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Abstract

This working paper examines key barriers to business sustainability discussed at a multidisciplinary conference held at the Harvard Business School in 2018. Drawing on perspectives from both the historical and business literatures, speakers debated the historical success and future opportunities for voluntary business actions to advance sustainability. Roadblocks include misaligned incentives, missing institutions, inertia of economic systems, and the concept of sustainability itself. It appears that overcoming these roadblocks will require systematic interventions and alternative normative concepts.

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Awareness of the potential for business to have far-reaching destructive impact on the natural environment goes back to the beginning of the Industrial Revolution.¹ The first regulatory and industry responses to environmental damage have been traced back to the middle of the nineteenth century in Western Europe and the United States.² In the 1960s academic economists converged on the classic analysis of the causes of and solution to environmental damage.³ They contended that misalignment between private and public interests caused unwanted harm, and government regulation was needed to realign conflicting incentives. This “road” to environmental protection took many forms, such as constraints on water and air pollution, restrictions on the disposal of chemical waste, limits on the destruction of habitat, and protection of vulnerable species.⁴ After these regulations took effect, environmental progress occurred on many fronts, but in some countries, including the United States and the United Kingdom, the regulatory approach remained highly controversial.⁵ Proponents of economic growth complained of the friction caused by regulation, and advocates for the environment bemoaned continuing damage.⁶

In the mid-1990s, advocates for a “new road” to environmental protection appeared – one that prioritized voluntary business action and the harnessing of opportunities for private profit. This new road promised a rapid, pain-free way of protecting and sustaining the natural

environment.⁷ Numerous businesses advocated for the new approach, and many engaged in visible and effective voluntary activities. Some authorities conjectured that a new and sustainable mode of capitalism was appearing.⁸ Certainly, the sustainability concept appeared to fit more harmoniously with this new road, as it ostensibly overbridged the inherent tensions between environmental issues and economic growth.

Yet, voluntary business action has not kept pace with the rate of environmental damage.⁹ As a result, questions have been raised about the proposed “new road”. What barriers block its use? What can firms do to overcome these barriers? What can be learned from the history of firm experience, and how can this be translated into new approaches to environmental protection? To begin answering these questions, a group of scholars organized a conference at the Harvard Business School in June 2018. It included experts from a number of disciplines: history, economics, sociology, and management scholars. This article, written by several of the presenters, builds on the contributions of all the participants at the event.

The Logic and History of a New Road to Environmental Protection

The old road to environmental protection was, and is, constructed with the ideas of Arthur Cecil Pigou, who noted that when economic actors do not bear the full costs of their actions, they do not use resources efficiently or make decisions that are collectively beneficial.¹⁰ He called these unconsidered costs externalities, and proposed a number of governmental interventions that would return them to the actor’s consideration. Governments were responsible for establishing frameworks of law to induce firms to internalize their costs by administering taxes, allocating permits, or technology that must be employed. Business managers and owners were only asked to consider their changed incentives and adjust their behavior accordingly.¹¹

In the late 1980s and the early 1990s, scholars began to assert that companies could dramatically reverse environmental degradation through voluntary action. Diverging from conventional theory, the American physicist and environmental scientist Amory Lovins proposed that environmental problems, such as climate change, could be solved for “fun and profit”.¹² Business leaders also supported the new direction. Paul Hawken, an entrepreneur pioneering organic food and founder of *Smith and Hawken*, argued in his bestseller *The Ecology of Commerce* (1993), that business was the only institution powerful enough to foster the necessary changes needed to avoid a global ecological crisis.¹³ John Elkington, a British author and management consultant, coined in 1994 the Triple Bottom Line (TBL), also referred to as 3PL (Profits, People, Planet) aimed to be a measure of the economic, social and environmental performance of a corporation, which would push forward a transformation of capitalism.¹⁴ The CEO driven World Business Council for Sustainable Development (WBCSD) translated the idea of “eco-efficiency” to a workable concept by creating a linkage between environmental performance and the bottom line.¹⁵ Members of the WBCSD then developed plans by which profitable firm action could address major environmental problems.

Advocates for a new, voluntary, road to environmental protection assumed that firms were not operating at their most efficient, leaving many latent opportunities for improvement. This assumption was inspired and supported by reports that environmental regulation, such as the Montreal Protocol, had instigated changes in products and production systems that turned out to be profitable. Firms in many industries reported that efforts designed to reduce pollution were also resulting in unexpected cost savings or quality improvements, so called “win-win” improvements. Consistently, companies such as Dow Chemical and 3M initiated programs to support and reward ideas for pollution reduction, and both claimed to have save millions of

dollars by doing so.¹⁶ Entrepreneurial start-ups like Britain's The Body Shop, the natural beauty retailer, and California-based outdoor company Patagonia, also promoted belief in a greener capitalism based on natural, or at least more environmentally benign, products and lifestyles.¹⁷ Many large corporations, including some large oil companies, publicly asserted a willingness to "walk the talk" about sustainable development.¹⁸

Ideas that firms were, and had been, inefficient and wasteful fit with popular perspectives in North America and Europe.¹⁹ Japanese manufacturers appeared to be able to produce many products at lower cost, and with better quality, than their western rivals. These advantages were attributed to better approaches to waste-reduction and production management.²⁰ Rather than estimate an optimal defect rate, Japanese management focused attention on waste reduction – even well past the point where, in the eyes of their western counterparts, costs seemed to exceed benefits. The obvious market success achieved by Japanese firms appeared to validate beliefs that their approach was the correct one, and that Western firms could profit from waste reduction programs that went well beyond current practice. The idea of voluntary for-profit protection of the natural environment was supported also by broader political ideas of the time. Neo-liberal ideas, endorsed by both US and UK governments, encouraged a belief in the power of the free market to increase efficiency. Governments around the world moved away from central regulation and toward market competition and privatized social services.²¹

By the late 1990s, belief in win-win action had become commonplace and widespread, not the least in large corporations. Businesses published corporate reports detailing their efforts, and business managers of all levels preached the merits of voluntary greening. Despite such enthusiasm, most economists continued to be skeptical of the potential for voluntary environmental protection.²² They agreed with part of the story, that private and public incentives

were sometimes aligned, but they disagreed that these incentives alone were sufficient to allow a new road to environmental protection. Ongoing improvement, they noted, implied a history of systematic managerial failure.²³ If past managers had chosen their actions wisely, no opportunities for voluntary action would exist. Thus, economists argued that any proposal for voluntary action must provide proof that managers had systematically erred in the past.

In search of a logic for historical managerial misjudgment, researchers focused on a possible scarcity of information for decision-making.²⁴ To make effective decisions, managers must evaluate both the costs and benefits of their options. If they lacked such information, they might make sub-optimal choices, and thereby miss opportunities to protect the environment profitably. Scholars argued that such missing information was endemic to environmental issues, and justified their claim by pointing to the dispersed nature of environmental benefits; restrictive organizational structures; and the need for new skills to interpret unfamiliar information about environmental performance.

Evidence of win-win innovations (changes that benefited both the firm and the environment) supported claims that voluntary action could be effective. Andrew King documented “innovation offsets” following water-pollution regulation.²⁵ Stephen J. Decanio and Lee argued that innovation could reduce the use of ozone depleting chemicals.²⁶ Höglund-Isaksson concluded that reductions in nitrous-oxide emissions were accomplished at little or no cost.²⁷ Michael Porter, a strategy professor at the Harvard Business School, suggested that environmental regulation, if it was strict and well designed, could enhance business competitive advantage.²⁸ In doing so, he proposed a way that the old regulatory road and new voluntary one could be merged.²⁹

The idea of a “new road” is not entirely new. In the Progressive Era of the United States, an idea similar to the modern “new road” became widely popular. It too shared an emphasis on ‘eco-efficiency’ although the concept was not yet coined. It proposed that as industrial operations grew more efficient the environment would be protected. For example, in the 1920s, efficient coal use was used as the key selling point for smoke abatement.³⁰ One American engineering periodical proclaimed in 1926 that “Every dollar that goes up in the chimney in smoke is a wasted dollar”.³¹ The 1920s was overall characterized by ideas of business self-regulation, where business was expected to police themselves, and deal with all sorts of social issues.³²

In the early 1900s, US President Theodore Roosevelt, himself a strong conservationist, put the issue of efficiency high on the national agenda.³³ Plant owners looked for efficiency measures that could improve the bottom line. In the mind of the engineers and technical managers in the US petroleum industry, pollution became a short-term problem that would be eliminated by the application of engineering efficiency. As Hugh Gorman has noted, petroleum managers and engineers came to believe that economic incentives to improve efficiency also served long-term efforts to fight pollution.³⁴ In parts of Europe, pollution control became associated with improving the bottom line. For example, managers in the Swedish copper industry shared a view that pollution represented lost profits and poor stakeholder relations, and thus they engaged in voluntary pollution control measures.³⁵ Timothy LeCain reported that attempts to implement win-win strategies in the US copper industry through efficiency measures created new environmental problems. The cost savings made possible by improved efficiency allowed companies to mine farther than before, which caused further disastrous environmental impact. The key abatement technology invented in the 1910s, the electric precipitator, cut plant

emissions considerably, but the use of the technology in an eco-efficient way both retarded the implementation of effective air pollution controls and created an entirely new set of environmental problems.³⁶

Potential problems with the efficiency agenda also have antecedents in this earlier period. Gorman argues that attempts to reduce pollution through increased efficiency resulted in diminishing returns. In the US petroleum industry, it no longer made economic sense to reduce pollution-causing discharges.³⁷ Business had been willing to address pollution problems generally only to the extent where pollution control resulted in a recovery of valuable material or decreased amount of material spent on damage or law suits. The efficiency agenda lacked a way to analyze or solve complex or collective ecological impacts.

Jones has argued that the focus on efficiency also impeded development of substitutes. He noted that early entrepreneurs developed and invented basic technologies in wind and solar power and organic food, but these ventures proved to be painfully difficult to make profitable in competition with cheap fossil fuels. Eventually, it took more than one hundred years for the wind industry to develop and scale, and even then, governmental support was needed to make it happen.³⁸

Roadblocks to the New Voluntary Road to Environmental Protection³⁹

What barriers prevent firms from realizing ways to profit while protecting the environment? Participants in our conference “Understanding and Overcoming Roadblocks to Sustainability”, considered this question. They documented some of the main impediments to action, evaluated the importance of supporting institutions, considered the inertia of social-technical systems, and

debated the inherent capacity of voluntary approaches. Some even questioned whether the ‘new’ voluntary road to environmental protection was headed toward the right objective.

Organizational barriers

Auden Schendler, a long-time environmental activist and author, argued that organizational barriers and budget constraints make even simple changes difficult to accomplish. His book “Getting Green Done” documented some of the challenges he faced in implementing simple improvements, such as installing efficient lighting in the company’s garage and lodge.⁴⁰ He argued that win-win opportunities exist, but that barriers often block their implementation. These difficulties are not caused by foolishness or intransigence, he argued, but by understandable, and possibly unavoidable, conflicting business incentives. Studies of technological opportunities miss these inevitable organizational barriers and frictions, he claimed, and consequently failed to measure the true cost of win-win improvements. Indeed, ignoring such organizational barriers may set up change agents for failure. Speaking of his own experience, he said: “when I went into the corporate sector and I tried to implement win-win solutions, I got machine gunned. It was like coming over the top of a trench.”

Ann-Kristin Bergquist documented barriers to environmental change in the Swedish copper- and pulp and paper industries. She reported that at a first stage (1960s and 70s), the main barrier was the lack of science-based information concerning the cause, scope and effects of emissions. Consequently, organizations focused on developing structures for acquiring environmental knowledge, including R & D. After discrete technological solutions were implemented the nature of the problems changed. In the 1980s, organizational aspects became relatively more important, such as the division of labor and the allocation of local

responsibilities.⁴¹ More recently, a third stage of change has come to the fore. It emphasizes coordination with stakeholders beyond the firm boundary and necessitates new organizational capabilities.⁴²

Missing supportive institutions

Adam Rome argued that accurate and practical measurement of environmental damage, and the institutions that allow it, is a critical determinant of corporate behavior. Based on a deep historical case of the chemical giant DuPont, he argued that it was the creation of a shared information gathering system, the US Toxic Release Inventory (TRI), that sparked the company to take action under the leadership of Edgar S Woolard (CEO from 1989 to 1995).⁴³ Rome argued that institutions for measuring environmental impacts are absolutely necessary for meaningful action: “challenging as it is to measure externalities,...if we can't do it then why don't we just be honest and say, capitalism is inherently unsustainable”.

Hugh Gorman noted that new metrics (such as the TRI) are emerging for a diverse range of environmental impacts – from climate change to habitat destruction.⁴⁴ He warned, however, that such systems often develop slowly: “Systems of environmental governance can take generations to establish, with much of the early effort associated with reaching consensus on what to measure and monitor.” He noted that it is only after a wide variety of actors agree on what is important to monitor and measure that these institutions are able to move on specific policy goals. One of the questions Gorman raised was whether indices ranking the “sustainability” corporations are helpful, and whether the institutions that create and track such metrics are transparent enough to allow external actors to access their meaning and accuracy.

George Serafeim argued that metrics and measurements form the basis for internal organizational decision making and investor decisions, and are therefore decisive in incentivizing change.⁴⁵ He noted that over the past several years, the number of firms that measure and report on their environmental social and governance (ESG) activities and performance has grown considerably, but he noted that these metrics tend to be idiosyncratic and unsuited to comparison across firms. One important roadblock to action, he noted, is caused by a lack of leadership in standardizing new metrics and disclosure standards. As a result, it is difficult to compare the performance of firms in a meaningful way.⁴⁶ He raised concern about the potential for new type of agency problem. Activist agents could manipulate corporate action without regard to the interest of stakeholders.

Megan Epler Wood a practitioner in the formation of the field of ecotourism, noted that private action is now spreading beyond “point source” polluters to other types of business activity.⁴⁷ For example, in the hope that new measures will allow greater awareness of environmental impacts, firms involved in eco-tourism are developing new ways to measure and report the effect of their operations. A problem Wood noted that business active in tourism have created a wide range of environmental impacts, but existing metrics and certification do not measure or report these costs in an understandable way. A key problem is that states and countries have created and adopted certifications that are not comparable, and as a result, consumers have stepped back from certification systems, because they are impossible to interpret, let alone to compare.

Inertia of Human Systems

Participants in the conference pointed out that consequential protection of the natural environment requires fundamental change in energy systems, but doing so requires overcoming the inertia inherent in any complex social-technical system.

Abby Spinak noted that existing systems for local governance were developed to support the electrification of rural North America.⁴⁸ Cooperatives allowed local communities to pool assets for the social good and regulate distribution. Unfortunately, these organizations now pose a barrier to system change, because existing cooperatives prioritize local benefits over system-wide value. She concluded that needed infrastructure improvements, such as new transmission lines for distributed power from wind and solar, can be impeded by the very social system intended to support electrification.

Marten Boon documented the inertia of technical and social systems in the oil industry, and he described how firms deflected public pressure by subsuming it into a vaguer objective.⁴⁹ He illustrated how firms in the oil industry faced significant pressure to change their investments toward lower-carbon energy. Faced with growing social pressure, they began to adapt, but then were “rescued” from needing to change by the emergence of a new popular objective” “sustainability”. Because the term “sustainability” is both broad and ill defined, oil companies could substitute action in other areas for protection of the environment. They could, for example, argue they were advancing sustainability by providing other social benefits – such as employment. Armed with new metrics and glossy brochures, oil companies could, and did, advocate for public policy that sustained the carbon path.

Martha Crawford argued that the complicated interconnections of energy infrastructures imply that governmental policy is the only effective tool. She reported that the European regulation, particularly the European Union Emissions Trading System, has resulted in

significant reductions in CO₂ emissions, but that these improvements have not been without pain. The cost of new generation and transmissions has been passed on to customers and some major utilities have seen their market value fall by more than 60 percent.⁵⁰

The capacity of the new road

Many of the participants in the conference expressed skepticism in the capacity of the new, voluntary, road to environmental protection, and doubted that it could allow meaningful change. Rome, Schendler, Bergquist, and King all emphasized the importance of continuing misalignments between private business incentives and environmental protection. Bergquist argued that the continuing, and structural problem of externalities begs the question of the role of governments, and she argued that governmental policy has proven to be very important in inducing substantive change, and often explains why firms based in some countries and regions have made more progress than others. She was critical about how the concept of sustainability has been translated into business practice and argued that it has delayed necessary reorientations, largely because of how the concept has been defined and used in different contexts.

Adam Rome argued that effect measurement and regulation of environmental damage was a necessary condition for meaningful action, but it was insufficient unless coupled with regulatory controls. He noted that DuPont's attempts at voluntary action were strongly supported throughout the company, yet the company nevertheless encountered difficulties "again and again, and in all sorts of ways". Chief among these problems was the relentless pressure from competitors who produced dirtier but less expensive products. Indeed, Rome expressed skepticism that such competition ever could be overcome in the absence of regulation. In his words, the failure to account for true costs is "basic, basic, basic", and even if it might be

tempting to talk about other important issues, we need to remind ourselves; “it’s the externalities stupid”.

Andrew King echoing some of Auden Schendler’s warnings, argued that the hope for a new voluntary road had forestalled progress down the old regulatory one.⁵¹ By promising simple, costless solutions, the new road had made people less willing to accept feasible, but imperfect, solutions. He argued that the new voluntary road to environmental protection had itself become a barrier to the old regulatory one, because hope for the painless alternative it implied had forestalled effective regulation.

Not all participants in the conference were so skeptical. Sarah Keohane Williamson, CEO of FCTL (Focusing Capital Long Term) talked about the potential for new financial structures to encourage longer-term thinking. Short-termism in investment markets are widely seen as a major obstacle for voluntary action to take long-term action to protect the environment, as it basically discourages companies to peruse long-term strategies. She said that progress is being made in this area, where asset owners, asset managers and corporations are working together to come up with practical ways to elongate the time frames in capital markets. FCLT now has a consortium of about the forty of the largest players worldwide, and one way to work in this area is to create contracts between assets holders, assets managers and corporations that are more long term.

Cheryl Smith of Trillium Investments – a firm that has been practicing sustainable and responsible investing since its founding in 1982 – stressed that assets owners and assets managers need to understand the ways in which corporations are externalizing their costs. Smith noted that that there has been, and still is, a strong incentive for corporations to externalize them, and the question is simply how to deal with that. The way Trillium and its founder Johan Bavaria

have worked, is to take the perspective of the owner, and think of how to get the owner's perspective aligned with the managers perspective and how to get the managers perspective aligned with the society as whole, and win the externalities. "What actually works is engaging with corporations, what actually works is persistence".

Shawn Cole argued that "impact investing" could potentially increase private incentives to protect the environment.⁵² Cole noted that there seems to be great opportunity for significantly more capital to move in this area, and the key driver of movement seems to be demographic trends. At the same time, he noted, there remains a large knowledge gap. The core academic finance community has until very recently showed limited interest in the issue and as a result, there is a lack of hard evidence concerning the conditions for effective progress. Nevertheless, he argued, impact investing should be approached as a possible route to meaningful improvements.

The wrong destination?

Scholars at the conference also debated whether the new road might be headed in the wrong direction. John Ehrenfeld, argued that the current objectives are polluted by misguided economic analysis.⁵³ He challenged the logic of welfare equilibria based on self-interest and argued that it is antithetical to sustainability. Ehrenfeld referred to sustainability as a co-complex system whose analysis is beyond our present ability because we lack the methods, the patience, and the systemic vision needed to understand it. We only know that it is headed in the wrong direction, implying that sustaining it is the wrong course of action. How shall we determine a new direction for action? Ehrenfeld suggested we begin by finding the right words to describe and analyze our world. For example, he proposed selecting *flourishing* as an alternative

normative concept because it better captures our real objective: the desire to move beyond mere maintenance of current conditions.⁵⁴ This conceptual substitution would, he argued, move people away from efficiency and toward caring and other emotional responses.

Otto Scharmer agreed with Ehrenfeld that new modes of human cognition and interaction are needed and argued for a radical transformation of capitalism.⁵⁵ Scharmer conceptualized this transformation as a journey from the existing ego-system awareness, which focus on the well-being of yourself, to an eco-system, which focuses on the well-being of a whole. Scharmer proposed a model for how the transformation might occur. He began by diagnosing what he said was the root cause of the problem: that we lack the quality of thinking, including our quality of economic thought, to design our social institutions. He proposed a set of stages through which humankind needed to progress if progress was to be made. In simple terms, the transformation would require a U-shaped journey that would start with understanding based on an opening of minds, then hearts, and finally will.⁵⁶ It would then proceed back through this process as changes were implemented. The transformation would require supporting infrastructures, including new governance systems and metrics.⁵⁷

Not surprisingly, in a multidisciplinary conference with historians, business academics and professionals, identification of a passable future road differed. Yet, many of the participants agreed the original objective of the new road based on voluntary action had become diffuse, making progress very difficult.

Summary and concluding remarks

Economic development has enabled improvement in the human condition in every part of the world: people are healthier, more educated, better housed, and better fed than ever before. These

remarkable socioeconomic improvements have been accomplished at a cost; a deteriorating global environment with climate change threatening the human civilization as we know it.⁵⁸ The environmental historian Donald Worster have noted that the environmentalism that emerged in the 1960s and 1970s had a clear destination and obvious route. The goal in the 1970s was to save the living world around us, including humans from destruction by our “technology, population and appetites”. But the painful difficulties to make the needed turn in the 1970s, and head in a diametrically opposite direction, made people look at a less strenuous road. By the mid-1980s, the new road called sustainable development emerged.⁵⁹ With a strong belief in voluntary action, sustainability quickly became business mainstream in 1990s and hopes were raised that the business community would take a leadership in reshaping capitalism to protect the environment. Thousands of corporate sustainability reports have been produced since then, and a voluminous literature about sustainability in management journals, if not their business history counterparts. Despite several decades of efforts from the business community and the academic community environmental fundamentals have continued to deteriorate sharply.

The conference debated critical questions about existing roadblocks, or whether the road is even passable. It was concluded that three decades of writers asserting that win-win solutions are possible, have made it all seem too easy to achieve results. Sustainability has become reconciled with success in generating profits, rather than focusing on preventing further deterioration of the natural environment. The imprecision of sustainability discourse has led businesses to understand the very definition and metrics of “sustainable business” as a competitive space.

It was reported at the conference that trend among firms to adopt new metrics has been strong and is not likely to slow down. The trend is the same in the capital markets; a growing

interest among investors engage in socially responsible- and impact investing. Yet, a major roadblock today is the absence of a common set of sustainability metrics, which makes it very difficult for investors to compare and discriminate between corporations, and understand what is being measured. Great uncertainty remains around what impact of new metrics will have in changing business behavior and ultimately environmental outcomes in the long run. More worrisome is the risk that even perfect new metrics, widely adopted, would incorrectly focus management attention on operational greening—reducing pollution, and carbon footprint, at the firm level, instead of on the threat that global climate change presents to entire economies. In a world headed towards warming beyond 2 degrees Celcius, whether Patagonia or Dupont cuts emission 20 percent, 30 percent, or even to zero, has little, or no bearing on sustainability at large.⁶⁰

Historians at the conference stressed that creating robust governance systems takes time, and that cultural values and technological systems and the very market rules makes it difficult, even impossible, for established firms to change the course through voluntary action, even when they have had the best intentions. New historical research has also documented how green entrepreneurs throughout history have encountered barriers in developing and scaling their businesses, basically because of the same reason; that competition with firms who do not count for their externalities, makes it very difficult for greener alternatives to compete.⁶¹ Both historians and management scholars were inclined to emphasize the importance of the “old road”; to acknowledge and revisit the role of governments and governmental interventions to shift the market rules, but also in creating robust environmental governance systems. Energy transition, for example, is not only about green-niche innovation, but socio-technical transitions, in which business and capital markets is only a part of the puzzle.

Scholars at the conference were critically concerned about the impact of the very concept of sustainability since it has made protecting the environment a tool for greenwashing and marketing with little practical change. But as John Ehrenfeld argued, sustainability does not exist at the firm level, it is a property of a whole system in which business is interconnected with other nodes: other firms, regulators, banks, consumers, and not the least the natural environment itself. Therefore, achieving sustainability concerns the health of the *whole* system, and studying pieces of the system in detail will not be helpful in understanding how the system can be changed.

Finally, overcoming current barriers requires that people rethink the very essence and power of economic and management theory, and how business schools and other institutions contribute to the current situation. Most of today's problems are the result of yesterday's thinking, and the roadblocks we are facing are the results of yesterday's decisions and actions. In almost every case, historical knowledge can be very useful in avoiding past mistakes or reinventing ideas that never really worked well in the past.

Appendix 1: The Old Road

In the 1960s and early 1970's, the classic approach to environmental protection culminated with the extension of Pigou's approach to include dynamic analysis of the sustainability of human welfare. First, Kenneth Boulding proposed that the world's economy would soon transition from a "cowboy economy" of independent operators exploiting unlimited resources to a "spaceship economy" where actors constantly bumped elbows.⁶² Then, a controversial book, *Limits to Growth*, introduced a scenario whereby economic growth could overshoot the restorative capacity of the natural environment and lead to a dramatic loss in welfare.⁶³ In response to such provocative claims, leading economists, such as Robert Solow and Joseph Stiglitz, developed

formal models of how human welfare could be sustained despite resource depletion.⁶⁴ These models led to modern concepts of “weak sustainability”, an idea that is closely aligned with the usual economic objective of “welfare maximization.”

The new approach came to dominate economic thinking, but a few critics remained. They pointed out that most analyses assumed that the natural environment was well-behaved and would not respond unpredictably or catastrophically to growing damage. Nicholas Georgescu-Roegen rejected the idea that human capital could be substituted for natural capital because the natural system has a physical reality that is governed by immutable laws. In his classic work, *The Entropy Law and the Economic Process*, he argued that the carrying capacity of the Earth was bound to decrease as human action transformed more natural resources.⁶⁵ More critics followed in the 1970s and 80s by Herman Daly and others who argued for a “strong sustainability” where growth could occur only if environmental resources were preserved at current, or historic, levels.⁶⁶ These critics called for far reaching systematic governmental regulations to avoid a future collapse of human life supporting systems. But the strong sustainability approach never gained mainstream acceptance.

The old road of government intervention to achieve “weak sustainability” remains the dominant mainstream thinking among economists. Indeed, one of the 2018 Nobel Laureates in Economics, William Nordhaus and Martin Weitzmann, use the classic approach to determine optimal interventions, in the form of taxes or permits, needed to maximize human welfare in a warming world.⁶⁷ They attempt that higher prices will encourage firms and consumers to find alternatives to carbon-based products as well as encourage new technologies that will make those substitutes competitive.

In summary, proponents of the old road to environmental protection assume that human welfare can be maximized if the environment is used efficiently, and they conclude that failure to maximize welfare is caused by “externalities” or other distortions in the conditions necessary for well-functioning exchange. They contend that environmental problems, and their correction, are the responsibility of government; firms are expected to act within these constraints and will not manage to solve grand challenges like climate change voluntarily, as long as the price signals are structurally wrong.

Appendix 2 Business attempts to widen the new road

From the 1970s to the present, corporations in the United States created institutions to support voluntary protection of the environment.⁶⁸ For example, corporations operating in the nuclear power industry formed the Institute for Nuclear Power Operations (INPO) after the nuclear accident at Three Mile Island in Pennsylvania. The INPO now sets and monitors guidelines for the operation of nuclear plants. Companies in the chemical industry created Responsible Care after an accident in Bhopal India killed thousands. It too sets and monitors a set of guidelines related to accident and pollution prevention.

Economists and political scientists have long recognized the potential for firms to engage in self-regulation, but usually they have assumed it would be at the expense of the common good. Adam Smith famously opined that “People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.”⁶⁹ Yet business attempts to coordinate for the public good have a long history. Pre-industrial practices governing the sharing of resources represent a form of

coordination for the public interest.⁷⁰ In early modern German forestry, the notion of *Nachhaltigkeit*, (lastingness in English) was introduced as a concept aiming at achieving continuous, steady, and sustained growth of timber for future generations.⁷¹ Ellinor Ostrom documented many examples where actors set up rules for governing communal resources.⁷² Other scholars have shown that such collusion for the good also occurs among modern business. Ingram and Inman, for example, report that Hotels around Niagara Falls formed agreements to protect the shared resource.⁷³ Furger reports the importance of collective governance in Maritime Shipping.⁷⁴

Other attempts to align private and public interests have addressed the information problems common to environmental goods and services. Recognizing that customers cannot evaluate the environmental attributes of products, companies have set up systems for maintaining a credible chain of custody. Unilever was influential in creating the Marine Stewardship council, which provides certification of the sustainable operation of fisheries around the world ⁷⁵. In capital finance, several private companies have created systems for evaluating and rating the social and environmental performance of publicly traded companies. Such information allows investors to consider information about environmental impact when making investments or choosing trade partners. These rating systems also provide firms with a benchmark for evaluating their own performance.

Firms have also banded together to coordinate collective investment. For example, in project finance, each bank in a syndicate providing loans to a project shares part of the risk of failure but the entire cost of evaluating that risk. This can give rise to a free-riding problem where each bank expects the other to do the assessment for the group. In the hope of reducing such free riding, leading banks created a set of requirements for project due-diligence – the

Equator Principles. These principles require assessment and public documentation of the environmental and social impacts of all major projects.⁷⁶

Corporations have also tried to influence government policy to provide private and public benefits. Leading companies in the United States formed the Climate Action Partnership 20006 to design and propose a cap and trade system that would increase profits while slowing climate change⁷⁷. It became the basis for regulation that passed the US House of Representatives, but failed in the Senate.

Evidence suggests a mixed performance record for corporate attempts to widen the road to voluntary environmental protection.⁷⁸ Attempts at collective and coercive self-regulation, such as the INPO and Responsible Care, have a mixed record. Both the objective of the self-regulatory program and its organization influence the effectiveness in providing private and public benefits. A few programs seem to have been successful, but the majority have not.

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²⁹ See Appendix 2 for an historical account of business attempts to widen the “new” road.

³⁰ Frank Uekötter, *The Age of Smoke: Environmental Policy in Germany and the United States, 1880–1970* (Pittsburgh, 2009), 49.

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³² Archie B. Carrol, Kenneth J. Lipartito, James E. Post and Patricia H. Werhane *Corporate Responsibility. The American Experience* (New York, 2012), 148.

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³⁶ Examples of profitable by-products was sulfur acid, fertilizers, pesticides, wood impregnates. See Timothy J. LeCain, “The Limits of ‘Eco-Efficiency’: Arsenic Pollution and the Cottrell Electrical Precipitator in the U.S. Copper Smelting Industry,” *Environmental History* 5, no 3. (2000): 341; *Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet* (New Brunswick, N.J., 2009). See also Jonathan Wlasiuk, *Refining Nature: Standard Oil and the Limits of Efficiency* (Pittsburgh, 2017).

³⁷ Hugh Gorman, “Efficiency”.

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³⁹ The reminder of this working paper draws on the presentations given by the speakers at the conference.

⁴⁰ Auden Schendler, *Getting Green Done: Hard Truths from the Front Lines of the Sustainability Revolution* (New York, 2010). Schendler is the Vice President for Sustainability at the Aspen Skiing Company.

⁴¹ See e.g. Ann-Kristin Bergquist, “Dilemmas of Going Green: Environmental Strategies in the Swedish Mining Company Boliden 1960-2005 in *Green Capitalism? Business and the Environment in the Twentieth Century*, ed. Hartmut Berghoff and Adam Rome (Philadelphia, 2017): 147-17. Thomas Lenox and Andrew King describe this process in US electronics companies.

⁴² Governmental regulations proved to be the most potent driver behind technological innovations and radical reductions of plant emissions in these industries. Legislative

requirements expressed in permits, urged firms to explore new technological options, to invest in costly R & D and developed new organizational capabilities, which resulted in solutions that over time proved profitable, but not always. Bergquist conducts research focused foremost on the history of business and environmental policy.

⁴³ See the article by Adam Rome, “DuPont and the Limits of Corporate Environmentalism” in the forthcoming Special Issue of *Business History Review* on Business and the Environment. Professor Rome’s research is focused on the history of environmental activism, business and the environment.

⁴⁴ Professor Hugh Gorman conducts research that concerns historical analysis of the interaction of technological innovation, uses of the environment and systems of governance.

⁴⁵ Professor George Serafeim conduct research on measuring, driving and communicating corporate performance and social impact. He has, among other assignments, served in several not-for-profit organizations including the board of directors of the High Meadows Institute, the working group of the Coalition for Inclusive Capitalism, and the Standards Council of the Sustainability Accounting Standards Board.

⁴⁶ The European Union enforced the non-financial directive 2017– a law that requires large companies to disclose certain information on the way they operate and manage social and environmental issues. Serafeim noted that this effects US firms that operate in Europe, while the US do not have anything equivalent.

⁴⁷ Elper Wood is the director of International Sustainable Tourist Initiative at Harvard Chan School of Public Health and is the author of the book *Sustainable Tourism on a Finite Planet* (New York, 2018).

⁴⁸ Spinak’s current research ties the history of electrification in the rural United States to the evolution of twentieth-century American capitalism and alternative economic visions.

⁴⁹ See the article by Marten Boon “A Climate of Change? The Oil Industry and the Zero-Carbon Energy Transition in Historical Perspective” in the forthcoming Special Issue of *Business History Review* on Business and the Environment. Boon currently studies the history of the oil industry and commodity trading.

⁵⁰ Crawford has a background as Chief Technology Officer and Executive Director, managing global R&D operations for multinational corporations in energy and chemical sectors, and are currently teaching at Harvard Business School.

⁵¹ Professor King conducts research on various topics related to business strategy and business and the natural environment. He is, among other things, a founder of the Alliance for Research on Corporate Sustainability (ARCS).

⁵² Professor Shawn Cole conducts research on financial services, social enterprise, and impact investing.

⁵³ In doing so, Ehrenfeld echoed Beckerman’s argument that weak sustainability “offers nothing beyond traditional economic welfare maximization”. Ehrenfeld has been the executive director of the International Society for Industrial Ecology and the Director of the MIT program on Technology, Business and Environment.

⁵⁴ John Ehrenfeld and Andrew J. Hoffman. *Flourishing. A Frank Conversation About Sustainability* (Stanford, 2013).

⁵⁵ Scharmer chairs the MIT IDEAS program for cross-sector innovation that helps leaders from business, government and civil society to innovate at the level of the whole system.

⁵⁶ Otto C. Scharmer, *Theory U: Leading from the Future as it Emerges. The Society for Organizational Learning*, (Cambridge, 2007).

⁵⁷ See Otto C. Scharmer and Katrin Kaufer, *Leading From the Emerging Future. From Ego-System to Eco-System Economies* (San Francisco, 2013).

⁵⁸ By the early twenty first century the planet was experiencing rising sea levels and glaciers were retreating in the Arctic, the Alps, Himalayas, Andes, Rockies, Alaska, Africa and elsewhere. The rate of Antarctica ice loss tripled between 2012 and 2017. The levels of the dominant greenhouse gases released into the atmosphere continued to increase. According to NASA statistics, the sea level risen with about 80 (+/- 4 mm) between 1993-2017. Information available at: <https://climate.nasa.gov/vital-signs/sea-level/> accessed January 10, 2019.

⁵⁹ Donald Worster, *The Wealth of Nature* (New York, Oxford, 1994), 142.

⁶⁰ Auden Schendler “The Big Whiff: How corporate America Missed the Climate Fix”, *Green Biz*, Aug 25 (2017).

⁶¹ Jones, *Profits*.

⁶² Kenneth Boulding, *The Economics of the Coming Spaceship Earth* (New York, 1966).

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⁶⁵ Nicholas Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge, Mass, 1971). “The Entropy Law and the Economic Problem”, in *Valuing the Earth: Economics, Ecology, Ethics* (1993). See also Herman Daly, “Georgescu-Roegen versus Solow/Stiglitz” *Ecological Economics* 22 no 3 (1997): 261-266.B

⁶⁶ Herman E. Daly, *Toward a Steady-State Economy*, Vol. 2 (San Francisco, 1973).

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⁷⁰ Edward Palmer Thompson, *Customs in Common: Studies in Traditional Popular Culture* (New York, 1993).

⁷¹ In 1713, the German chief mining official Hans Carl von Carlowitz introduced the concept of sustainable (*Nachhaltigkeit*) silviculture in his book *Sylvicultura oeconomic*. Carlowitz’s basic question was how to achieve such conservation of timber that there would be a continuous, steady and sustained use, which at the time was a serious issue in Europe. See Ulrich Grober “Deep Roots – A Conceptual History of ‘Sustainable Development (Nachhaltigkeit)’, *Wissenschaftszentrum Berlin für Sozialforschung*, 2007.

⁷² Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990).

⁷³ Paul Ingram and Crist Inman, “Institutions, Intergroup Competition, and the Evolution of Hotel Populations around Niagara Falls”, *Administrative Science Quarterly* (1996): 629-658.

⁷⁴ Franco Furger, “Accountability and Systems of Self-Governance: The Case of the Maritime Industry,” *Law & Policy* 19, no. 4 (1997): 154-221

⁷⁵ Lars H. Gulbrandsen, “The Emergence and Effectiveness of the Marine Stewardship Council,” *Marine Policy* 33, no. 4 (2009): 654-660.

⁷⁶ Andrew A. King, “Why It Pays to Become a Rule Maker,” *MIT Sloan Management Review* 56, no. 2 (2015):11-13.

⁷⁷ Thomas W Malone and Mark Klein, “Harnessing Collective Intelligence to Address Global Climate Change”, *Innovations: Technology, Governance, Globalization* 2, no. 3 (2007).

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