

**BUILDING GREEN INDUSTRIES: SOCIO-CULTURAL DETERMINANTS OF  
ENTREPRENEURIAL ENTRY**

Jeffrey G. York  
University of Virginia  
Darden Graduate School of Business  
Ph: 804-922-9099  
[Yorkj@arden.virginia.edu](mailto:Yorkj@arden.virginia.edu)

Michael J. Lenox  
University of Virginia  
Darden Graduate School of Business  
Ph: 434-924-3212  
[lenoxm@arden.virginia.edu](mailto:lenoxm@arden.virginia.edu)

Working Paper – Please do not cite or distribute without permission

Last Revised: April 29, 2010

**Keywords:** Entrepreneurial Entry, Institutions, Environment, Socio-Cultural Environment,  
Green Building

## 1. ABSTRACT

Researchers have long sought to explain the institutional forces which influence entrepreneurship. Entrepreneurship is often viewed as the engine of economic prosperity and social advancement, and the question of how to encourage higher founding rates for new ventures has received a great deal of attention. The question of determinants of the *type* of entrepreneurship which prevails has received less attention. While the economic and political conditions in a region have been anecdotally related to founding rates, there are few rigorous empirical studies which bridge institutional theory and entrepreneurship. We know even less about how the socio-cultural environment, the informal and unwritten “rules of the game” influence entrepreneurial founding rates. This study seeks to fill this gap by addressing the question of how the economic, political and socio-cultural environment influences both the overall firm founding rate and the creation of new firms which create environmental as well as economic impacts. Utilizing a unique dataset on new firm foundings in the green building industry we build upon existing theory to explain how the institutional environment will exert differential influence on the overall rate of entrepreneurship and the rate of entrepreneurship for ventures which explicitly seek to address degradation of the natural environment. Our study suggests that the institutional environment does influence firm founding rates, however, while economic factors are highly correlated with overall founding rates, the socio-cultural environment may exert more influence on the foundings of “green” firms.

## 2. INTRODUCTION

What explains the types of ventures entrepreneurs start? Baumol (1990) famously hypothesized that entrepreneurial energy exists in a steady state across societies, and will be turned to socially productive or unproductive activities through the institutions within a given society. We have some empirical evidence that Baumol was correct (Sobel, 2008). There is also significant empirical evidence that economic and political conditions can influence levels of entrepreneurship; however we still know relatively little of how social institutions, or the unwritten “rules of the game” (North, 1990) will influence entrepreneurial entry.

However, we know little about the social-cultural antecedents of entrepreneurship. Because the institutional surroundings of potential entrepreneurs influence their decision to found a new venture, it seems reasonable to believe that cultural environment surrounding entrepreneurs will influence not only their propensity to initiate a venture, but *the type of venture they start*. Utilizing insights from institutional theory and prior research, this paper develops and tests a theory of how the economic, political and socio-cultural institutional setting impacts and examines the emergence of entrepreneurship in the green building industry.

Green building offers a unique setting for examining entrepreneurship in an area which has blatant spillovers to the public good. Because the societal and particularly the environmental implications of green building are inherent to these ventures, we believe this context provides an excellent setting to better understand how culture can influence entrepreneurship. Green building seeks to reduce the environmental impact of the construction industry through supplanting and augmenting existing practices with practices and products which reduce the energy consumption and environmental degradation caused by the built environment (Yudelson, 2007). Thus, new business entrants into green building are an example of “environmental entrepreneurs” defined

by Dean and McMullen (2007) as those who create and improve markets for environmental resources and are a subset of social entrepreneurs, individuals who seek to create explicit social returns through new venture formation (Austin, Stevenson, & Wei-Skillern, 2006; Short, Moss, & Lumpkin, 2009). We utilize a unique dataset to measure entrepreneurial entry into the green building industry from 1999-2007 and compare the results to overall rates of entrepreneurship during the same period. Thus, we examine how socio-cultural conditions influence not only the rate, but the type of entrepreneurial entry in a region.

This study makes three contributions. For the field of entrepreneurship, we expand our knowledge of how socio-cultural environment can influence not only the level of entrepreneurial entry in a region, but also the type of entrepreneurial businesses which are founded. We contribute the evolving field of social entrepreneurship by offering one the first quantitative, empirically rigorous studies of social entrepreneurship. Finally, we advance the literature on organizations and the natural environment through the creation and testing of a theory regarding the creation of new firms which simultaneously create economic and ecological benefits for society.

In the following section, we briefly review the literature on institutional antecedents of entrepreneurship. Next, we utilize this literature, along with existing theories and evidence on entrepreneurial entry to develop an entry model for differentiating environmental entrepreneurial entry rates from “traditional” entrepreneurship. We introduce our empirical setting, and test our model utilizing a data set of 2427 entrepreneurial entries from 2000-07. Finally we discuss our results and the implications of our findings for future research in the areas of social entrepreneurship and entrepreneurial entry.

### **3. THEORY AND HYPOTHESES**

Management scholars have long focused on the institutional environments' influence on business. Institutional theory has acted as the foundation of many of these studies which build on idea that firms are largely the product of the environment in which they are embedded (Scott, 1995). While the idea of institutional entrepreneurship has been utilized to resolve the dilemma of embedded agency, the tendency of firms towards homogeneity has also been a recurring theme. DiMaggio and Powell (DiMaggio & Powell, 1983) canonically proposed that organizations go through a process of structural isomorphism in which "... a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions ... isomorphism can result because nonoptimal forms are selected out ... or because organizational decision makers learn appropriate responses and adjust their behaviour accordingly" (149).

Scholars have found evidence that at least three types factors influence the rate of entrepreneurship in a region. These factors can be divided into economic, political and socio-cultural environment (Shane, 2004). In the following section, we review the literature of these factors.

#### ***Economic Environment***

The economic environment in which potential entrepreneurs are embedded will clearly influence the likelihood that they will create new firms. Research has suggested that the economic environment influences entrepreneurial activity through three mechanisms: capital availability, reduced tax rates (the ability to capture rents), and overall income levels (demand for goods and services).

Capital availability increases the ease with which potential entrepreneurs can start new ventures. Most new ventures are capital constrained and must either borrow money to initiate operations, or seek out investment from strategic partners, angel investors or venture capital. Thus, higher levels of angel investment and venture capital activity in a region can be a determining factor in creating higher levels of entrepreneurship. However, the vast majority of ventures do not receive private funding from these sources, but are instead initiated via bank loans or even credit card debt. Higher interest rates increase the cost of capital and increase the risk which individuals must bear to initiate new ventures. Shane (1996) found evidence that higher interest rates were negatively associated with number of businesses per person in the U.S. from 1899-1988.

While capital availability has been shown to be correlated with increased rates of entrepreneurship, entrepreneurs must feel confident that they will be able to create and keep economic profits from the new venture. Research has demonstrated that higher marginal tax rates can suppress entrepreneurship by a) decreasing desirability of having variable earnings, which are inherent in new ventures and b) reducing the profitability of an opportunity and thus reducing the likelihood potential entrepreneurs will act (Harper, 1998). Evidence supports the theory that higher tax rates are negatively correlated with overall firm founding rates. For example, Bruce and Mohsin (2006) found that income and capital gains taxes exerted negative but quantitatively small influences on rates of entrepreneurship in the U.S. suggesting that tax policy, while significant for entrepreneurial entry, does not operate in isolation.

Even given extremely low tax rates for new businesses, there must be demand for new products and services for entrepreneurship. An economy that is strong and growing fosters demand for goods and services increases, creating opportunity for potential entrepreneurs. Thus,

overall income levels would be expected to be positively correlated with entrepreneurial entry rates. Stated simply, when individuals have higher income levels they are more likely to spend money on the new goods and services offered by new firms. For example, Shane (1996) found that economic growth had a significant positive effect on the number of U.S. businesses per capita, 1899-1988.

While it is intuitively clear how the economic environment impacts the overall rate of entrepreneurial entry, the impact of these factors on the type of entrepreneurial entry, is likely to be more nuanced and has certainly received far less attention in prior research. Environmental entrepreneurs seek to address environmentally relevant market failure at the same time they produced economic rents. Thus, similar to traditional entrepreneurs, environmental entrepreneurs are beholden to the economic environment. As environmental entrepreneurship is defined based around economic as well as ecological opportunity (Dean & McMullen, 2007) economic conditions will critically impact the creation of environmentally beneficial ventures. However, because environmental entrepreneurs may be largely motivated by their environmental beliefs and normative assessments as well as the possibility for economic profits (York & Venkataraman) they may be willing to take on greater levels of risk and uncertainty to implement their venture.

Social scientists have long hypothesized that concern for environmental goods is highly related to income levels (Van Liere & Dunlap, 1980). This relationship is vividly illustrated by a quote from environmental justice and green job advocate Majora Carter:

What's popular in places considered ghettos—whether that's the inner city or Appalachia—is having a decent quality of life. I think that's why the movement hasn't reached a crescendo in poor and working-class communities. But [environmentalists] have been talking about issues that don't really affect them. If

you're speaking to someone whose first priority is survival, no one is going to give a crap about the polar bears—nor should they (Paul, 2009).

Individual concern for the natural environment escalates along with quality of life. Thus, the income levels can be expected to positively impact founding rates for environmental entrepreneurs in a manner similar to the overall entrepreneurial entry rate.

However, environmental entrepreneurs are beholden to the economic environment, yet motivated by non-pecuniary incentives, the economic environment will have a significant, but reduced impact on entry of new, environmentally relevant ventures compared to the overall population of entrepreneurs. Thus:

***Hypothesis 1: Rates of entry for environmental entrepreneurship will be higher in regions with gross domestic product; however this relationship will be weaker than for the overall rate of entrepreneurial entry.***

### ***Political Environment***

The political environment influences entrepreneurial activity through moderating the perception of the risks and rewards involved in starting a new venture. The political environment is comprised of public, centralized institutions, that is the policies, regulations and laws put in place and enforced by the state (Pearce, Dibble, & Klein, 2009). These formalized rules can influence levels of entrepreneurial activity through 1) creating greater political freedom, 2) creating incentives to bring new products and services to market, 3) enforcing both physical and intellectual property rights and 4) creating regulatory hurdles potential entrepreneurs must overcome to initiate a venture.

Political freedom is the freedom from being subjected not only to the will of other private actors, but also to the will of the state. Individuals who are subject to having the fruits of their labor expropriated by a corrupt government would clearly be less likely to engage in creating new ventures (at least legally legitimate new ventures). Similarly, states which provide low levels of protection from other actors are also likely to experience low levels of legitimate entrepreneurship, as entrepreneurs could have their resources and profits taken by force. Economist Mancur Olson's concept of "market augmenting government" illuminates the concept of a market augmenting government, as one that creates political freedom to encourage entrepreneurial action (Olson, 2000). Olson described market augmenting government in a seminar on entrepreneurship in 1997:

Now it's customary as we know, to think of markets and government as alternatives. Should the role of the market or the role of the government be larger? And of course we know there are times when governments and markets are alternatives when decisions are made that something should be done by the government or privatized and done by the market and of course that happens. But I would argue that the governments of the successful economies are net market augmenting. That is to say they generate, account for, explain more markets than they replace or repress. Those governments are a source of markets in a big way when economies work well. (Olson in Sarasvathy, 2000:21)

Olson went on to clearly articulate the characteristics of market augmenting governments; they (a) facilitate trade when a spot market is not available, when "the quid is available at one time and place and the quo at another time and place", (b) provide third party enforcement of contracts and (c) provide financing but not production (Olson in Sarasvathy, 2000).

Politically created incentives for entrepreneurship are one example of government creating financing opportunities for new ventures. The state could influence the creation of new ventures through providing incentives, such as tax breaks, for small businesses. Incentives could

also provide consulting resources, loans at favorable rates or even direct investment. Studies have shown such incentives to have a strong effect on the development of emergent industries (Sine, Haveman, & Tolbert, 2005). These types of efforts are selective, and aim to promote particular sectors or practices over others. Thus, state policies which are created to support the creation of new ventures will be expected to have a positive effect on the overall level of entrepreneurship in a state.

Policies which explicitly support one type of entrepreneurial entry, through providing tax breaks, expedited approval processes and even direct financing have been shown to be impactful across multiple industries. Hiatt and Sine (2008) found that regulatory prohibitions on the consumption of alcohol not only increased the failure of breweries, but also increased the founding of soft drink producers. These types of efforts are selective, and aim to promote particular sectors or practices over others. Not surprisingly, public institutions that are created to support the adoption of new practices or standards will be expected to have a positive effect on the adoption of those standards. For environmental entrepreneurs, this effect may be even stronger, as they often seek to create property rights for environmental goods which were previously held to be public (Anderson & Leal, 2001). Government policies which encourage the adoption of more environmentally friendly practices, such as voluntary certification or establishing property rights for environmental goods, for example rights to carbon emissions or rights to clean water, will be expected to increase entry by environmental entrepreneurs. Environmental entrepreneurs may be involved in actions which help to create these policies; however, the overall rate of entry would likely be impacted only when the policy is enacted. A classic example of policy driving entry is the recurring expiration and reinstatement of the renewable energy tax credit which has been explicitly linked to entry by solar and wind firms (Pernick & Wilder, 2007). Thus:

*Hypothesis 2: Rates of entry for environmental entrepreneurship will be higher in regions with a greater number of policies which promote environmental goods.*

### ***Socio-Cultural Environment***

The social-cultural environment consists of the public, decentralized institutions, that is the unwritten “rules of the game” (North, 1990) which influence entrepreneurial action. It consists of the beliefs and attitudes members of society hold towards the legitimacy, or illegitimacy of specific activities. These beliefs influence entrepreneurship rates through moderating individual actors perceptions of the desirability of starting a new venture and their belief in the potential success and thus profits, of new ventures. While scholars generally agree on the importance of the socio-cultural environment in influencing entrepreneurial behavior, relatively little empirical work has been conducted in this area. In some exceptions, the role of social movements (Sine & Lee, 2009) and social norms (Meek, Pacheco, & York, Forthcoming) in moderating founding rates have been examined. A related area which has received a great deal more attention is derived from theories of resource dependence and population ecology (Camp, 2005).

In a study of the creation of the U.S. wind power industry Lee and Sine (2009) found evidence that Sierra Club activities had a greater impact than the availability of resources on the creation of new wind power generating facilities. Similarly, Weber et. al. (2008) detailed the efforts of social movement participants to motivate entrepreneurial entry into the emergent grass-fed beef industry. This nascent literature suggests that when social movements organize to encourage entrepreneurial entry they can be a powerful force in influencing new firm foundings. While these studies are specific to industries, the effects of social movements on overall rates of entrepreneurship could be generalized, given a focus on the creation of entrepreneurship, not

specifically a type of entrepreneurship. However, we theorize that those social movements directly related to environmental causes will have a differential impact on environmental entrepreneurs through providing legitimacy to their endeavors, creating superior market conditions for their offerings (both from a funding and demand perspective) and will increase the flow of information regarding entrepreneurial opportunities in a region related to environmentally relevant market failure. Thus:

***Hypothesis 3: Rates of entry for environmental entrepreneurship will be higher in regions with greater membership in environmentally relevant social movements.***

While the role of social movements has begun to receive some attention in the entrepreneurship literature, social norms, defined as defined as unwritten rules of conduct of a group (Elster, 1989) have received very little empirical study. Social norms can influence the degree to which entrepreneurship is viewed as an esteemed and socially beneficial activity in a region (Aldrich, 1999; Aldrich & Fiol, 1994). For example, if entrepreneurs are viewed as “exploitative” in a community, the status of entrepreneurship as a career is lowered, and thus made undesirable as a career choice. On the other hand, if entrepreneurs are viewed as “creative” or “engines of economic growth” then their status is elevated, and individuals are more likely to seek entrepreneurship as a viable career path. There is limited empirical evidence to support this theory.

Krueger and his colleagues’ (2000) study of intention-based models of entrepreneurship tested for the effect of perceived social norms on entrepreneurial intentions, however, they found no evidence of such a relationship. Giannetti and Simonov’s (2004) study found evidence that social norms were impactful on entrepreneurial entry in Sweden. While findings from studies on

social norms and entrepreneurship are mixed, there is evidence that suggests values and beliefs do have an ability to impact (over and above economic and political environment) firm formation (Davidsson, 1995; Davidsson & Wiklund, 1997). Values can be held by both individuals and groups (Kilby, 1993; Kluckhohn, 1951). Social norms are present at a group level, (Lipset, 2000) and thus can be assessed at the country, state or regional level. For example, prior research has demonstrated higher levels of homogeneity in entrepreneurs from different countries than in non-entrepreneurs from the same country (McGrath, MacMillan, Yang, & Tsai, 1992). Buttler and Herring (1991) examined the General Social Survey (GSS) for the years 1983-1987 and found significant differences in social norms among the self employed versus the general population. Many researchers have implicitly assumed that individuals choosing self employment represent a homogenous group (Blanchflower & Meyer, 1994). Yet, other studies suggest the attributes of entrepreneurs differ drastically across cultures and countries (Hayton, George, & Zahra, 2002; Thomas, 2000).

If we know little about how the socio-cultural environment effects the emergence of entrepreneurship, and environmental issues are largely driven by the socio-cultural environment, we believe that environmental entrepreneurship would offer an excellent context to better illuminate the role of social institutions in driving entrepreneurial entry.

If social norms differ across entrepreneurs by means of different value systems, and social norms are influential in individuals' views of the natural environment, then social norms are likely to influence the motivation and therefore, the likelihood, of entrepreneurship in the environmental context. Meek et. al. (Forthcoming) found that social norms of environmentalism were highly correlated with entrepreneurial entry in the solar energy industry, and that norms of

family interdependence and conformity impacted the efficacy of state policies supporting entrepreneurial entry.

***Hypothesis 4: Rates of entry for environmental entrepreneurship will be higher in regions with higher social norms of environmentalism.***

#### **4. DATA, METHODOLOGY, AND RESULTS**

There are several reasons why the green building industry was chosen to provide empirical support in this study. First, as our research question is about how the regional environment impacts the type of entrepreneurship, not only the volume of entrepreneurship, we needed to identify an industry in which all entrants could be considered to be “social” entrepreneurs, that is, do they address some societal issue explicitly? As green building is defined as a process of “design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants” (USGBC, 2004a) those entrants that seek to operate in this industry meet Short et al.’s (2009) broad definition of “using practices and processes that are unique to entrepreneurship to achieve aims that are distinctly social...” (172). Second, in view of the amorphous nature of social and environmental entrepreneurship, researchers have struggled to construct any reliable records of entrepreneurial entry. The green building industry does have reliable and reasonably detailed data along this line. Third, because we were specifically interested in the impact of the socio-cultural environment, it was necessary to identify a issue which is relatively clearly defined and which is a) considered important by a social movement relative to the industry and b) is representative of some larger social norm, in this case environmentalism.

Relevant information about the green building industry are described in this section, along with information on how the empirical analysis data was obtained, the methodology of the analysis and the results.

##### ***The Green Building Industry***

Only five years ago the term “green building” might have evoked images of the back-to-nature movement, with yurts and straw bale houses dotting a bucolic landscape. Today, however, green building has become big business, with Fortune 500 firms such as Dell, IBM, Toyota and Bank of American heavily investing in greening their real estate portfolios. The value of green

building projects is projected to increase to \$60 billion by 2010, comprising 10% of commercial construction (Murray, 2008).

The US Green Building Council (USGBC) defines green building as “design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants” (USGBC, 2004b). Broadly speaking, green buildings are high performance property constructed with consideration of its impact on human health and the natural environment. Green buildings are designed to use less energy, water and reduce the overall life-cycle environmental impacts through improved sitting design, material selection and construction (Yudelson, 2007).

While the seeds of the green building movement were sewn by American Institute of Architects (AIA) activities and the Federal government most would agree that prior to 2000, green building did not receive much attention from the mainstream companies. Green buildings seemed to be interesting experiments, but not something that was within the grasp of most firms. After all, how could you even tell what a “green” building was? Did it have to use solar power? Was it made of straw bales? Did it mean you couldn’t have lights inside? The efforts of the USGBC explicitly and relentlessly focused on answering these types of questions with the aim of “nothing less than to fundamentally change the build environment by creating energy-efficient, healthy, productive buildings that reduce or minimize the significant impacts of buildings on urban life and on the local, regional, and global environments” (Yudelson, 2007).

The USGBC has emerged as one of the most influential and successful social movement organizations in U.S. history, attracting organizations from a diverse array of fields and countries. Many attribute this growth and success to the USGBC’s flagship project, the Leadership in Energy and Environmental Design (LEED) rating system. By 2008, every day

\$464 million worth of construction would register with the LEED program *every day* (USGBC, 2008a).

---

*Take in Table 1*

---

The LEED system works by assigning points to a building project based on six criteria areas:

1. Sustainable Sites
2. Water Efficiency
3. Energy and Atmosphere
4. Materials and Resources
5. Indoor Environmental Quality
6. Innovation and Design Process (USGBC, 2008b)

In order to be considered for LEED certification building projects must first be registered. Then, upon completion of the project, the project administrator will submit documentation for consideration by the USGBC. Based on the number of points allocated to the project, one of four levels of certification can be awarded: Certified, Silver, Gold or Platinum.

As LEED adoption has grown, so has the supply base of firms which provide products and services to support LEED adoption. Due to the largely disaggregated nature of the construction industry, this growth has been difficult for analysts to parse. In this study, we constructed a unique dataset which provides a clear view of entrepreneurship in the green building sector at the state and product category level during the period 2000-2007. Our study provides insight into the growth of social entrepreneurship in this area.

## ***Data***

To test our hypotheses, we built a longitudinal dataset of entrepreneurial entries and green building entrepreneurial entries in the United States aggregated at the state level. Our window of observation begins in 2000 (the first year LEED certification was made available) and runs through 2007 (the last full year for which data were available for each of our variables). During this time period, 2, 472 firms entered into the green building space. The resulting dataset consists of 400 state-year observations across 50 states and 8 years. Because some independent variables are lagged, we lose one year of observations, so the final sample consists of 357 state-year observations.

For our primary dependent variable of interest, entry by environmental entrepreneurs, (*Green Building Entry*), we utilized the GreenSpec Directory of green building products and suppliers created by Building Green, an independent publishing company (BuildingGreen, 2007). The GreenSpec directory has been published annually every year since 1999 (with the exception of 2004) and identifies products screened on a criteria including products that can help to obtain LEED certification through conserving natural resources, saving energy or water, or avoiding toxic emissions. Data to code this measure was coded as the number of companies listed in the directory for each state-year in our panel.

In order to differentiate between environmental entrepreneurship and overall rates of entrepreneurial entry, we created a second dependent variable (*Employer Entry*). These data, which are a count of employing units reported for the first time, were collected from the US Census Bureau's *2010 Statistical Abstract National Data Book* and are publicly available. We utilized this dependent variable in testing Hypotheses 1, as described in the following section.

For our dependent variables, we measured the economic environment utilizing the state's real gross domestic product (*Real GDP*) which is simply an inflation adjusted report of the state income level.

The state's political environment was operationalized as the implementation of state level policies that support the adoption of LEED green building registration. We gathered data on 41 state-level policies (*State Policy*) from the Database of State Incentives for Renewable Energy and Efficiency (DSIRE) maintained at the North Carolina State Solar Center (DSIRE, 2008), and from an online database of incentives provided by the USGBC . The majority of these policies are requirements that state funded or occupied buildings must pursue LEED certification. Many states also offer economic incentives for green building. For example, the state of Oregon provides a "Sustainable Building Tax Credit" for buildings achieving Silver, Gold or Platinum LEED certification that is calculated based on the gross square footage of the project (Yudelson Associates, 2007). States may also provide assistance in gaining certification, such as New York's assistance program that supplies help in design coordination and LEED certification processes (Yudelson Associates, 2007). The state level variable was coded as a cumulative continuous variable for which "1" was added for each policy in effect.

For our measures of the socio-cultural environment, we utilized two measures. First, we operationalized the presence of environmental social movements as the number of members active in the USGBC. USGBC membership (*USGBC Membership*) was measured as the number of USGBC members in a given state for a given year. The membership data were collected from a public online database available at the USGBC homepage and coded as a count variable. Second, we measured to presence of environmentalist social norms using the League of Conservation Voters score for each state. Finally, we controlled for the overall political climate by including the state's cumulative score from the League of Conservation Voters (*LCV Score*) scorecard. The scorecard awards points based on how members of congress from a state voted on environmental measures, and thus represents the public support in a state for environmental causes. These data are publicly available at the League of Conservation Voters' website.

We specified several controls for the analysis. First, as an additional control for the economic environment, and for specific interest in the building industry, we controlled for the overall rate of construction by including the number of commercial building permits issued (*Total Construction*). These data were provided by Reed Construction data and are available from their website at [www.reedconstructiondata.com](http://www.reedconstructiondata.com).

Next, we controlled for economic opportunity driving entry into green building by controlling for the adoption of the LEED standard as the count of LEED registered projects in a state during a given year (*LEED Buildings*). This data was provided privately by the US Green Building Council.

To control for growth of overall entrepreneurial opportunity, we rely on a measure of the overall level of entrepreneurship in a state (Entrepreneurial Growth). Entrepreneurial Growth was measured utilizing the Kaufman Index of Entrepreneurial Activity (KIEA) (Fairlie, 2008). The KIEA measures the percent of individuals (ages 20-64) who do not own a business in the first survey month and then start a business in the following month with 15 or more hours worked. We utilized the annual summary report on state levels of entrepreneurial growth as a proxy for entrepreneurial activity in each state-year. This data is publicly available at <http://www.kaufman.org/kaufmanindex>.

Finally, we also control for the organizational density of the green building sector. Studies in population ecology have found an inverted U-shaped relationship between density and founding rates, suggesting that firm foundings are dependent upon the size of an industry (Carroll & Hannan, 1989). We constructed a variable of organizational density (*Field Density*), measured as a count of the total number of green building companies known to exist in a state for the previous year.

All appropriate variables were divided by population to control for the effect of population on total entry, green building entrants, LEED buildings, commercial construction and gross domestic product. Variables were also scaled to enhance interpretation of the coefficients.

## ***Methodology***

We utilize an ordinary least squares (OLS), fixed-effects panel model to measure the rate of entrepreneurial entry in each state. Because the dependent variable is event count data, we also considered a Poisson or Negative Binomial specification. We experienced convergence issues with these models when using fixed effects suggesting the data were not, in fact, a good fit for count models. The data set has a large range, with counts ranging from 0 to 74, and thus is not typical count data, suggesting that OLS was an appropriate model. In addition, we included, but did not report the results for, a full set of year dummy variables to account for the unobserved effect of time on the dependent variable.

-----  
*Insert Table 2 about here*  
-----

## ***Results***

Table 3 shows the estimates from the OLS specification. Model 1 in Table 3, the base model with only control variables for *Employer Entry*, illustrates that entrepreneurial entry is higher in states with higher *Commercial Construction* ( $p < .1$ ) and higher levels of *Entrepreneurial Growth* ( $p < .1$ ). As expected, *Field Density* was also highly correlated with entry ( $p < .001$ ).

-----  
*Insert Table 3 about here*  
-----

Model 2 tests the effects of the primary independent variables of interest for entrepreneurial entry. *Real GDP* has a positive and significant coefficient ( $p < .01$ ), providing partial support for Hypothesis 1, which stated that higher levels of gross domestic product in a state positively influences entrepreneurial entry in that state. Not surprisingly, the measures of green building *State Policy*, *USGBC Membership*, and *LCV Score* were not significant.

Model 3 presents the base model with only control variables for *Green Building Entry*. None of the control variables were significant. Model 4 presents the full model for *Green Building Entry*. The coefficient for *Real GDP* is not significant; however, it is positive supporting Hypothesis 1 which stated that the impact of Real GDP would be less for green building entrepreneurs than the general population of entrepreneurial entrants.

The coefficient for *State Policy* is not statistically significant, thus, Hypothesis 2 which stated that environmental entrepreneurship would be correlated with support from environmental policies in a region, was not supported. Similarly, the coefficient for USGBC Membership was not significant, thus Hypothesis 3, which stated that environmental entrepreneurship would be higher in regions with higher membership in social movements supporting environmentalism, was not supported.

Finally, *LCV Score* has a positive and significant coefficient ( $p < .05$ ), supporting Hypothesis 4 which stated that environmental entrepreneurship would be higher in states with higher levels of social norms of environmentalism. For every point increase in LCV Score we see a subsequent 56% increase in the rate of entry by green building suppliers.

As a robustness check we specified Model 5 in which we regressed our variables of interest on the percentage of green building entrepreneurial entries in a state in a given year (*Green Building Entry/ Employer Entry*). Results were consistent with Model 4, with only *LCV Score* having a significant coefficient ( $p < .05$ ).

## 5. DISCUSSION AND CONCLUSION

How does the social environment and the norms in which we are enmeshed influence the propensity of individuals to engage in entrepreneurial action? While past studies have struggled with this question because positive cultural belief about entrepreneurship are notoriously difficult to define, we took a different tact with this analysis. By explicitly linking both the social movements and social norms we studied with entrepreneurial ventures that produced and inherent social benefit through the reduction of degradation, we were able to gain a more fine-grained understanding of the impact of social norms on entrepreneurial entry.

In particular, our finding that the economic environment does not have the same impact on entrepreneurial entry for environmental entrepreneurs raises several interesting questions. It could be that entrepreneurs who enter into social and environmental ventures simply have greater passion for their venture, and ignore the economic signals of their environment. Or, perhaps these entrepreneurs are simply less educated on the financial risks of undertaking their new ventures in less than rosy economic times. Based on our findings, it does not seem that the broad economic environment, as typified by real gross domestic product, nor the sector specific economic conditions, as represented by overall commercial construction, were influential for new ventures in green building, while each factor was positively correlated with the overall rate of entrepreneurial entry. This implies that for social entrepreneurs, not only is their mission different, but their motivations and economic analysis is quite different as well. While one limitation of this study is our inability to dig further into these differences with panel data, this finding represents a rich area of future exploration for the role of affect and passion in social and environmental entrepreneurship.

Our second finding of interest was the surprising lack of correlation between state policy, USGBC membership and the entry of green building entrepreneurs. There are several explanations for this result. First, it could be that the policies which encourage adoption of the LEED program do not necessarily encourage entrepreneurial entrants. In examining these policies, we found that the majority (71%) of the policies we found focus on state owned, funded or occupied buildings. It is conceivable that such a policy could even suppress entrepreneurial entry, as these large contracts could be seized by incumbent firms with existing relationships with state officials.

Our lack of findings regarding the relationship between USGBC membership and entrepreneurial entry is more puzzling and seems to be at odds with Lee and Sine's finding that Sierra Club Membership is highly correlated with wind farm entrants (2009). Perhaps because the USGBC is an organizational membership, rather than an individual membership, it is an inferior indicator of underlying social movements, and more reflective of large businesses commitment to the institution of LEED. It could be that large-scale membership of the USGBC represents a "crowding out" effect in which the positive effect of early memberships are cancelled out as organizational density reaches higher levels.

Perhaps our most interesting finding is the strong, persistent positive correlation between environmental social norms, as represented by the LCV score and green building entry. Meek and his colleagues found similar impacts (Meek et al., Forthcoming) for the solar industry in a recent study. Our study implies that social-norms, the unwritten rules by which individuals chose their habits and associations, provide a more significant influence on environmental entrepreneurs than economic, political or even social movement conditions in a region. One could argue that LCV score simply represents the political will of a state's congressional

representatives, and the correlations we see are driven by the policies these individuals champion and influence. However, because our study also includes the specific policies targeting the green building industry, and the growth in overall entrepreneurship in the state, we argue that LCV is an excellent representation of the social norm of environmentalism in a region.

As we seek to discover the impact of the socio-cultural environment, social, and specifically, environmental entrepreneurship provides us with a rich setting to tease out these illusive relationships. This study broadens the growing social entrepreneurship literature by showing that it is important to examine not only the potential effect of entrepreneurship on society, but also the effect of social forces on entrepreneurial entry.

## REFERENCES

- Aldrich, H. E. & Fiol, C. M. 1994. Fools rush in? The institutional context of industry creation. Academy of Management Review, 19(4): 645-626 pages.
- Aldrich, H. E. 1999. Organizations Evolving. Thousand Oaks, CA: SAGE Publications Ltd.
- Anderson, T. L. & Leal, D. R. 2001. Free Market Environmentalism (Revised ed.). New York Bolton: Palgrave Macmillan  
H. B. Fenn & Company Ltd. Distributor.
- Austin, J., Stevenson, H., & Wei-Skillern, J. 2006. Social and Commercial Entrepreneurship: Same, Different, or Both? Entrepreneurship: Theory & Practice, 30(1): 1-22.
- Baumol, W. J. 1990. Entrepreneurship: Productive, Unproductive, and Destructive. Journal of Political Economy, 98(5, Part 1): 893-921.
- Blanchflower, D. G. & Meyer, B. D. 1994. A Longitudinal Analysis of the Young Self-Employed in Australia and the United States. Small Business Economics, 6(1): 1-19.
- Bruce, D. & Mohsin, M. 2006. Tax Policy and Entrepreneurship: New Time Series Evidence. Small Business Economics, 26(5): 409-425.
- Butler, J. S. & Herring, C. 1991. Ethnicity and Entrepreneurship in America: Toward an Explanation of Racial and Ethnic Group Variations in Self-Employment. Sociological Perspectives, 34(1): 79-94.
- Camp, S. M. 2005. Patterns of Entrepreneurship Development. In M. A. Hitt & R. D. Ireland (Eds.), The Blackwell Encyclopedia of Management, Second Edition: Entrepreneurship, Vol. 3: 204-208. Malden, MA: Blackwell Publishing.
- Carroll, G. R. & Hannan, M. T. 1989. Density Delay in the Evolution of Organizational Populations: A Model and Five Empirical Tests. Administrative Science Quarterly, 34(3): 411-430.
- Davidsson, P. 1995. Culture, structure and regional levels of entrepreneurship. Entrepreneurship and Regional Development, 7(1).
- Davidsson, P. & Wiklund, J. 1997. Values, beliefs and regional variations in new firm formation rates. Journal of Economic Psychology, 18(2-3): 179-199.
- de Soto, H. 2000. The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else. London: Bantam Press Limited.
- Dean, T. J. & McMullen, J. S. 2007. Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. Journal of Business Venturing, 22(1): 50-76.

- DiMaggio, P. J. & Powell, W. W. 1983. The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. American Sociological Review, 48(2): 147-160.
- Elster, J. 1989. Social norms and economic theory. Journal of Economic Perspectives, 3(4): 99-117.
- Giannetti, M. & Simonov, A. 2004. On the Determinants of Entrepreneurial Activity: Social Norms, Economic Environment and Individual Characteristics. Swedish Economic Policy Review, 11: 269-313.
- Harper, D. 1998. Institutional Conditions for Entrepreneurship. Advances in Austrian Economics 5: 241-275.
- Hayton, J. C., George, G., & Zahra, S. A. 2002. National Culture and Entrepreneurship: A Review of Behavioral Research. Entrepreneurship: Theory & Practice, 26(4): 33.
- Kilby, R. W. 1993. The study of human values: Lanham, MD, England: University Press of America.
- Kluckhohn, C. 1951. Values and value-orientations in the theory of action: An exploration in definition and classification. In T. Parsons & E. Shils (Eds.), Toward a general theory of action. Cambridge, MA: Harvard University Press.
- Krueger, N. F., Reilly, M. D., & Carsrud, A. L. 2000. Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(5-6): 411-432.
- Lipset, S. M. 2000. Values and entrepreneurship in the Americas. In R. Swedburg (Ed.), Entrepreneurship: the Social Science View.
- McGrath, R. G., MacMillan, I. C., Yang, E. A.-Y., & Tsai, W. 1992. Does culture endure, or is it malleable? Issues for entrepreneurial economic development. Journal of Business Venturing, 7(6): 441-458.
- Meek, W. R., Pacheco, D. F., & York, J. G. Forthcoming. The impact of social norms on entrepreneurial action: Evidence from the environmental entrepreneurship context. Journal of Business Venturing, In Press, Corrected Proof.
- Mokyr, J. 1990. The Lever of Riches: Technological Creativity and Economic Progress. New York: Oxford University Press.
- Murray, R. 2008. Smartmarket Trends Report 2008: McGraw-Hill Construction Analytics.
- North, D. C. 1990. Institutions, Institutional Change and Economic Performance. New York, New York: Cambridge University Press.
- Olson, M. 2000. Power and prosperity : outgrowing communist and capitalist dictatorships. New York: Basic Books.

- Paul, K. 2009. Green for the Masses, Newsweek.
- Pearce, J. L., Dibble, R., & Klein, K. 2009. The Effects of Governments on Management and Organization. The Academy of Management Annals, 3(1): 503-541.
- Pernick, R. & Wilder, C. 2007. The Clean Tech Revolution: The Next Big Growth and Investment Opportunity. New York: HarperCollins Publishers.
- Scott, W. R. 1995. Institutions and Organizations. Thousand Oaks: SAGE.
- Shane, S. 1996. Explaining Variation in Rates of Entrepreneurship in the United States: 1899-1988. Journal of Management, 22(5): 747-781.
- Shane, S. 2004. A General Theory of Entrepreneurship: The Individual-Opportunity Nexus. Northampton: Edward Elgar Publishing Incorporated.
- Short, J. C., Moss, T., W., & Lumpkin, G. T. 2009. Research in social entrepreneurship: past contributions and future opportunities. Strategic Entrepreneurship Journal, 3(2): 161-194.
- Sine, W. D., Haveman, H. A., & Tolbert, P. S. 2005. Risky Business? Entrepreneurship in the New Independent Power Sector. Administrative Science Quarterly(50): 200-232.
- Sine, W. D. & Lee, B. 2009. Tilting at Windmills? The Environmental Movement and the Emergence of the U.S. Wind Energy Sector. Administrative Science Quarterly, 54(123-155).
- Sobel, R. S. 2008. Testing Baumol: Institutional quality and the productivity of entrepreneurship. Journal of Business Venturing, 23(6): 641-655.
- Thomas, A. S. 2000. A Case for Comparative Entrepreneurship: Assessing the Relevance of Culture. Journal of International Business Studies, 31(2): 287-301.
- USGBC. 2004a. An Introduction to the U.S. Green Building Council and the LEED Certification Program.
- USGBC. 2004b. An Introduction to the U.S. Green Building Council and the LEED Certification Program.
- USGBC. 2005. LEED for New Construction and Major Renovations - Version 2.2: US Green Building Council.
- USGBC. 2008a. Green Building By the Numbers.
- USGBC. 2008b. LEED-NC Version 2.2 Registered Project Checklist.
- Van Liere, K. D. & Dunlap, R. E. 1980. The Social Bases of Environmental Concern: A Review of Hypotheses, Explanations and Empirical Evidence. Public Opinion Quarterly, 44(2): 181-197.

Weber, K., Heinze, K. L., & DeSoucey, M. 2008. Forage for Thought: Mobilizing Codes in the Movement for Grass-fed Meat and Dairy Products. Administrative Science Quarterly, 53(3): 529-567.

York, J. G. & Venkataraman, S. The entrepreneur–environment nexus: Uncertainty, innovation, 1 and allocation. Journal of Business Venturing, In Press, Corrected Proof.

Yudelson, J. 2007. The Green Building Revolution. Washington, DC: Island Press.

***Table 1 – Key Factors in Obtaining LEED Certification (LEED-NC)***

---

<b><i>LEED Prerequisite</i></b>	<b><i>Key Issues Addressed through Credits</i></b>
1. Sustainable Sites	Develop only on appropriate sites, provide for non-auto access, preserve open space, reduce light pollution
2. Water Conservation	Reduce use of potable water for irrigation and for sewage conveyance
3. Energy and Atmosphere	Reduce energy use, use less harmful refrigerants, generate renewable energy on-site, provide for ongoing energy savings, purchase green power
4. Materials and Resources	Provide for recycling, reuse existing building, reduce construction waste, use rapidly renewing materials, use regionally sourced materials
5. Indoor Environmental Quality	Improve indoor air quality, increase outside ventilation, use only nontoxic finishes, carpets, and composite wood products, provide individual comfort control, provide daylighting and views to outdoors
6. Innovation and Design Process	Provide for exemplary performance beyond LEED standards, use of LEED Accredited Professionals on design team

---

Source: (USGBC, 2005; Yudelso, 2007)

**Table 2 – Summary statistics and corelations of the variables**

Variable	Obs	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8
1 Green Building Entry	400	6.06875	7.834737	0	74								
2 Employer Entry	400	17966.22	21855.71	1338	167047	0.6905							
3 Commercial Building	400	345.605	359.5093	8	2774	0.5475	0.8016						
4 LEED Buidling	400	24.385	61.49647	0	826	0.3434	0.4653	0.4291					
5 Entrepreneurial Growth	400	29.55186	9.308417	8.166	72.373	-0.055	-0.0069	-0.0505	0.0404				
6 Real GDP	400	208529.2	249498.5	17331	1539444	0.6859	0.9478	0.8407	0.5311	-0.0519			
7 State Policy	400	0.27	0.642754	0	4	0.1688	0.2889	0.1075	0.4137	0.0314	0.3183		
8 USGBC Membership	400	27.0925	64.32533	0	836	0.379	0.5117	0.4546	0.9535	0.0413	0.5666	0.425	
9 LCV Score	400	90.1375	57.50483	0	200	0.2984	0.1743	-0.0414	0.1509	-0.2463	0.1829	0.3639	0.1532

**Table 3 – OLS Regression for Entrepreneurial Entry and Green Building Entry**

	<b>Model 1</b> Controls Ent. Entry	<b>Model 2</b> Fixed Effects Emp. Entry	<b>Model 3</b> Controls GB Entry	<b>Model 4</b> Fixed Effects GB Entry	<b>Model 5</b> Fixed Effect GB Entry/ Emp. Entry
<b><u>Controls</u></b>					
Commercial Construction	1.58+ (0.84)	2.76** (0.93)	-1.96 (2.27)	-0.60 (2.50)	0.01 (0.13)
LEED Buildings	0.39 (4.05)	-0.41 (4.54)	0.01 (0.01)	0.02 (0.01)	-0.22 (0.81)
Ent. Growth	0.46+ (0.25)	0.44+ (0.25)	-0.00 (0.00)	-0.00 (0.00)	1.03 (2.32)
Field Density	0.42*** (0.05)	0.41*** (0.05)	0.35*** (0.05)	0.34*** (0.05)	0.33*** (0.05)
Not Reported- State & Year Fixed Effects					
<b><u>Independent Variables</u></b>					
Real GDP		0.04** (0.02)		0.48 (0.43)	0.00 (0.00)
State Policy		-1.26 (4.98)		-0.02 (0.01)	14.87 (56.10)
USGBC Membership		-33.76 (33.73)		0.04 (0.09)	0.24 (0.76)
LCV Score		-5.55 (101.66)		0.56* (0.28)	2.38* (0.95)
Observations	350	350	350	350	350
$R^2$	0.31	0.33	0.42	0.44	0.45
Adjusted $R^2$	0.17	0.18	0.31	0.31	0.33

Standard errors in parentheses

+ p<.10, \* p<.05, \*\* p<.01, \*\*\* p<.001

Note: Variable population adjusted and scaled to ease interpretation