

# Finance and Management for the Anthropocene

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## Abstract

The Anthropocene era is characterized by a pronounced negative impact of human and social activities on natural ecosystems. To the extent finance, economics and management underlie human social activities, we need to reassess these fields and their role in achieving global sustainability. This article briefly presents the scientific evidence on accelerating impacts of human activities on nature, which have resulted in breach of planetary boundaries and onset of global climate change. It offers some potential leverage points for change toward sustainability stewardship by highlighting the important role of finance and economics in addressing climate change. We examine the role of financial stakeholders in addressing planetary boundaries and offer a modified stakeholder theory, from which we propose future directions for finance in the Anthropocene.

## Keywords

Anthropocene, planetary boundaries, stakeholder theory, sustainability, theory of the firm

## Introduction

Scientists are calling the present age the “Anthropocene”—a period in geological history where humans (anthropos) and their activities are changing nature more than natural processes that have remained stable for millions of years. Human activities have a greater impact on nature’s cycle than nature itself, and human choices will determine nature’s long-term viability for supporting life. The Anthropocene era calls for basic reassessment of all human knowledge, its practices,

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interests, and directions. This is particularly true for economics and finance, two of the fundamental driving engines of modern societies that are partly unconnected to the environment. In order to address climate change, one of the biggest environmental problems, a transition to a low-carbon economy is needed. This transition, however, requires rethinking the basic principles of economic organization, the financial engine that drives markets and companies, and business models that we consider acceptable, such as infinite growth. We are amid an economic, social, and ecological crisis that mandates a reconsideration of economic principles, management theory, and finance (Bay & Schinckus, 2012; Lagoarde-Segot, 2015).

In this article, we discuss the role of finance with regard to addressing sustainable development in the Anthropocene. Financial institutions, such as the Chartered Institute of Management Accountants (2010), emphasize the positive role that a proactive financial management can play in addressing sustainability: “Without the data they own, the analysis they can provide and the discipline they bring to planning, climate change initiatives will struggle to gain either credibility within the organisation or rigour to deliver tangible, sustainable results” (p. 9). Financial directors are seen to have a key role in addressing sustainable development initiatives in a business organization’s strategic policies. Finance is “the best placed function to take the lead on sustainability and manage corporate performance . . .” in sustainability (Stilwell, 2009, p. 27).

A vast majority of financial models, indicators, and criteria set forth in business sustainability frameworks look inward, are applied selectively, neglect context, are ill-designed for attention to systemic effects and overall integration, and as a result provide little useful information about the sustainability effect of finance (Dingwerth & Eichinger, 2010). Consequently, the focus on financial indicators in combination with social conditioning and values of financial sector employees and management, fiduciary responsibilities, the use of financial models that exclude sustainability values, and expectations of clients and investors prioritize a “business case” approach instead of a “sustainability case” that focuses on sustainability effects. Mostly, financial decision making excludes sustainability, environmental, and ethical considerations. This is not only true for industrial practice but also for the academic world. A recent study, for instance, found that leading finance journals do not publish any studies about the impact of climate change on financial risks (Diaz-Rainey, Robertson, & Wilson, 2017). The authors of the study call the neglecting of environmental, societal, and sustainability risks in finance “stranded research.” Consequently, we need to reimagine a “Finance for the Anthropocene” that is, consistent with recent scientific findings related to the lack of environmental stewardship.

Our article is structured as follows: We initially discuss the necessity for a new understanding of the relationships between humans and nature. We then present the potential leverage points for change toward sustainability stewardship. This discussion highlights the important role of finance and economics in addressing climate change challenges. Building on this, we examine the possible role various financial stakeholders can take to address the planetary boundaries. Next, we suggest the need for revising our current theoretical thinking and offer a substantial modification of stakeholder theory. Finally, we discuss future directions for finance in the Anthropocene.

## **A New Understanding of the Relationships Between Humans and Nature**

Over the past half century, natural sciences research on Earth’s ecosystems has shown great and fundamental changes in Earth’s capacity to support life as we have known it (Reid et al., 2010; Steffen, Richardson et al., 2015). International research programs on global environmental change have clearly documented the increasing impacts of humans on natural systems (Barnosky, Ehrlich, & Hadley, 2016). They point to the need for a fundamental rethinking of economic and business activities to meet the needs of present and future generations. Three concepts are important for understanding the evolving relationships between humans and nature: the Great Acceleration, Planetary Boundaries, and the Anthropocene.

The great acceleration of human impacts on nature is captured in a study by Steffen, Richardson, et al. (2015). Tracking and charting a variety of social and ecosystem trends between 1750 and 2010, this study shows some stark developments, which have in turn influenced political discourse around the negotiation of the Sustainable Development Goals (e.g., Griggs et al., 2013) and influenced thinking among businesses (Whiteman, Walker, & Perego, 2013). The planetary boundaries concept proposes nine critical variables that need to stay within defined boundaries for the earth system to continue operating as it has during the past 8,000 years of the Holocene (the current geological epoch that followed the last glacial period preceded by the Pleistocene). The Holocene is often characterized as a period of unusual stability, which has seen the development of much of the modern trappings of human civilization; it appears that humanity may already be transgressing two of the nine boundaries, and we know the climate boundary is also at risk (Figure 1a).

Although planetary boundaries are a biophysical concept, they exert real social pressures. Steffen et al. (2004), more recently updated by Steffen, Broadgate, Deutsch, Gaffney, and Ludwig (2015), document the trajectories of many drivers and responses at the global level for the past 250 years, and show how these have dramatically accelerated since the middle of the 20th century (see Figure 1b). While growth in population and GDP lead the socioeconomic trends, many other factors modulate their effects, such as globalization and urbanization. Though not linked causally in a simple way, the resulting trends in Earth system parameters all show steep rises in the past 50 years. The updated version, however, shows some hopeful plateauing (e.g., in stratospheric ozone) and disaggregates some of these by economic categories of countries, showing signs of resource use becoming decoupled from GDP in some countries. Some of these trends are likely to be real, pointing to potential solutions; others may be the result of impacts being transferred to developing nations, highlighting the importance of economic processes of exchange. These issues are now a matter of intense study (e.g., Häyhä, Lucas, van Vuuren, Cornell, & Hoff, 2016; Hoekstra, 2013; Lenzen et al., 2012; Lenzen & Peters, 2011; Wiedmann et al., 2015). Notably, while population has been a major driver in the past, it will be *consumption per head* that is key in future projections (Riahi et al., 2017). These findings undergird a number of treaties and agreements signed in 2015-2016, including the Sendai Framework for Disaster Risk Reduction, the COP21 Climate Treaty, the Sustainable Development Goals, and Habitat III. A move toward a “sustainable” society will require that economics and finance move in that direction.

Mainstream economics and finance are in deep conflict with these postulates as they are philosophically grounded on individualistic and materialistic principles that allow economic agents to appropriate and deplete the living systems of the Earth. With the exception of ecological economics, mainstream economics and finance denies the intrinsic value of nature and considers living systems as merely “natural resources” to be used for human purposes. Finally, it disregards the limitations of low-entropy sources and capacity of nature in relation to economic activities. One example is the financial concept of discounting. This concept prices present values higher than future values. To have \$100 now reflects a higher value than to have \$100 in 20 years. This concept, however, is in contrast to the concept of sustainable development that emphasizes both the needs of current and future generations. Consequently, conventional finance discounts the needs of future generations and favors the need of the current generation. This approach is a clear recipe for humanity’s own destruction. We need new business and financial models in organizations to tackle this immediate and unavoidable planetary challenge. In the Anthropocene, the main goal of the economy cannot be unlimited economic growth or maximizing economic welfare for the current generation without considering the need of future generations. What is at stake is the flourishing of life on Earth (including human, nonhuman, and future life).

Though we see a rise of socially oriented business models such as B-corporations and social enterprises, most business organizations consider the natural environment and human persons as mere means to accomplish their own purposes and goals. Their dominating self-centered orientation leads to decision paralysis that produces ecological and social destruction on a large scale.

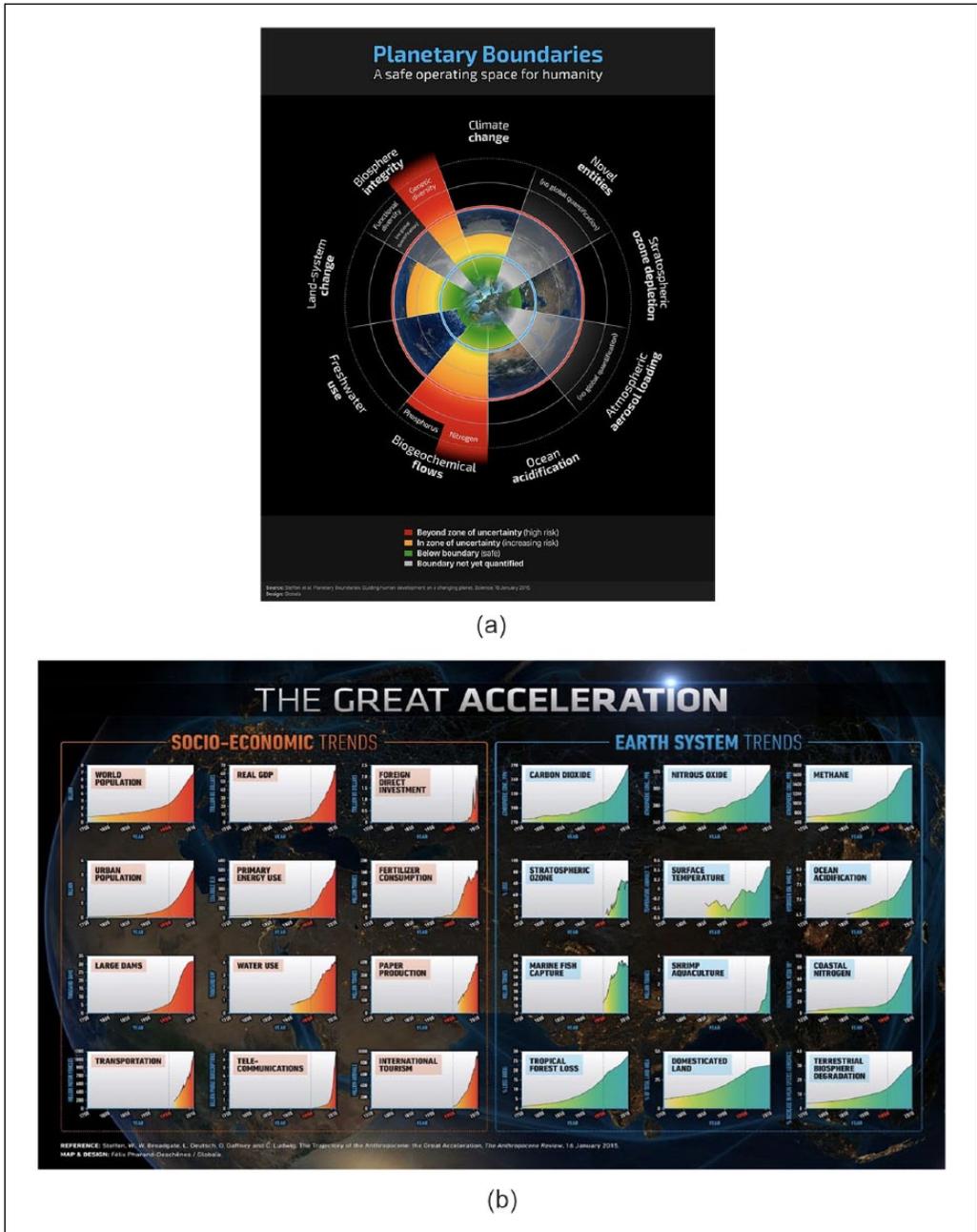


Figure I. (a) Planetary boundaries and (b) the great acceleration.

At the macro-economic level, Jackson and Victor (2015) argue that “modern capitalist economies are driven toward economic growth as there are positive feedback mechanisms which push this system toward further growth” (p. 240). Money and finance have a major influence on decisions about investment, production, employment, trade, and consumption. Furthermore, some growth-related issues are inherent to our current financial system. Without economic growth, for instance, it is not possible to charge interest on loans. In advanced capitalist economies real economic

activities are always matched by financial transactions. Jackson and Victor's (2015) conclusion is that "the debt-driven, materialistic consumerism-based economies cannot be sustained. However, community-based, resource-light, low-carbon, service-intensive economies are possible" (p. 244). We advocate in this article that this requires new financial and business models that are compatible with the requirement of flourishing of life on Earth.

The tragic reality of the Anthropocene is that not only the present form of the corporation is inappropriate for promoting ecological and prosocial business behavior, but unincorporated businesses may create their own ecological and social "deficits," too. The underlying business models on which mainstream commercial and financial organizations are premised are fundamentally flawed. They are mainly focused on short-term profit maximization, though some leading companies, such as Unilever (James, 2018), start to challenge the system in favor of a more sustainable business model and concepts such as impact investing, divestment, and socially responsible investment—a move away from exclusively relying on pure financial models and concepts. Currently, even some big pension funds divest from controversial investments (see also Hunt & Weber, 2018, in this issue).

Today's materialistic, one-dimensional and self-centered way of conducting economic activities should be questioned from the perspective of nature, future generations, and society at large. If business and finance cannot find more appropriate (i.e., ecologically sound and socially sensitive) models for its functioning, there is little chance for achieving sustainability on Earth. Thus, this present article represents a *call to action* for future research in the areas of finance and management in this new era.

Together, the great acceleration and planetary boundaries concepts have underpinned the recognition of the Anthropocene (Crutzen, 2002; Waters et al., 2016). Arguably, this recognition should drive a profound philosophical and ethical reappraisal of humanity's role in maintaining its own life-support system (Steffen et al., 2011), albeit with due humility (Hamilton, 2015). Thus, the Anthropocene must be viewed as an era in which humanity becomes responsible for stewarding its own life-support system. This requires the support of economics and finance.

## Leverage Points for Change

The Anthropocene calls for new economic principles, and models for transitioning to an economy that does not destroy the richness of life processes on Earth but preserves and enhances them. Peter Brown proposes basic postulates to be accepted as the foundations of a life-enhancing, sustainable economy

(1) membership—humans are not masters but members of the community of life; (2) house holding—the Earth and the living systems on and in it have intrinsic value, they are worthy of respect and care for their own rights; and (3) entropic thrift—low entropy sources and capacities that undergird the possibility and flourishing of life must be used with care and shared fairly. (Brown, 2015, p. 16).

Mainstream economics and finance is in a deep conflict with these postulates as it is philosophically grounded on *individualistic* and *materialistic principles* that allow economic agents to appropriate and deplete the living systems of the Earth (Freedman, 1962). Common financial market models, for instance, exclusively use financial indicators such as past performance, momentum, book-to-market value, and others to calculate the market value of a firm (Carhart, 1997; Fama & French, 1993). Indicators such as positive and negative social and environmental impacts of a company's business are not components of these models, but rather externalities. Even environmental economics only allocates value to nature if it is possible to monetize it (Pearce & Turner, 1990). Finally, concepts from ecological economics that see the economy as a subsystem of the environment (Costanza, 1989) and promote the possibility of steady-state economics without infinite growth (Daly, 1990) are rather academic and are not reflected in real-world economic approaches.

**Table 1.** Hierarchy of Leverage Points.

System characteristic	Description	Meadows' leverage points
Parameters	Relatively mechanistic characteristics typically targeted by policymakers	Parameters, magnitude of buffers compared to flows, structure of material stocks and flows
Feedbacks	Interactions between elements within a system of interest that drive internal dynamics	Length of feedback delays compared to rates of system change, strength of negative feedbacks, gains associated with positive feedback loops
Design	Social structures and institutions that manage feedback and parameters	Access to information flows, rules of the system (incentives, constraints), power to change/self-organize system structure
Intent	Underpinning values, goals, and worldviews of actors that shape the emergent direction to which the system is oriented	Goals of the system, mind set/paradigm from which the system arises, the power to transcend paradigms

Note. Adapted from Abson et al. (2017).

Today's markets are the dominant coordinating mechanism of economic activities that rely exclusively on market efficiency reflecting all available information into the price of a security (Malkiel & Fama, 1970). But in many cases, prices are rather imperfect and incomplete indicators for evaluating economic activities from a wider ecological and social perspective. A number of studies, for instance, found that portfolios that divested from fossil fuels because of climate change issues outperformed conventional benchmarks (Henriques & Sadorsky, 2018; Hunt & Weber, 2018). However, conventional benchmarks should always perform better than divested portfolios according to portfolio theory (Markowitz, 1952).

Hence, the dynamics of the disembeddedness at the microlevel in the capitalist economy can be summarized as follows (Shrivastava & Zsolnai, 2014): self-centered orientation of businesses leads to developing disinterest in environmental and social consequences of the actions and policies, which contributes to socially and environmentally disembedded functioning and finally fuels self-centeredness of modern-day businesses.

There are many options for change which vary from small (yet, possibly important) tweaks through to wholesale re-envisioning of what economic systems are for. Abson et al. (2017), drawing on the "systems thinking" approach of Donella Meadows (1999), propose a hierarchy of leverage points in complex systems, from parameters through feedbacks and design to underlying intent (see Table 1). Leverage points refer to the ability to reconnect individuals with nature, revising institutions guiding the markets, and rethinking how knowledge is generated and used for sustainability (Meadows, 1999). This type of systems thinking is in stark contrast to financial accounting and reporting that tries to simplify complex systems through the use of simple indicators (Gray, 2002). In the following section, we use the four system characteristics as a structure to organize the diversity of opportunities in adjusting business and finance activities.

## Finance and the Anthropocene

Finance should not only fit in the Earth's biophysical systems but should help maintain and foster these systems. This challenge, however, is not reflected by the currently prevailing finance theories and financial practices (Ghoshal, 2005; Tencati & Zsolnai, 2009). Thus, in light of Meadows' system characteristics, we argue that the underlying *design* of our economic system must be altered to serve as a leverage point. Nonfinancial impacts, positive or negative, should

be considered in any financial decision to assess both financial and environmental/social risks adequately. The environmental performance of commercial borrowers, for instance, should be part of the credit risk assessment in commercial lending. Environmental and social risk should be considered in project finance, and social and environmental criteria should be part of all investment decisions. Though an increasing number of financial industry participants integrate these nonfinancial criteria in their decision making (Weber, Diaz, & Schwegler, 2014), their integration is often rather a nice-to-have than mandatory (Weber & Feltmate, 2016).

The transition to a low-carbon economy requires new or deeply transformed financial institutions and business models able to foster sustainable and regenerative functioning to support the flourishing of life on Earth. Thus, the *parameters* of the system must be addressed. The financial system plays a very important role in the transition to a sustainable low-carbon economy since it allocates funds, administers portfolios, and manages risks. The decisions of financial sector agents can both reduce or exacerbate climate change problems or can support a more sustainable economy. This relates to the *intent* system characteristic.

Calderon and Stern (2014) suggest that it would be necessary to invest between 1% and 4% of the gross world product (i.e., the combined GDP of all nations) to limit carbon emissions to a level whereby temperatures rise by less than 2°C on average, in an almost *status quo* scenario. The most important investments are needed on infrastructure such as electricity generation, transportation, industry, and buildings because they are the main sources of carbon emissions (Meltzer, 2016). Public and private funds are required to finance a low-carbon economy in developed and developing countries.

However, low-carbon projects face some challenges that need to be addressed by policymakers to facilitate the transition toward a more sustainable and resilient economy (Boissinot, Huber, & Lame, 2015; Campiglio, 2014). Under a low-cost emission scenario, low-carbon projects have long-term payback, which is not always attractive for private financial agents focusing on short-term risk-return profiles (the tension between economizing and ecologizing values; Frederick, 2012). Also, ongoing fossil fuel subsidies, political instability in some countries, regulatory barriers, and fiscal budgetary constraints are threats for the execution of low-carbon projects, especially those related to renewable energies (Renewable Energy Policy Network for the 21st Century, 2016). The parameters of the system can be altered through public policy interventions by creating incentives and inducing synergies to monetize positive externalities derived from low-carbon projects. Supportive public policies are key to reduce the cost of alternative sources of energy and continue making them more competitive in comparison with fossil fuels. Without internalizing the costs of carbon emissions there will not be a market for low-carbon economy finance.

Furthermore, financial players and financial markets should avoid the tragedy of the horizon (Carney, 2015). Often financial returns are only assessed from a short-term view. Hence, for instance, integrating climate-related financial risks, such as stranded assets is often seen as unnecessary because investments and loans are rather short-term. Using longer term predictions or scenarios, however, will help financial markets assess long-term risks and will help them avoid being exposed to these risks in the future. Additionally, it will help the financial industry to discuss these long-term risks with their borrowers and investees, and consequently, contribute to climate change mitigation.

Private investments are focused more on financing mitigation initiatives than adaptation ones. The majority of investments are raised and spent domestically, which means that countries are concentrated in financing national policies to meet or be closer to national goals. To fill the policy gaps in the transition to a low-carbon economy, it is necessary that governments, central banks, the financial sector (e.g., banks, the securities markets, institutional investors, and rating agencies), and the real economy sector work together. Thus, the *feedback* system characteristic must be addressed as well. Next, we present some suggestions regarding the role of each relevant stakeholder for the promotion of sustainability and provide some examples of banks and businesses positioning themselves to succeed in the low-carbon economy. Implicit in this discussion

are the interactions between the system elements and stakeholder groups for affecting the internal dynamics of the system.

Normative stakeholder theory advanced by Donaldson and Preston (1995) contends that under this model, managers are obligated to manage the firm's stakeholders by *balancing* their interests. While no one stakeholder is supposed to be harmed, each relationship is to be managed based on conflicting needs. Among these stakeholder relationships to be managed is the natural environment. Starik (1995) first introduced the argument that the nonhuman natural environment warrants stakeholder status and thus should be included in the stakeholder map for strategic management. While this was a major step forward for the inclusion of sustainability issues in a stakeholder model of the firm, the "environment-as-stakeholder" solution has serious shortcomings in the protection of the environment and the long-term state of nature. It relegates sustainability issues to the same level as all other stakeholder claims. The natural environment becomes merely another contestant that needs to be balanced among a host of other competing demands. This approach does not change the fundamental moral obligations of the firm toward the natural environment. What weakens the environment further is the fact that it has no direct voice for promoting sustainability issues (Starik, 1995). From a fairness perspective, the natural environment cannot qualify as a real stakeholder because it does not voluntarily enter into a "cooperative scheme" with the organization (Phillips & Reichart, 2000).

Adequate and articulated public policies are a prerequisite for economy decarbonization to provide clear and credible signals and incentives to the private sector. Public policies and regulations in the form of cap-and-trade schemes, carbon taxes, renewable energy subsidies, climate change investment frameworks, and withdrawing support for carbon intensive projects are very important to change investment decisions in the short-term and redirect investment flows to climate change mitigation and resilience.

Campiglio (2014) proposes additional public policies not based on carbon prices to promote low-carbon investments. These public policies involve central banks. The central bank's main mandate is to conduct monetary policy to achieve low and stable inflation and help manage economic fluctuations to promote stability for the financial sector. Some authors think that changes in bank regulations could have a positive impact on access to finance for low-carbon sectors. For example, reducing liquidity and stock of assets constrains, reserve ratio requirements, or risk-weighted capital ratios could favor low-carbon investments characterized by long-term horizons, low liquidity, and risky profiles.

Development banks are also very important players because they provide credit on more favorable conditions than commercial banks and offer technical assistance to help borrowers during the implementation phase of their projects. Some of them have specific lending programs and risk management instruments for renewable energy, energy efficiency, and environmental activities and have been the main promoters of green bonds. For development banks, it is important to continue working in a coordinated way with national governments, develop portfolio targets to reduce carbon emissions in their lending, measure the carbon print of their portfolios, and report and adequately manage climate change risks as they relate to lending, technical assistance, and third-party involvement.

Similarly, national securities commissions should develop standards for the incorporation of nonfinancial information in stock exchange listing rules and include sustainability in the fiduciary duties of market participants to provide important incentives for long-term considerations through the investment chain (Aviva, 2014; Schoenmaker & Tilburg, 2016).

Despite important advances in the financial sector's involvement in climate change, to keep going forward it would be helpful for financial agents to continue developing climate change strategies to manage risks and take advantage of opportunities. For instance, commercial and investment banks could expand climate change considerations to all asset classes by measuring the carbon footprint of all portfolios and loans, assessing portfolio exposures to stranded assets, and stress test their products in terms of credit risk and revenue flows. They could also develop long-term strategies for climate change, including metrics and tools for impact measurement and aligning internal policies with a climate change mind set. There are opportunities to finance,

underwrite, and invest in new low-carbon options and develop climate-related markets and services for institutional and individual investors such as weather derivatives, emission trading services, and climate change consulting services (Boston Common, 2014).

Rating and research agencies can also play an important role in providing key information to companies, investors, and financial institutions to define strategies, make better investment decisions, and manage risks associated with climate change. Big data and predictive analytics can facilitate a more comprehensive understanding of climate change challenges and opportunities. Investing in data and forecasting capabilities and getting information from other agents (e.g., meteorological organizations, environmental research centers, and energy researchers) is fundamental to enable rating and research agencies to offer more accurate analyses and recommendations. Specialized indices for climate change investments are required.

For insurance companies, climate change has a double impact in terms of increasing costs from claims derived from more frequent and severe disasters and portfolio exposure (especially for investments in carbon-intensive industries). Thus, risk assessments and the development of innovative insurance products are crucial for adapting to climate change challenges and opportunities (Miller & Swann, 2017). Finally, for financial agents it is important to report and use sustainability-oriented accounting standards, which accurately disclose material information to stakeholders. One example of these standards is the system of the Sustainability Accounting Standards Board.

Investment with sustainability in mind has several distinct strategies which investors have pursued in the past. Krosinsky and Purdom (2017) call these strategies “The 7 Tribes of Sustainable Investing” and argue that they include (1) values first, or ethical investing, (2) value first investing using a blend of ESG (environmental, social, and governance) and financial processes, (3) impact or community investing, (4) thematic investments across asset classes, (5) other ESG-oriented processes including using filters, (6) shareholder engagement and advocacy as well as, (7) minimum standards. Each of these “tribes” bears further scrutiny, and various asset owners can deploy one or more of these distinct strategies and has done so to varying effect.

Studies show that 21 trillion USD of investment, or roughly 5% of the Value of Everything (UNEP Inquiry, 2015), has some involvement in these seven strategies, which means that 95% does not. Therefore, sustainability within investing remains a niche strategy. This is even clearer when considering that two thirds of this 21 trillion USD remains deployed in older, negative screening strategies, which have often underperformed benchmarks. Such underperformance leads many to believe that they have to leave returns “on the table” and wonder if bringing in ESG considerations is a breach of fiduciary duty. In contrast, value first fund managers have often outperformed (Krosinsky & Purdom, 2017; Krosinsky & Robins, 2008; Krosinsky, Robins, & Viederman, 2011), including Generation Investment Management, and more recently Parnassus Investments, who now manage 21.6 billion USD. This is the largest amount of assets under management ever by a fund manager with ESG considerations as a primary investment strategy and includes their Parnassus Endeavor fund. This fund merely looks at the “best companies to work for” and is the #1 Large Growth fund in the United States regardless of sustainability considerations over the past 1, 3, 5, and 10 years. It also happens to be a fossil fuel–producer free fund, originally as an outcome of its investment process, showing that negative screening does not always have a negative effect on returns, even if it often has been historically.

Of the other “7 tribes,” impact investing is rising but remains a niche for purpose, thematic investing. It has had some success but also financial challenges, while other ESG integration strategies, including engagement, continue to grow in interest and relevance for *feedbacks*. However, we see that this perhaps has the most potential for use as a minimum standard. The Equator Principles would be an early example of this concept, and norms-based screening against the UN principles remains a practice in Europe. As such, minimum ESG standards, especially in this age of low-fee, passive investments, holds much future promise, especially in a world full of systemic challenges. This affects the goals of the system (*intent*) as well as the *feedback* processes of the system.

## Toward a Modification of Stakeholder Theory

Stakeholder theory is the dominant theory in the current business management literature when investigating questions of why and how firms (should) address social and/or environmental issues. A stakeholder is defined as “any individual or group that affects or is affected by the achievement of the organization’s objectives” (Freeman, 1984, p. 46). Without the support of these stakeholders, a business firm risks its own survival.

We suggest the dialogue about what an organization is, and how it is strategically managed, needs to take place at the planetary level of analysis. Reducing the natural environment to one among many competing stakeholders of organizations binds managers to a short-term, narrow frame. What is needed is a new way of promoting the natural environment and the associated sustainability issues to the forefront of how firms are defined and managed. This involves revising the *intent* of the financial system. A revision of how the relationships between organizations and their stakeholders has to be re-envisioned to change the frame away from organizations as the focal point, to shift toward planetary sustainability as the new organizing principle. Thus, it is also desirable to revisit the *feedbacks* or interactions among the stakeholder network in addition to the underpinning values and goals of the system.

Sustainability needs to become the focus of concern for *all* stakeholder relationships with the organization. One of the main challenges for this paradigm change is getting stakeholders to work together toward mutually shared goals (Horisch, Freeman, & Schaltegger, 2014). The interactions (feedbacks) among the stakeholders and with organizations must operate at the local, national, and global levels with a revised focus on future generations, not just the current relationships (Dodson, Azevedo, Mohiuddin, Defavari, & Abrahão, 2015). This calls for a new understanding of what counts in the determination of the total performance of a business. Total performance cannot be measured only by immediate profits, but rather by long-term value created.

Stakeholder theory needs a revision of its underlying institutional logics. New logics or world-views related to *intent*, are necessary to reconnect individuals with nature and re-emphasize their ecological values. A revised set of institutional logics should involve a reformulated definition of stakeholder to include nonhuman organisms and the planet as a whole (Zsolnai, 2006). Dodson et al. (2015) propose a new definition of stakeholder that includes the natural environment and future generations. This simple reframing of stakeholder definition is a promising first step toward revising the institutional logic of stakeholder theory. The fields of economics, finance, and management must go further, however. The principles governing stakeholder relationships must also reflect a concern for long-term ecological well-being. Additionally, the social and financial measures assessing the quality of stakeholder relationships should *all* be based on an underlying long-term, ecological logic to build a planetary stakeholder theory.

A revised stakeholder management approach can lead to Abson et al.’s (2017) idea of leverage, but it needs to build in capacity for firms to transformationally adapt over time (Verbeke & Tung, 2013). This involves giving prominence to sustainability issues in the long-term the management of *each and every* relationship with individual stakeholders. Orts and Strudler (2002) advocate making the regard for nature an underlying condition for organizations. Thus, environmental management “must include an appreciation of ethical value of the natural environment, including esthetic, cultural, and historical value” (p. 227).

Future research in stakeholder management could focus on developing a unifying concept or institutional logic that systematically aligns the goals of all organizational stakeholders around a concern for future generations and sustainability. This could help organizations create long-term value that contributes to planetary social welfare (Windsor, 2017). The first step in this would be revising the definition of value creation. This becomes a new “intent” system characteristic. The creation of shared value needs to go beyond mere economic value added and includes concerns for quality of life and planetary well-being. Social welfare needs to encompass the “economic, social, physical, and spiritual health of a society as a whole” (Jones et al., 2016, p. 221). Thus, we call on economics, finance, and

management researchers to move beyond the current paradigm and include sustainability issues in the evaluation of the quality of every stakeholder relationship with the firm, and between firms. This should occur across the entire framework of corporate financial, social, and environmental responsibility for implementing Abson et al.'s (2017) leverage points for sustainability transformation:

1. The *definition* of stakeholder should be *revised* to emphasize the ecological prominence for the well-being of future generations.
2. The *principles* of stakeholder management should be *expanded* to include sustainability values across all organizational stakeholders.
3. The underlying *institutional logics* of what constitutes the stakeholder theory of the firm should be *reframed* so managers envision the goals and purpose of the organization to be about long-term value creation for human and nonhuman entities.
4. The *evaluation* of the quality of stakeholder relationships should be *remeasured* so that sustainability be part of the function of each stakeholder interaction with the firm.

## Conclusions and Future Directions

The “Anthropocene”—the great acceleration of social and human impacts on Earth systems—is testing some of the life-supporting boundaries of the planet. Economic systems underlie most of the social and human impacts on Earth. In this article, we examine the need for designing financial systems to be mindful of planetary boundaries. This requires redefining the proper role of organizations in society. Researchers, policymakers, and practitioners should collaborate and use the latest results of natural, social, and behavioral sciences in parallel with traditional knowledge and contemporary arts to capture the interconnectedness of life and human organizational activities on Earth.

What does this imply for finance and business practice? First, research must accept limits to economic growth on an ecologically finite planet and fully integrate these considerations into management and financial models. If the limits of growth are not internalized in financial modeling, for instance, the models will not be aligned with sustainable development. Research is needed that integrates environmental and sustainability risks as parts of financial modeling.

Second, instead of focusing on the business case for sustainability, that is, using those aspects of sustainability that can create additional financial returns, we have to focus on the *sustainability case for business and finance*. The latter centers on how businesses and finance can address sustainable development. Without focusing on the main sustainability problems, businesses and the financial sector will not be able to contribute to sustainable development. We have learned from the last financial crisis that ignoring systemic societal changes can lead to a collapse of the financial system. The same might happen if finance continues to ignore climate change and the transition to a low-carbon economy.

Third, a tight link must be made between financial economy and the biophysical economy so that we can understand the biophysical impacts (on food, water, energy, oceans, natural assets, etc.) of “economic and financial” decisions (such as interest rates, monetary policies, investment portfolios, etc.). One approach to guide this academic research could be to address the UN Sustainable Development Goals and to analyze how financial and management models are able to address the 17 goals over which there is global consensus.

Fourth, financial markets should avoid, as much as possible, any tragedies looming on the horizon and start to integrate long-term risks into their risk management practices. If long-term risks such as climate change are not considered and managed today, the financial markets will be exposed to them in the future. Financial assets are at risk of being radically devalued because of extreme weather events or other climate change–related risks.

Fifth, financial decision makers should stop basing their decisions on past performance and instead focus on possible and plausible future developments. Current financial models base their predictions purely on extrapolating past developments. This is unreasonable given all of the

social and environmental changes to be expected for the future. Instead, financial decisions should be based on future scenarios that include potentially radical and disruptive changes.

Sixth, fiduciary duty (Richardson, 2013; Waitzer & Sarro, 2012), an important regulation for institutional investing, has to be broadened. Currently, and despite the 2005 published Freshfields Report, many asset managers still regard fiduciary duty as a concept for only addressing financial returns for beneficiaries. However, it should also address the fiduciary duty to achieve the financial returns without violating social, environmental, and sustainability aspects. Maximizing the financial returns of pension funds through financing climate change and environmental degradations should not be considered as activities that are in line with the funds' fiduciary duties.

Finally, policies and regulations that align financial markets with societal and environmental goals such as the Sustainable Development Goals or Climate Goals should be implemented. Financial markets and the financial industry can be powerful allies with regard to addressing these goals. Domestic central bank regulations or international financial market guidelines could play an important role in developing the sustainability case for finance.

The Anthropocene represents a shift in the geophysical reality of the planet (Hoffman & Jennings, 2015). The crisis we have caused has to be addressed by stakeholders in all segments of global society, including those in finance and management. Our article is an attempt to highlight and emphasize this need for work going forward.

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