

Essay

Moral and Institutional Foundations of Sustainable Technological Entrepreneurship

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Abstract: In this essay, we reflect on the conditions that allow firms to play a leading role in the ecological transition process. The essay starts with an analysis of the technological and economic features of eco-efficient technologies. We argue that they are weak levers for the ecological transition. As eco-efficiency is based on profit-maximising goals, the pace of the transition is unlikely to peak quickly. In fact, this profit motive restrains firms from fully embedding ecological principles in their choices. Some behavioural concerns arise, as rationally bounded firms are likely to pursue uncomplicated and effortless pathways so as to safeguard profits. For instance, firms may pretend to be sustainable, while chasing opportunistic practices such as greenwashing, wokening, and cost shifting. Hence, they cannot lead the ecological transition process. A few consequences derive. First, new moral values must become pivotal criteria in firms' decision-making processes. Second, such a big challenge must become shared and widely accepted in social discourse, so as to involve all economic actors and trigger a general process of institutional change. These are necessary conditions for the ensuing economic and social provisioning to take care of the limits of the Earth. Finally, we suggest that the teaching of economics must also be concerned with making such a change in mindset successful.

Keywords: decision making; eco-efficiency; moral values; sustainable entrepreneurship; valuation criteria



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1. Introduction

The latest Intergovernmental Panel on Climate Change (IPCC) report states that we are facing big environmental challenges: climate change, pollution, abuse of energy, and exhaustible resources. The vastity of these problems require addressing both environmental risks mitigation and social and regional gaps in adaptation [1]. Most scientists of all disciplines, including economists, acknowledge the need to rebalance the relationship between the planet's biocapacity and the ecological footprint determined by consumption and production activities. The reference to human activities shows that the ecological transition from an energy-hungry and matter-hungry economic system to a frugal one implies a huge process of human adaptation.

The transition required is therefore as much social and economic as it is ecological, because the challenges above pose both direct and indirect threats to the economic system. It is a very demanding process, as it calls for a radically different mindset of all economic agents [2–4].

It may be argued that the change is already underway: an increasing number of firms are incorporating eco-efficient principles into their production processes, for instance, through the adoption of renewable energies, matter-saving technologies, and circular production processes. Moreover, firms are apparently supported by the financial system, which, for instance, favours greener ventures against activities connected to heavy fossil fuel consumption.

Several studies support this view. However, they usually take for granted the possibility that the economic, social, and ecological pillars of sustainability can hold up together in some adapted business models. We dispute this view on three grounds.

First, we discuss the technological and economic aspects of the eco-efficiency principles that make them inadequate means for the ecological transition.

Second, firms' behaviour is focused on maximising profits through economic optimization. Their decision-making process pays no attention to the systemic consequences of natural resource exploitation and waste production as driven by the competitive dynamics of a globalised economy [5]. The ecological transition instead requires that profits can no longer be sought in spite of the social costs produced at the system level.

Third, we highlight the behavioural obstacles that prevent firms from fully switching to a new era. The need to comply with market requirements induces rationally bounded firms to safeguard profits by pursuing opportunistic strategies such as greenwashing, wakening, and cost shifting while pretending to be sustainable.

We finally hold that if, and only if, firms can embrace a new moral appreciation of the relationship between human beings (and economic agents, more specifically) and nature, they may become a driving force of the transition process. The idea that the socio-economic-ecological transition process must involve a fundamental change in the agents' system of preferences, thereby calling for a re-design of firms' decision-making process, is discussed in the Section 4.

The final section is devoted to addressing future research. Two directions are suggested. First, a thorough investigation of the process of institutional change entailed by the above is needed. Second, it is of some concern that economics curricula support or induce the self-interested bias of economic agents. We argue that a systemic and interdisciplinary revision of the content of economics teaching is mandatory.

2. Is the Ecological Transition in the Firms' Hands?

Over time, the debate on the theoretical problem of what is an ecologically sustainable economy, which was spurred by system-thinking scholars [6–8] has lost its centrality in favour of a more pragmatic stance: how can we practically reach an ecologically sustainable economy? Which prompts can we expect from the production system and the decision-making process of firms?

Let us start with the consideration that conventional production economics is based on the idea that firms make optimal decisions as to the allocation of factors and the levels of production achieved. Maintaining that decisions are optimal is just another way to say that they are efficient, i.e., they achieve the best outcome possible—the highest level of performance, or the minimum production costs—given the existing conditions.

From a technological viewpoint, the conventional argument about firms' efficiency rests on some controversial assumptions. One is that factors can be easily substituted for one another. A second one is that technologies, including new ones, are freely available off the shelf. The consequence of the first assumption is that a change in relative prices will displace the existing technology in favour of another, more efficient one at the new set of factor prices. Hence, if one production factor, e.g., a natural resource, becomes scarce, its relative price would go up and production plans would embody the price change, thereby substituting the now dearer factor with a cheaper one.

The second, more dynamic assumption implies that all technologies are available effortlessly. If a technology is ruled out by the existing set of factor prices [9], it may easily become the preferred one if prices change appropriately.

Taken together, the two assumptions lead to the consequence that if factor market prices move in some direction, the best technology that uses relatively more of the cheaper factor will always be adopted. For example, when energy becomes the relatively dearer factor, the new technology will (in principle) save energy relative to labour and capital and other factors.

The two assumptions above have been criticised on the basis that prices do not constitute an appropriate basis to assess firms' innovation processes and technological change in general [10]. Studies on technological innovation have shown that neither assumption is sustainable. The ratio at which factors are combined is necessarily fixed, as proposed by Georgescu-Roegen or, in more standard terms, by Atkinson and Stiglitz [11,12] where, like in recipes, factors are complementary, thus you cannot simply replace one ingredient with another. Accordingly, only one or few combinations are feasible, and more than a trivial change in relative price is needed to induce technical change. Energy, for instance, is not replaceable by more labour in the short-medium term. We can only hope that, if energy prices increase boldly enough, in the long term, the change will induce a search for energy-saving technologies. However, technological change is not linear and straightforward, as agents are rationally bounded [13]. Innovation does involve learning, i.e., the capability to acquire and combine different types of knowledge and to put them into practical solutions. Learning is correlated to past behaviour/choices path-dependency, and this specificity leads to heterogeneity of firms in the market [14]; consequently, firms' response to relative price changes may differ greatly. Moreover, sometimes the trajectories pursued in the past may lead to lock-in issues that hinder technological switches [15,16].

Notwithstanding these concerns, the confidence that conventional economists and policymakers have about the capability of business firms to pursue the transition and fulfil the growth expectations through the resources' efficiency is still very high. Many environmental economists (such as Pearce [17]) maintain that the market can still take care of the previous lack of awareness of the nature-economy link. The fundamental economic scheme does not change, and it is suggested that the market clearing capacity may embrace the environmental conservation goal.

The new reference is eco-efficiency, which allegedly overcomes the limitations of the conventional efficiency view to account for environmental issues, e.g., externalities such as fossil fuel consumption, pollution, and waste production. Eco-efficiency is defined as "the delivery of competitively priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life cycle to a level at least in line with the Earth's estimated carrying capacity" (quoted in Caiado et al. [18] (p. 893)). The goal is to achieve *decoupling*, i.e., the disconnection of economic growth from the increased use of resources.

According to the conventional perspective, decoupling is attainable through more technically efficient processes (in terms of resources used or waste produced), with the continuous support of the allocative properties of the market process. Greener production will be rewarded with the optimal allocation of capitals achieved by the financial system also via the creation of new markets, in which capital accrues to seize the incentives [19]. Inasmuch as the promise of eco-efficiency is to take care of both economic growth and environmental issues, the concept has found favourable interest from policy-makers and businessmen alike. The former has tailored institutional solutions such as norms or incentive schemes for a more sustainable growth along the eco-efficient pathway. The latter may consider eco-efficiency as a smart way to protect their core business while gaining a reputation for attaining impressive results as to their environmental practices, for example when they claim a 50% reduction in plastic used.

A major eco-efficient strategy, welcomed by both institutions and businesses, is circularity [20,21]. The basic idea is to use waste as input for other related production processes (basically, an addition to scope economies). Hence, firms should refashion their business models to include the closure of the production loop through using renewable energy and recyclable resources, employing longer product life cycles, and encouraging sharing activities. The conventional argument is that, thanks to innovation, sustainable-oriented business models address the issues of social cohesion and resource intensity of production while ensuring competitiveness [22].

We can distinguish three main drivers pushing firms towards a more circular economy. First, innovation modifies the factors' relative prices. Firms invest in eco-efficient

technologies either to reduce the dependence on scarce resources, to minimise production costs to strengthen market position, or to maintain/increase the market markups.

A second driver is finance. Climate change has shifted the finance trajectory towards environmental investments, enhancing firms' adoption of profitable greener innovation.

The third driver is activated by institutions. Firms can be induced by governments' action, through norms or incentives, to look for greener choices, thereby reinforcing the market mechanism and the inevitable change in relative prices [23].

It is fair to say that the concept of a circular economy stretches the limits of conventional linear thinking [24]. In fact, circularity and eco-efficiency are vaguely reminiscent of Boulding's finite and closed world of a spaceship [25]. Yet, their assimilation by practitioners and engineers, whose aim is to innovate specific industrial processes and refine their business models, respond to environmental issues by accepting a profit-making frame, rather than changing the economic structure to comply with the biophysical and social constraints [26,27].

We therefore argue that these drivers may not be sufficient to kick off a sustainable entrepreneurship because the continuous reference to competitive prices makes it clear that the profit motive goes untouched.

In fact, the pragmatic shift mentioned at the beginning of this section was not epistemologically neutral. In the eco-efficiency paradigm, firms are still moved primarily by economic payoffs and not by the internalisation of ecological constraints; this means that external motivations are still the main driver of the alleged ecological transition. By choosing this path, firms will exploit nature only a bit less (pursuing *relative* decoupling), while no attention is paid to *impact* decoupling, i.e., a decrease in environmental harm such as biodiversity loss per unit of economic output [28].

The systemic effects are lost if the focus of technical efficiency is on the improvement of the existing measures of productivity. For example, a firm's economic gain obtained through an eco-efficient process may cause a price reduction that, in turn, stimulates demand. The ensuing increase in production volumes may well result in increased resource consumption. This rebound effect is known as the Jevons paradox [29].

Moreover, technical change is supposed to substitute natural resources as input in the production function. This represents the *weak* version of the sustainability concept, as it assumes that there is no difference between the well-being produced by different types of capital; the upshot is that monetary compensation for environmental degradation is possible. The *strong* sustainability perspective supported by ecological economists states the opposite: there is no substitutability between natural and manufactured capital and the decision-making process of economic agents must take care of the *critical threshold of natural capital* [30,31].

This theoretical point is crucial to explain the changing role of firms in the ecological transition. The efficiency goal should not be estimated in isolation from the social and ecological context [32]. This means that, through eco-efficiency, firms should address the integration of a plurality of ecological and economic issues. For example, Herman Daly suggests that the decision-making process should account for different types of efficiency: the *service* efficiency of the manufactured capital stock; the *maintenance* efficiency, which reflects the durability of the manufactured capital stock; the *growth* efficiency, which describes the ecosystem capacity to maintain the sustainability of the economic organization; and the *ecosystem service* efficiency, which is an expression of the loss minimization of other ecosystem services [32,33].

In conclusion, the firms' rationale for eco-efficiency cannot simply be based on relative prices and increased economic productivity. A shift of mindset leading firms to redefine their priorities according to a new environment-centred value system is indeed required. In the next section, we wonder whether firms have the capability to handle such a system of values. To answer this question, we will analyse what kind of behavioural barriers are produced by the standard economic practice when ecological issues are dealt with.

3. Behavioural Issues of Sustainable Entrepreneurship

Economic agents found their behaviour on beliefs. These are the “individual’s representation of the causal structure of the world, including the relationship between the individual’s actions and the probabilities of the various possible resulting outcomes” [34] (p. 9). Rationality follows from beliefs. Standard rationality focuses on *how* economic agents make decisions, whereas *what* constitutes a rational decision and *why* are neglected [34]. Accordingly, firms are assumed to maximise their own expected payoffs. There is no room for social preferences, e.g., the well-being of others, except for the effects of uncoordinated Pareto-efficient solutions.

The relation with nature is part of the system of beliefs. In conventional economics, beliefs about nature are rooted in the anthropocentric process of human adaptation: resources are out there to be exploited and the planet is a place of opportunities. This perspective is incompatible with ecological rationality which requires instead that firms’ decisions follow beliefs based on a radically different relationship between humans and nature [35].

We may appreciate once more why eco-efficiency solutions, such as energy-saving technologies or circular production, are insufficient. To become *green*, not just *greener*, firms may possibly undergo changes in their own organisation, embedding moral values that take care of the environmental time scale, —much longer than the economic one, and of the social impact of their strategic decisions.

The questions stemming from these remarks are as follows: are firms able to envisage and pursue a set of economic goals that are consistent with the ecological constraints? Can they learn how to convert their beliefs? Do they have the required information and knowledge to manage the learning process?

The answers may be not so straightforward. We mentioned above that sustainable choice mainly depends on the firms’ learning attitude, which may trigger or hamper adaptation and change. Heterogeneity suggests that the degree to which firms will be able to adapt will vary. Bounded rationality will drive them to find the easiest solution, usually just a satisfactory one. Hence, firms will be more likely to simplify the world’s complexity rather than manage it. It is easy to acknowledge, then, that a shift from the egoistic principle towards benevolent or deontological ones is far from being a mundane task [36].

In the real world, we have a number of strong examples of how some kinds of misbehaviour “solve” the difficulty and the contradictions that firms going green experience.

The most familiar one is *greenwashing*. This behaviour is based on two simultaneous actions: a relatively poor environmental performance and a positive communication about it [37]. The British Competition and Market Authority [38] monitors corporate sustainability behaviour annually, noting that it is skyrocketing. The websites of 500 companies claiming green solutions showed that 40 per cent appear to use communication strategies that are misleading in relation to consumer law.

According to Delmas and Burbano, greenwashing firms can be recognized by four different drivers [39].

The first one consists of nonmarket external drivers such as regulation or informal monitors (e.g., the site goodguide.com). A very well-known example is the mismatch between Chevron’s pledge for ecological transition and its clean energy claims. In 2021, three environmental associations referred Chevron to the Federal Trade Commission (USA) as a company overstating its investment in renewable energy and its commitment to reducing fossil fuels to mask its role as one of the world’s biggest polluters. Between 2010 and 2018, Chevron pledged only 0.2% of its own capital expenditures to low-carbon energy resources while spending billions of dollars on advertising and marketing to build a new profile as a green company [40,41].

The second greenwashing driver consists of market forces such as consumer demand, investor demand, and competitive pressure. Faced with an environmental misalignment between their own strategies and environmentally friendly pressures, firms adopt the greenwashing behaviour to reduce a reputation loss or a threat to their competitive market

position. H&M is a resounding greenwashing case for a fast sustainable rebranding. The company was sued in July 2022 in New York for trying to deceive environmentally aware consumers with a new product line featuring “environmental scorecards” in the labelling, packaging, and marketing. However, the labelling did not disclose the true sustainability of the products. This misleading behaviour was also confirmed by the Dutch regulator who ruled that it had used “falsified information that did not comport with the underlying data”. The latest H&M greenwashing lawsuit is about the misleading claim of the “Conscious Choice” collection because a cheap-and-fast business model cannot be defined as sustainable only because cotton is organic and recycled [42].

A third driver of greenwashing attitudes is organisational [39,43]. According to the capabilities theory of the firm, the firm’s behavioural structure and its capacity to fit the market demand for sustainability relate to a bundle of constitutive elements such as firm characteristics, the incentive structure, the ethical climate, the organisational inertia, and the intra-firm communication [44,45]. In this case, greenwashing is the outcome of inner organisational barriers hampering the change in moral values of a firm. Using qualitative analysis, Yamoah et al. investigate the role of values and beliefs of business leaders and managers [46]; they find that circularity greenwashing is an emerging phenomenon to contrast pressures by the most environmentally aware consumers and competitors. In the interviews, respondents state that sustainability goals threaten the economic ones and do not produce direct benefits. For them, profit remains the main aim of business activity, and environmental strategies are perceived as a re-organizational cost. Problems of cognitive alignment between strategic and operational competence and the lack of inner ecological competence are the main barriers to circularity implementation.

Finally, greenwashing can be driven by managers’ optimistic psychological bias [39]. This is caused by the managers’ tendency to consider a problem as unique, and to neglect both the importance of data from the past and the forecast of opportunities in the future [47]. The excess of optimism, on the one end, and the lack of specific norms urging green performance on the other, drive managers to make short-term greenwashing decisions without considering the potential negative consequences in the longer term, such as a loss of reputation or lack of adequate investments in innovation.

A subtle evolution of greenwashing as a mischievous solution to an ethical dilemma is *wokening*. While the former denotes a divergence between real behaviour and communication, the latter does not necessarily imply bad ecological behaviour: the focus is rather on the cultural appropriation of values in order to protect enterprises from any real scrutiny by ecological campaign groups. Generally speaking, woke capitalism as proposed by Rhodes denotes a situation where corporations and capitalists, CEOs, and billionaires publicly and financially adopt and support progressive (usually left-wing) political causes in order to appropriate and distort the meaning of those shared values [48]. The goal is to manipulate those values to make them compatible with corporate interests and commonly accepted by public opinion and institutions as well. As a result, the more radical implications of collective goals are downgraded.

Let us focus on ecological values. As claimed above, the ecological transition should be based on strong sustainable principles, which would require a radical change in firms’ behaviour. Through cultural appropriation, instead, firms work hard to maintain change within the business-as-usual boundaries. Through wokening, corporate resources get mobilised to lay hands on places in public agencies, to influence policy decisions through suasion, lobbying, control of media etc., and to address markets by controlling the institutions that manage the process (e.g., rating companies). This way, they address public morality, which itself “becomes captured and exploited as a corporate resource” [48] (p. 11). The goals may be both cultural and symbolic, on the one hand, and more tangible, on the other [49].

In the first sense, corporations *going green* want to destitute the ecological discourse of its original and way more radical implications. Hence, on the one end, the State presses or nudges firms to behave according to shared common values; on the other end, capitalists

drive the State to act in ways that are specific, harmless, or even beneficial to them. As a consequence, “public political interests (. . .) become increasingly dominated by the private interests of global capital” [48] (p. 11).

In the second and related meaning, corporations aim to spread their institutional power well beyond the economic sphere. Corporations may take advantage of the charismatic figures who lead them [50]. As Spash shows, business leaders take positions in NGOs and policy bodies [51,52]; and corporations influence policy goals and leverage projects etc. Politically, they increasingly try to “determine the laws which are supposed to govern them” [48] (p. 12). Morally, “CEOs of major corporations are increasingly wanting to position themselves as good-hearted and socially responsible citizens” [48] (p. 26). According to Rhodes, “(t)his posturing is the perfect distraction” that helps corporate populism to thrive (ibid.). What we face is a neo-feudalism [53] in which corporations and the economically powerful earn moral and political authority in addition to legal authority (see also [54]). The case of Jeff Bezos is a striking example of how CEOs and billionaire agents may act like the good guys to divert attention to the systemic problems caused by capitalism [48]. Amazon’s CEO has established a public reputation as a left-leaning liberal, fighting with Trump over personal values and morality. In 2020, Bezos launched the Bezos Earth Fund, committing US \$10 billion to the fund (pairing the US government’s total investment to fight climate change). The aim was to work “alongside others both to amplify known ways and to explore new ways of fighting the devastating impact of climate change on this planet we all share” (quoted in [48] (p. 84)). That was a huge personal commitment by one of the richest persons in the world; yet at the same time, Amazon, —whose business made Bezos’ personal fortune possible, —was the second largest responsible for carbon dioxide emissions, had established itself as a champion in tax avoidance worldwide, and had a long record of bad working conditions in its warehouses.

A further step in misbehaviour is *cost shifting* [55] as a normal business practice. Unlike conventional externalities, which in principle can be internalised into market transactions, cost shifting is deliberate behaviour turning private costs into social ones. Such a displacement works best when the effects borne by the collectivity are difficult to observe or difficult to input to the producer.

A major example is the *leakage effect*, i.e., the choice to outsource biophysically intensive production to other geographical areas so as to comply with green regulations at home. This cost-shifting attitude is a rational choice in a linear economic framework where cost saving is the main goal. In our reasoning, intentional environmental cost shifting has increased the international division of labour enhancing socio-economic disparities worldwide. Indeed, since the expansion of global value chains occurred in the 1990s, carbon transfer has increased attaining 25–35% of CO₂ emissions embodied in international (intermediate) goods trade [56,57], where developing countries with a low-carbon performance have borne the higher impact of carbon transfer [58]. The ecological-economic decoupling may easily end up as just a regional shift of environmental loads [28,59].

The three patterns of firms’ cheating behaviour described so far highlight the gap between what is publicly communicated and believed and what is privately carried out. The real scope and objective of action are hidden in all three cases, although with some differences. The rationale of the above misconducts is that they still are anthropocentric, while a sound ecological transition requires solid ecological metapreferences [60]. A departure from the standard cognitive and moral framework calls for a greater degree of *moral intensity*; by this, we mean a complex process of awareness through which an ethical dilemma in a decision-making process is recognized and solved within the moral domain [61,62]. According to Jones, moral intensity is a “construct that captures the extent of issue-related moral imperative in a situation” [63] (p. 372). Jones frames moral intensity using six components, each characterized by its own moral strength: magnitude of consequences, temporal immediacy, social consensus, proximity, probability of effect, and concentration of effect.

In our context of sustainable entrepreneurship, a low level of moral intensity (for example, a scarce temporal immediacy between the ethical issues at stake and the outcome of the action taken; or a lack of proximity such as little care of people involved in the decision-making process), is harmful to the community [63]. More specifically, we argue that when moral intensity is weak, unethical actions and misbehaviours like those exposed in this section will most likely emerge from market dynamics.

4. The (New) Moral Basis of Sustainable Entrepreneurship

Our analysis highlights the need to rethink the way production processes are carried out. Both the scale and pace of the ecological transition are such that unlimited economic growth can no longer be a desired goal [64]. This calls for a new moral (and theoretical, as we shall see) foundation to account for both socially sustainable and ecologically sound economic processes [65,66]. In Spash's words, economics should be redefined "on the basis of how to create and maintain systems that fulfil the needs of a meaningful and worthwhile life for moral agents (human and non-human)" [67] (p. 360).

This ambitious goal is not warranted by the market principle of coordination. The ongoing organization of the economy, when seen in the longer term, is a globalised world where large economic actors (corporations) are the most favoured, while an impressive range of unbearable social costs are spread over. The outcome diverges markedly from Adam Smith's prediction of the gifts of the invisible hand. The reason is that while in *The Wealth of Nations* he developed the idea of a market economy geared toward the socially useful role of wealth, in *The Theory of Moral Sentiments* he also underlined how contractual relations had to rely on actors sharing common beliefs [68,69]. This is a general point: any form of coordination requires a mutual understanding of the beliefs that regulate the legitimate expectations of the participants [69]. Thanks to routinely presumed cognitive and moral assumptions, individuals coordinate their action plans with minimal reflection [70]. In the 18th century, the modernity of market coordination was supported by pre-modern trust and workmanship. Today, coordination is based on an institutional set-up of norms and sanctions, and by the celebration of business as the socially most valuable activity. Despite this radical change, his metaphor of the invisible hand is still dominating the ideological discourse about the superiority of markets.

The morally relevant upshots have been the detachment of the firm's goals from the embedding community, on the one end; and the social willingness to accept the commodification of everything, including people and the environment, on the other.

This form of social provisioning may be consistent with the market imperative but certainly does not consider either the Earth's carrying capacity and social cohesion. The issue of sustainable entrepreneurship relates exactly to this problem. The profit motive, although mitigated by the search for sustainability/eco-efficient technology, clashes with the required embeddedness and decommodification of ecologically consistent economic action.

The objective of firms' decision-making process cannot just be the self-centred maximisation of individual benefits but also the satisfaction of collective desires and interests emerging from the social and cultural context. Accordingly, a radical revision of the valuation criteria underpinning economic behaviour is required.

Are firms prepared to question the moral value of their economic choices, thereby including principles of choice that involve other agents and institutions, and not simply the value extracted by the market process? [71]. If they are to be set at the core of the ecological transition, firms should rethink their relationship with general well-being.

As the reproduction of society occurs through community self-regulation, communication and mutual agreement, uncoordinated individual ethical behaviour is not likely to achieve an effective solution to the transition problem, even if it refers to universal principles of greener behaviour such as circularity and eco-efficiency. Rather, what is needed is a public discourse about the change in the value system unfolding among all the agents of the economy (firms are crucial, here). In this way, consumers, firms, and the public actor can find their role and understand their own contribution to the preservation

of society and the environment. That helps orienting actions and represents an insurance element. That should also avoid the present schizoid tendency to ground green discourses on communication standards still relying on ideas of progress as the domination of nature (as implicit in greenwashing and wokening).

In other words, this is a call for the creation of a new *moral intensity* to guide future business investments without harming the embedding community. Let us summarise the argument.

The first pillar of a new moral intensity is to rebuild the sense of participation of firms in the local community, a condition that was obvious in Adam Smith's time and has been destroyed through globalisation. On the one hand, entrepreneurs ought to focus on how their action can benefit the social provisioning to their community; on the other hand, social control of economic processes may feed back to them because values-as-principles (or metapreferences) activate the collective valuation process, via institutional and cultural change.

A second aspect follows from the above. The change required to tackle ecological challenges cannot be simply designed. Although institutions may propel the process of change of the ethical content of public discourse, this should become a shared one. All agents are unsettled: firms may be stuck to self-interested motivations; consumers rely on established patterns of consumption and often lack the knowledge required to act ecologically; furthermore, they may experience heavy budget constraints in their forward-looking consumption choices. Likewise, policymakers too often think and act locally, with little understanding of the general picture, while vested interests may command public action.

Our conclusion is that entrepreneurship may become the driving factor of the new era, if the value issue is tackled seriously. As seen in Section 4, firms must stop bending ecological values towards profit maximisation, thereby delaying the time of action or in the worst-case scenario missing the realisation of the action.

5. Future Directions

The aim of this essay was to set out the conditions which allow entrepreneurship to be the leading force of the upcoming ecological transition. We claimed that (a) eco-efficient technologies are not sufficient means for strong sustainability; (b) firms must restrain their self-interested (profit-based) motivations, so as to eschew opportunistic strategies; and (c) they should rather fully embrace ecological moral values and complex valuation criteria as pivots of their economic action.

However, we understand that the transition process is far from smooth and painless. Sustainability is not a mere exercise in additivity. Most business literature seems to neglect the systemic implication of including the social and environmental dimensions in decision-making processes. The ecological transition involves changes at different levels (moral, cognitive, and practical) for different agents (individuals, organizations, and institutions), in order to align normative ecological values, personal values, and benefit values deriving from market constraints [72]. We did not dwell on the routes to make the transition feasible: a deeper investigation is required in future research.

Although, we may outline a few directions. For instance, we recommended above that institutions should prompt public debate on the importance of encompassing ecological values in decision making. Institutional changes, such as incentives, norms and nudges, may help deconstruct settled mental models.

Here, we suggest another major issue: training economic agents to perform more complex decision-making processes than they currently do. The economic literature has shown that education in economics may spur self-interested behaviour [73]. Although evidence have been sometimes disputed [74], there are many ways through which standard education in economics may encourage self-interested behaviour [75].

First, economics studies attract people who are more self-interested than others (the self-selection issue found in Frank and Schulze [76]). Second, economic models usually

neglect motivations other than self-interest, such as altruism or collective well-being. By the same token, economic training leads students to believe that others are self-interested, thereby inducing agents to behave accordingly [77]. Third, in these models, economic calculation is based on self-interest; hence, academic training does motivate economists and economics students to behave in ways that are more consistent with the predictions of economic models [78]. Finally, students in economics have more positive perceptions of unrestrained self-interest, i.e., greed (which is a subjective moral appraisal), and fairness concerns are reduced.

People's attitudes about motives such as greed or ethical behaviour depend not only on moral judgments but also on the availability of legitimising justifications [70]. The development of social and ecological beliefs is fundamental for producing a self-justification of sustainable innovation. This opens the door for a new economics education to delegitimise the pursuit of greed and favour ecological values in social preferences.

Another aspect is to embed biophysical fundamentals in the teaching of economics. Kapp stated as early as 1946 that "student must be made to understand economic institutions and doctrines in the light of the problems and ideals of Western civilization" [79] (p. 379). As the ecological transition is acknowledged as the main problem, a systemic and interdisciplinary perspective is needed. In fact, in a recent article, Røpke suggests that this is a required step to promote the just sustainability of society [80].

This reflection brings with it the need to invest in a wide-ranging and profound debate on the teaching of economic principles and a radical reform of university curricula in economics. The aim is precisely to contribute to the creation of a new education for a sustainable social provisioning which embraces ethical dilemmas as fundamental basic problems in economics.

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