



Environmental finance: A research agenda for interdisciplinary finance research



Martina K. Linnenluecke^a, Tom Smith^{a,*}, Brent McKnight^b

^a UQ Business School, The University of Queensland, St Lucia, QLD 4072, Australia

^b McMaster University, 1280 Main Street West, Hamilton, ON, L8S 4M4, Canada

ARTICLE INFO

Article history:

Received 12 July 2016

Accepted 13 July 2016

Available online 25 July 2016

Keywords:

Environmental finance

Asset impairment

Adaptation to climate change

Volatility

Real options

ABSTRACT

Environmental Finance is an emerging and rapidly growing interdisciplinary field of research, concerned with the financial implications of environmental change for industries and firms, and the need to transition to a sustainable economy. The field brings together research in finance and the natural sciences to develop financial and market solutions to some of humanity's most pressing concerns; namely, climate change and shifts in other Earth system processes. Firms need to adjust to these environmental changes, which offer many opportunities for wealth and growth. There are various historical examples of technological breakthroughs over the history of modern markets that have driven growth and wealth; such as, railways, electricity, automobiles, radio, micro-electronics, personal computers, biotechnology, and the internet. The 2015 Paris Climate Agreement has given the green light to clean technology firms worldwide to start commercializing their patents. This will create the next technological breakthrough – a clean tech revolution that will drive growth and wealth in the same way as earlier breakthroughs. This article summarizes the state of this newly formed interdisciplinary field and sets out avenues for future research.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

Recent scientific findings have generated significant concern about the level of global environmental change driven by direct human-induced impacts on ecological systems. In 2009, researchers introduced a planetary boundaries framework (Rockström et al., 2009) which defines the limits (or boundaries) of human modification of critical Earth-system processes. These boundaries cannot be transgressed if we are to retain a “safe operating space” for global societal development. Fig. 1 illustrates these Earth-system processes: climate change, biosphere integrity, land-system change, freshwater use, biochemical flows (release of phosphorous and nitrogen into the atmosphere), ocean acidification, atmospheric aerosol loading, stratospheric ozone depletion, and the introduction of novel entities into the environment (new substances, new forms of existing substances, and modified life forms) (Steffen et al., 2015). As more and more of these system boundaries are transgressed, society faces greater risks of adverse environmental change, possibly on a global scale. The consequences of rapidly increasing human pressure on the planet are already visible and include observed changes in regional weather extremes and ecosystem degradation due to chemical and fertilizer pollution. Other changes have started to manifest globally, such as more intense, frequent, and

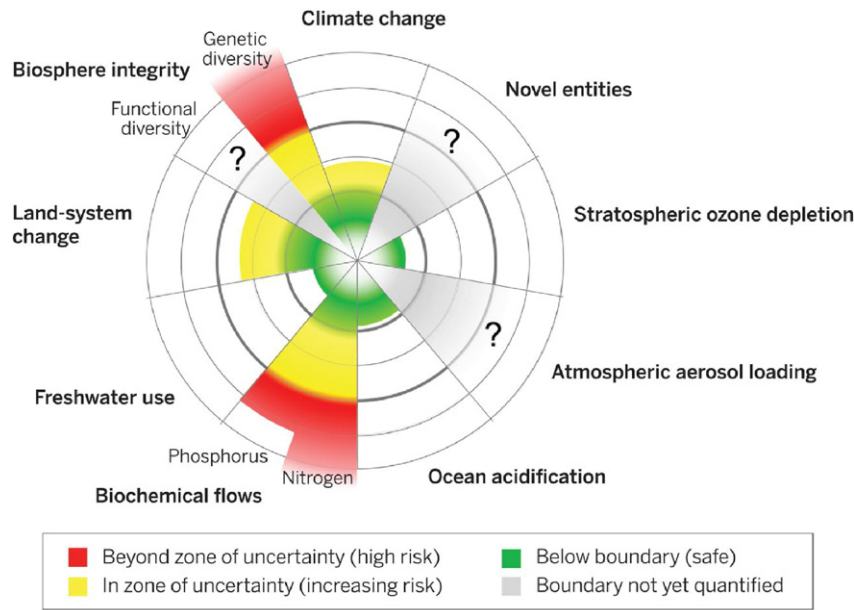
longer-lasting heat waves (Perkins et al., 2012). The economic impacts are expected to be significant (Stern, 2015).

The potential shift from desirable to undesirable states for human development (possibly even at a global scale) points to the urgent case for societal action, especially in less developed countries where adaptive capacity is low. The risks have been recognized as real—an international architecture has been established to provide climate adaptation and mitigation funding to developing countries and encourage technological knowledge transfer (e.g., Cui and Gui, 2015; Eyckmans et al., 2016; Locatelli et al., 2016; Markandya et al., 2015). The key agents behind the accelerated pace of change are not just individual humans and their consumption patterns, but organized human industrial activity in form of the human enterprise, which significantly expanded after the Second World War. Since 1950, the world's population doubled to reach over 6 billion people by the end of the 20th century. Over the same period, global economic activity increased by more than fifteenfold (Steffen et al., 2007). Industrialization has brought great benefit to many, especially in developed economies. This phase is sometimes known as “The Great Acceleration” (Steffen et al., 2007) and is characterized by rapid increases in total real GDP, foreign direct investment, resource consumption, and fossil fuel use. At the same time, humans have changed the world's ecosystems more rapidly and extensively than ever before.

The human enterprise now dominates much of modern life; however, a large proportion of the world's population continues to live in absolute poverty and environmental degradation has reached planetary

* Corresponding author.

E-mail addresses: m.linnenluecke@business.uq.edu.au (M.K. Linnenluecke), t.smith@business.uq.edu.au (T. Smith), bmcknight@mcmaster.ca (B. McKnight).



Source: Steffen et al. (2015)

Fig. 1. Planetary boundaries. Source: Steffen et al. (2015).

scales. The Great Acceleration has reached a critical point, and serious planetary-scale threats need to be dealt with proactively. And the case for action is not just a moral imperative to preserve the integrity of Earth's systems for future generations. More immediately, firms and industries face significant challenges (Whiteman et al., 2013). The severity of global environmental change suggests drastic responses, both in terms of mitigation (i.e., reducing impacts on the environment) and adaptation (i.e., adjusting to the impacts of environmental change). Environmental Finance is an emerging and rapidly growing interdisciplinary field of research concerned with the financial implications of environmental change for industries and firms, and the need to transition to a sustainable economy where humanity lives within the boundaries of our Earth system (Linnenluecke et al., 2016).

This paper sets out the research agenda to accompany this transition. Firms need to adjust to these environmental changes, which do not present significant threats but also many opportunities. Hong et al. (2008) identify many historical examples of technological breakthroughs that have driven growth and wealth; such as railways, electricity, automobiles, radio, microelectronics, personal computers, biotechnology, and the internet. The 2015 Paris Climate Agreement has given the green light to firms worldwide to start commercializing their clean technology patents. Indeed, there are already over 500,000 clean technology patents worldwide, most held by firms in Europe, China, and the US. Clean technologies cover a range of solutions from renewable generation and smart grid technologies through green chemistry and water treatment. This will create the next technological breakthrough – a clean tech revolution that will drive growth and wealth in the same way earlier breakthroughs.

2. Literature review

Throughout the history of human enterprise, industrial activity has largely been conducted with little thought to potential impacts on the natural environment. Since the Industrial Revolution, a growing manufacturing base has consumed increasing environmental resource inputs; however, society has only recently begun to consider the full impact of (aggregate) industry action on global environmental change. It is only in more recent times that we have admitted the possibility that a

changed environment may have consequences for firms and industries operating in vulnerable sectors (Winn and Kirchgeorg, 2005). This is despite the fact that nineteenth century economists had already recognized that unsustainable levels of resource consumption could lead to adverse environmental changes and associated negative outcomes for society (Malthus, 1878; Marsh, 1864; Mill, 1848). Indigenous knowledge about the negative impacts of human activity on the environment dates back even further and recognizes the importance of self-regulatory mechanisms once a society is faced with resource limitations (Gadgil et al., 1993).

2.1. The impact of economic activity on the environment

Systematic efforts to identify the impacts of economic activity on the environment began in the 1960s when global ecological problems first became highly visible. Carson (1962) raised public awareness about the severity of environmental degradation and is often cited as a catalyst for the environmental movement of the 1960s and 1970s. Carson's work detailed how agrochemicals (in particular, pesticides such as DDT) contaminated the food chain and compromised animal and human health. Simultaneously, scientific research began to draw attention to other significant social and environmental problems, such as rapid population growth (Ehrlich, 1968), species extinction (Ehrlich and Ehrlich, 1981; Holdren and Ehrlich, 1974), pollution, and acid rain (Likens and Bormann, 1974). Scholars also began asking how those negatively affected by these problems should be compensated (Coase, 1960; Dales, 1968). The extent of these problems not only triggered the environmental movement, but was recognized at an intergovernmental level at the 1972 United Nations Conference on the Human Environment. The aim of the conference was to quantify global human impact on the environment and to define principles for guiding environmental preservation efforts. One of the most important outcomes of the conference was the establishment of the United Nations Environmental Programme (UNEP) in 1973.

Corporations were generally regarded as the actors with the reach, resource access, technology, and motivation to help solve environmental (and social) problems (Hart, 1997; Hawken, 1993); albeit these issues were recognized to be beyond the scope of any individual firm,

Download English Version:

<https://daneshyari.com/en/article/5053281>

Download Persian Version:

<https://daneshyari.com/article/5053281>

[Daneshyari.com](https://daneshyari.com)