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Research article

When can a green entrepreneur manage the local environment?

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ABSTRACT

How do we deal with environmental management issues at the local level? Traditionally, the approach proposed from an environmental management perspective has involved various kinds of "top-down" regulatory measures, such as defining a standard that must be satisfied or a tax on pollution. Conversely, there has been less focus on the analysis of local, bottom-up approaches, as for example the effectiveness of various ways of organizing a local environmental transition process. Our focus is on analyzing of under what conditions it is possible for a "green entrepreneur" (GE) to manage a transition from brown to green energy? Theoretically, we consider four entrepreneurial skills, at least two of which must be present for the GE to succeed. In the case of the Danish island of Samsø and its rapid introduction of renewable energy, three of these skills are found to be present: profits, communication, and trustworthiness. The GE, however, failed to activate the fourth skill concerning the ability to persuade local non-green actors regarding the value of the green component. Thus, a main result is that it is crucial to convince non-green locals about the profitability of local environmental management rather than its potentially green components.

1. Introduction

Local environmental engagement and management is required to make the global economy less polluting, as described in the ENEP green economy initiative (UN, 2009). Among other things, this covers investments and innovation in natural capital (agriculture, fisheries, water, and forests) and in energy and resource efficiency (renewable energy, manufacturing, waste, buildings, transport, tourism, and cities). This is an application of the so-called "Hardwick's rule" (also known as the "weak sustainability hypothesis, see Perman et al., 2011): In order to sustain a non-declining consumption path over time in the presence of non-renewable resources, it is necessary to invest all resource rent into productive capital to achieve a non-declining total capital stock (natural and man-made).

Likewise, numerous books that sound dire warnings of environmental disaster often end on an optimistic note, concluding that the salvation of civilization rests on the shoulders of heroic social and environmental entrepreneurs (Hall et al., 2010). In particular, entrepreneurship combines an understanding of social and technical expertise with the experience of non-profit and for-profit projects to improve the practice of green and/or sustainable design and development (Sustaineship, 2012). In the literature, however, it remains an open question as to what extent entrepreneurs are able to promote a greening of the economies, how they are motivated, whether there are structural barriers to the capture of economic rents for green ventures, and whether environment-oriented entrepreneurs differ from traditional entrepreneurs (Hall et al., 2010).

We try to fill this gap by considering a situation where the "Green Entrepreneur" (GE) may have the required knowledge and coordination skills to initiate local environmental management. The issue of optimal group size in relation to sustainability is addressed in Brandt and Svendsen (2013), who find that the implementation of local Agenda 21 is problematic if consensus in a given group is needed. When a GE is included, however, the probability of successful environmental management at the local level may be increased significantly.

Thus, our main research question is:

When can a green entrepreneur successfully manage the local environment?

This research question is investigated using a model examining

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the conditions under which GEs can overcome informational shortcomings and coordinate collective action. The four entrepreneurial skills we identify are: 1) *profits* and the ability to secure the high private financial performance of a given environmental management and, at the same time, deliver a sufficiently green component (a high-performing GE); 2) *coordination* skills (the ability to bring people together and convince them about the values of the proposed environmental management scheme, thereby fostering the willingness to corporate) (a unifying GE); 3) *persuasion* and the ability to convince those who initially only derive value from the private income of the proposed management plans about the value of the collective benefit (environment-friendly part) of the project (a persuasive GE); and 4) *trustworthiness*, so that potential participants will trust the GE to in fact be able to deliver an environmental management scheme that is profitable for all participants (a trustworthy GE). The theoretical model describes the circumstances in which a combination of these skills is necessary and examines a situation where the GE must at the same time be high-performing, unifying, persuasive, and trustworthy in order to be able to initiate and manage local environmental projects.

Our definition fit well into the more general characterization of a GE in the literature, as for example expressed by Walley and Taylor (2002), who state that current approaches to understanding the nature of entrepreneurship take an integrated socio-psychological approach. This implies suggesting that the interaction between personality and such factors as past experience, existing competence and the immediate context have proved to be decisive for the performance of the entrepreneur.

When linking these theoretical findings to the Danish case of Samsø, we find that the local GE is an idealistic rationalist and that the proposed local environmental management project succeeded not because of its green components but rather because the GE convinced "ordinary" people with no specific environmental preferences to join the project—a result also found in Sandler (1997), who points out the necessity of creating policies that are both environmental friendly and profitable. Furthermore, by acting as a first-mover, the GE becomes trustworthy.

In the following, Section 2 develops the model and presents the potential skills of the GE along with three versions of the model, which require different skills to initiate local environmental management activities. Section 3 introduces asymmetric information, where, for example, those involved from the outset do not know the type of GE and management project they will be facing. We describe how a high-performing GE can signal its true type and be perceived as a trustworthy GE, capable of delivering a high-performing project. Section 4 then considers how entrepreneurship made non-polluting energy production work in the Danish case of Samsø. The conclusions are presented in Section 5.

2. The model

In this section, we set up a theoretical framework and introduce another GE before elaborating on which skills a GE requires to overcome the coordination and knowledge problems that possibly prevent a group of people from voluntarily producing a particular type of environmental management.

The focus is on local environmental management that generates both a private benefit, for example power or biogas (valued either for its salability on the market or its opportunity costs from the members' own use of the produced power or biogas) and non-market values such as less pollution, more sustainable use of resources, and public goods such as cleaner air, more tourists, and so forth, which may also directly or indirectly benefit non-members.

We restrict our attention to situations in which many local investors are needed to realize a management scheme that improves (local) environmental performance. We define $I=\{1,2,\cdots,n\}$ as the number of participants, with $(i \in I)$ denoting the individual participants. Many local investors are needed in situations where each potential participant has a budget constraint, b^i, assuming that the person will use their budget constraint to participate in a good project but also that the individual budget is small compared to the fixed costs of the project.

A first, important characteristic of the good in question (the good that the local environmental management plan is supposed to provide) is that the development of the private and collective benefits increase with the project size. The vital assumption here is that, for each added participant, the capacity of the project increases in such a manner that the financial return for all of the participants remains constant. Similarly, the collective benefit of the project increases when project size increases: The greater the number of participants, the greater the public goods component of the project.

A second characteristic of an environmental good is economy of scale in the form of particular network externalities and knowledge together with infrastructure sharing. For example, building the first wind turbine requires considerable infrastructure, including roads and power grid connections together with the extensive negotiation of contracts required merely to sell the power. The cost per capacity installed diminishes for the following turbines, as some of the required infrastructure already exists.

More formally, the total costs of the specific local environmental management in question will be described as $C^{Total}(n)$. Since the project size increases with the number of participants, the total costs are a function of n. Thus, $C^{Total}(n)/(n)$ is the average costs of the project and $AC(n)=C^{Total}(n)/(n)$. For a given n (probably up to a certain n size), adding another participant will reduce the project's $AC(n)$, so that $AC(n)>AC(n+1)$.

The analysis is simplified in the following two ways. First, we will only look at equal cost-sharing arrangements. This implies that for any group of n people that accept the environmental project, each will pay $C^{Total}(n)/n$ of the total costs. This is not an important assumption, since other sharing rules could also have been used, but the equal sharing rule remains a focal point.

Second, the private benefit provided by this local environmental management is also shared equally. Let the total revenues of the given project be $R^{Total}(n)$. Since the project size increases with the number of participants, the total revenue is also a function of n. Let $AR(n)=R^{Total}(n)/(n)$ be the average revenue of the project, which is constant and not depending on n. The collective benefit is non-market in type and valued according to individual preferences. Let $G(n)$ be the size of the collective good, so that $G(n+1)>G(n)$.

We now try to replicate how a population can be described by its preferences toward environment-friendly behavior. Assume that a relatively small fraction of the population values environment-friendly behavior but that the majority is only interested in the private benefit and that their decision is unaffected by whether or not the final outcome contains an environmental performance component. While this is a very simple partition, we believe our assumption captures the essence of a normal population.

We therefore consider two types of participants: One group that does not value the environmental performance of the proposed environmental management scheme, caring only about the private stream of income they gain from the project. We call this type of participant the F-type ("F" for financial type (= homo economicus). The second type is the G-type ("G" for green). This G-group also derives utility from the public goods and the environmental components of the project. Since we are considering a relatively local (or small-scale) environmental management project, let there be a limit of potential participants of n^{G+F}. All of the participants are equipped with the following quasi-linear utility function: