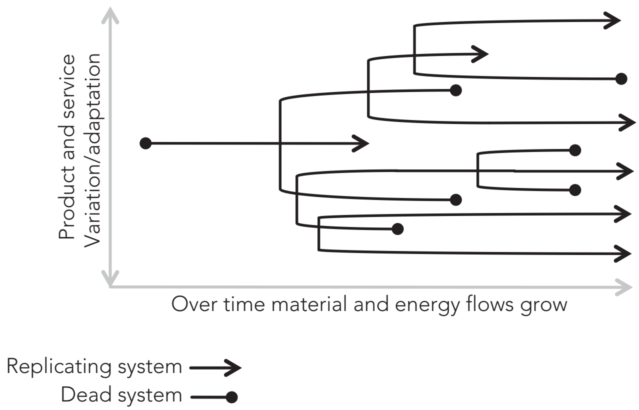

FIGURE 2.2 Bifurcation Flows
Bifurcation of form allows for increased flow efficiency.

Arrows indicate value-producing, economically viable forms going forward; dots indicate extinctions due to failed adaptations.

Adaptive change doesn't follow straight lines or occur at a steady pace. For years, there was a debate among biologists about whether ecological systems adapted gradually or in fits and starts. The debate was mostly resolved as the late evolutionary biologist Stephen Jay Gould determined that the process of life and its resulting ecologies follow an unpredictable "punctuated equilibrium" process of evolving change. In punctuated equilibrium, not much happens for long periods, and then suddenly everything changes before stabilizing once more. Economies and industries show punctuated equilibrium behaviors in their rates of adaptive structural change.

Adaptive change isn't always positive, in terms of increasing the flow of value or life through a system. There are periods of decline, regression, and falling back. For instance—252 million years ago, a mass extinction called the Great Dying occurred. Ninety-six percent of marine species went extinct, along with 70 percent of all terrestrial vertebrates. The exact causes are unknown, but speculation includes a meteor, which may have landed in the ocean. In economies, widespread declines in value throughput measured as GDP contractions or recessions accelerate organizational extinction rates. Economic value flow contractions vary in size and cause, just like large extinctions and ecological collapses.

Although these kinds of temporary fallbacks do occur, over the long term ecology and economy grow more life flow measured as living biomass and their capacity for value flow increases. For instance, according to the late scholar of historical economics Angus Maddison, the annual GDP flow facilitated by one person in 1 A.D. is estimated at $460 in constant 1990 U.S. dollars.[9] Humanity's flow of value and the rate of growth have increased significantly over the last 2,000 years, as indicated in figures 2.3 and 2.4.

The struggle for life and economic survival isn't that different. Imagine two rams fighting for territory in the Rocky Mountains. The butting of horns makes a furious sound as they compete for dominance. The rams' genes are a determining factor in the size of their horns. The capability for growing large horns (among other

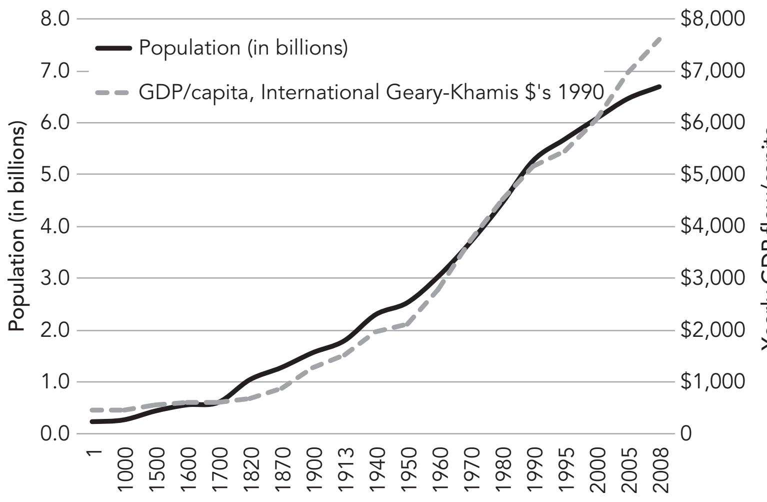

FIGURE 2.3 Global Population and GDP Per Capita, 1–2008 A.D.
Source: Angus Maddison

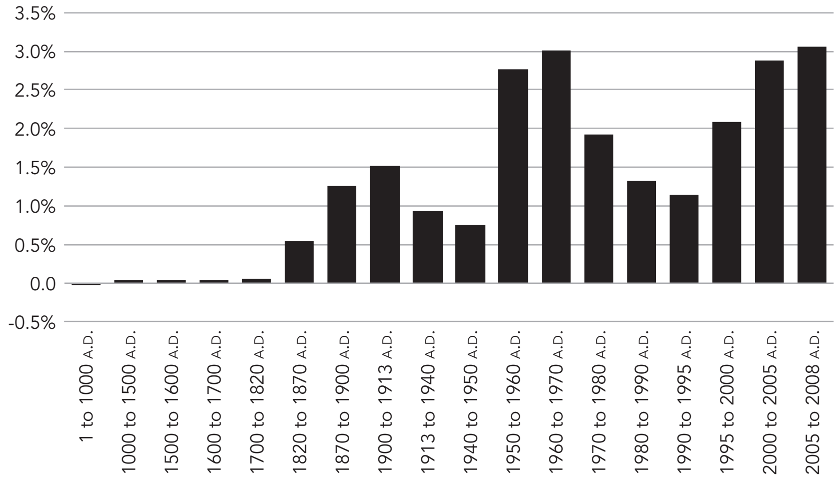

FIGURE 2.4 Annualized Global GDP Growth, 1–2008 A.D.
Source: Angus Maddison

capabilities) enables the ram to win fights, ultimately securing reproductive access to females via territorial dominance. Successful reproductive sex acts as a feedback loop—since rams with large horns are more likely to reproduce, more rams with large horns will be born. This amplification of genes can eventually lead to larger horns among the ram species that populate the ecological landscape.

Across an open plain, miles away, a man smiles as he looks forward to purchasing a new Dodge Ram truck. The Ram truck's branding, engine technologies, and marketing capabilities are all innovations expressed by the manufacturer. The brand promotes a sense of masculinity, authenticity, and power to the potential male truck purchaser. The cash value exchanged for the truck purchase allows for more Ram truck advertising to replicate and keep the macho Ram truck brand innovation alive. Just as reproductive sex amplifies genes and their expressed traits, perpetuating the iterative cycle of life, shopping and purchasing are the acts required for innovations to capture resources and reproduce the flow of an innovation's expressed capability. This economic process of selective value informational feedback amplifies successful innovations.

Biological or economic reproduction alone doesn't guarantee successful forward propagation. Reproduction merely captures resources and the potential to begin the amplification cycle. Likewise, resource consumption doesn't guarantee an innovation's propagation, but merely signals the innovation's success at producing value for a customer. The cash value from a sale may be put back into reproducing and expressing more of an innovation, but doesn't guarantee future value creation success.

Understanding the Networked Panarchy

In complex adaptive systems whether physical, ecological or economic in nature, all things are networked and connected. This is obvious, but also so overwhelming that it is often forgotten. The image of a butterfly's wings flapping in Japan leading to a typhoon in Australia is a popular metaphor in chaos theory literature. The romantic notion of a single organism's impact on the future is poignantly accurate and simultaneously useless. Looking at complex systems in fine grain detail is like chasing butterflies to predict typhoons. Likewise, knowing the location of every painted dot in the pointillist painter Georges Seurat's painting of an afternoon picnic on the island of La Grande Jatte won't explain the context, mood, or beauty of the painting.

Vision comes from a sense of distance and synthesis of how points combine to create a flowing narrative. Just as with Seurat's painting, adaptive systems like the economy are better understood in broad contexts and as narrative processes rather than in overwhelmingly reductionist detail.[10] In ecology, some practitioners estimate that only three to six key variables are needed to track the basic drivers of a system. This may be true for adaptive economic systems as well. Some key economic variables explored in later chapters, dealing with pricing power and competitive differentiation, will attempt to explain longer-term economic survival traits.

Complex adaptive systems exist as linked networks of elements organized into feedback loops and hierarchies. A term from ecology that helps capture the "big picture" of this complex network connectedness is "panarchy." A panarchy is a network of connected adaptive hierarchical systems.

Panarchies are everywhere. Your body is a panarchy, ranging from your smallest to largest systems: intracellular mitochondria found within your 200+ types of cells form tissues, which arrange themselves into functioning organs, which in turn support your entire body's goal of staying alive to reproduce its genes. Each hierarchical level is a system set among a panarchy of connected networks.

Panarchies of nested hierarchies can be visualized as stacked pyramids or nested circles. The economic panarchy is analogous to the ecological panarchy, as seen in figure 2.5. Each ecological layer

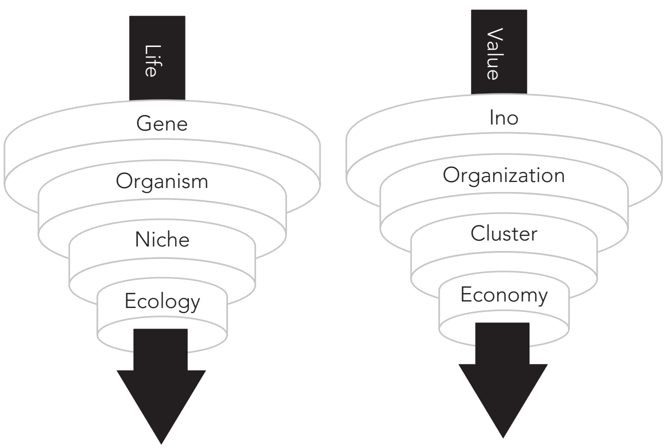

FIGURE 2.5 Ecological and Economic Panarchy Process
Each layer in the ecological and economic network acts as a macroprocessesor, selecting survivors and weeding out those incapable of propagation. Over time, this leads to the adaptation of life and of value.

corresponds functionally with a parallel economic layer. Comparing selected flows through value- and life-creating panarchies can help us understand the economy and value-creating processes.

The information captured within an innovation can be broken into units called "inos." Inos are the economic analog to biology's genes. Inos, expressed as capabilities and behaviors by organizations, cascade down into the economy, just like genes expressed by organisms cascade down into the ecology. Each layer—and the relationship between layers—is explained in later chapters, from top to bottom, so don't worry too much about the mechanism now. The thing to remember is that panarchies are wonderful adaptive, flowing feedback networks composed of a number of levels.

Adaptive changes and knowledge cascade down the panarchy, either rejected as nonviable or selected and amplified by the layer below. This filtering macroprocess is adaptive selective feedback, the heart of evolution's process. The value and life generated in aggregate provides the material for creating and sustaining fresh inos and genes. As material and energy flow through it, a panarchy structurally adapts, creating more complexity and increasing the capacity for life and value flow.

Panarchy's networked hierarchies overlap across time and space in terms of interaction, structural knowledge shared,[11] resources, and energy flows. Figures 2.6A and B show the nested relationships with ecology and economy. (Note that the time and space axes in the charts that follow are logarithmic, not linear.)

Panarchies help us link the big and small adaptive pictures. In studying economies, it's not worthwhile to look at each individual actor's choice or the impact of every individual innovation that pops up. At the top level of the economy, it is difficult to predict the short-term fits and starts of an economy's flow measured as real GDP. However, looking at the interaction among all these pieces and some of the patterns displayed at every level can help us better understand the workings of the economic system, and how economic and organizational growth happens.

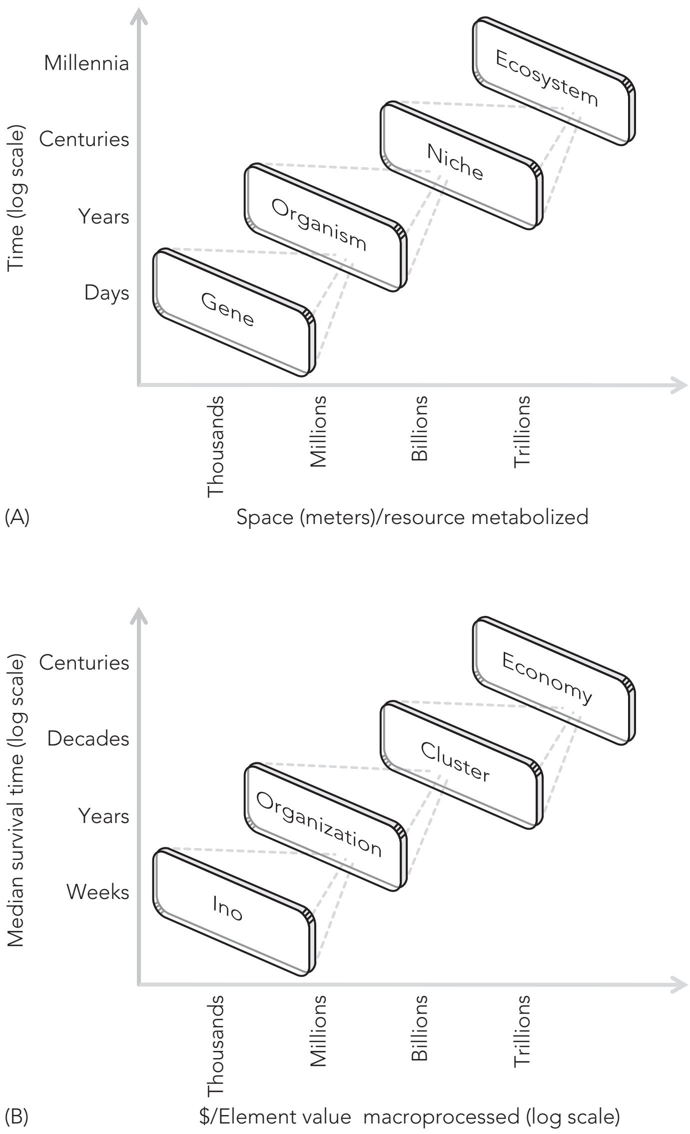

FIGURE 2.6 (A) Ecology's Panarchy Network; (B) Evolution's Economic Panarchy of Network Links and Elements

This growth creates remarkable opportunities for individuals. Understanding how the adaptive panarchy works has important ramifications for investors. For value investors, the focus is on the organizations' ability to sustainably capture excess value, in the form of profits, as it flows through a competitive cluster (market). Efficiently allocating capital to organizations means understanding the middle economic layers: the cluster and the organization. The ino's layer is typically too volatile and risky for most allocators and is more suited to venture capital. The top layers of aggregate economy and beyond are affected by government debt, monetary policy, and sociopolitical drivers beyond the scope of this book.

Summary

Evolution's complex system of life (ecology) is analogous to the continual flow of the adaptive economy. Understanding one adaptive system—or panarchy—helps us understand the other. As material knowledge and energy flow through it, a panarchy's structure changes, bifurcating into more complex forms and allowing for greater and more efficient throughput of material and energy. Adaptive systems don't lend themselves to reductionist thinking, but by looking at general patterns and rules, we can start to understand some of their traits, behaviors, and goals.