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Cultural Antecedents of Green Entrepreneurship in Saudi Arabia: An Institutional Approach

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Abstract: Recent decades have brought cultural changes toward the increase of environmentally-friendly initiatives such as green entrepreneurship. Some countries are failing to develop environmental initiatives, whereas others are transitioning and advancing toward this new trend. In particular, Saudi Arabia has initiated efforts toward becoming an ecologically-friendly society. Motivated by this, we explore whether cultural characteristics are associated with green entrepreneurship in Saudi Arabia. Institutional economics is adopted to frame our hypotheses and analysis. The hypothesized relationships were empirically tested in a sample of 84 observations from 21 cities during the period 2015–2018. Data were collected from reports by the Saudi General Authority and analyzed through regression models. The main results show that cultural characteristics, such as environmental actions, environmental consciousness, and temporal orientation, increase the level of green entrepreneurial activity across cities in Saudi Arabia. The findings of this study contribute to existing knowledge on green entrepreneurship, as well as to the discussion of implications for policy and practice related to environmentally-friendly productive activities.

Keywords: green entrepreneurship; sustainable entrepreneurial activity; culture; institutional approach; developing countries; Saudi Arabia

1. Introduction

Research on sustainable entrepreneurship has considerably grown in recent decades, which has enabled scholars to link entrepreneurship and sustainable development [1]. Ultimately, researchers have utilized the term “sustainable entrepreneurship”, along with added expressions such as “green entrepreneurship” or “environmental entrepreneurship” [2–5]. Although there are slight differences among these terms, in general, this type of entrepreneurial activity is seen as part of a new global societal trend in an era where the focus on green policies is stronger than ever. Furthermore, green-related entrepreneurship has become an important subfield of entrepreneurship research [2]. Such societal challenges bring a need for better knowledge of both the antecedents and consequences antecedents of green entrepreneurial activity. In this paper, we consider green entrepreneurship, in line with an intensified call for conducting business in a “greener” way. A preoccupation with green entrepreneurial activity has thus arisen [6–8], boosted by a culture of green entrepreneurship that shapes new breeds of entrepreneurs [9] and contributes to molding social norms that support this “greenism” [10].

In this study, it is suggested that the socio-cultural norms that enhance green entrepreneurial activity in Saudi Arabia offer the opportunity to observe the early roots of post-material culture [11]. In Saudi Arabia, cultural identity is the feeling of belonging to a group and is part of a person's self-concept and self-awareness. This relates to generations, nationality, religion, race, language, social class, region, or any social group that has its own unique culture [11]. In this way, cultural identity is not only a distinctive feature of the individual, but of a similar group of people who share the same views [12]. Likewise, culture plays a direct and vital role in achieving the three strategic pillars of Saudi Arabia's 2030 vision, which are: (1) building a prosperous economy, (2) building a vibrant society, and (3) building a homeland [13]. One of the main objectives tangential to these three pillars involves increasing environmentally-friendly activities, including green entrepreneurship. However, there is a lack of evidence that enables us to gain a full understanding of whether different cultural characteristics are helpful in accomplishing this sustainable production objective.

From an institutional economics point of view [14,15], the role of formal (particularly economic regulations) and informal institutions (particularly culture) in sustainability has been discussed [16]. Meek et al. [17] and Urbano et al. [18] also discussed how informal institutional factors may explain more differing types of entrepreneurial activities, including green entrepreneurship, than formal institutions. In this sense, according to Adler [19] and Andries and Stephan [20], there are institutional factors characterized by cultural differences in environmental activities and actions. Encouraging an environmental consciousness that embraces these aspects is one way to expand sustainability [21,22]. It is also vital to comprehend how entrepreneurship accounts for social values, beliefs, and culture, which change over time and space [23,24]. In this regard, organizational processes have a temporal dimension, often implicit and without discourse, that clearly characterizes the entrepreneurial process [25]. It is still unknown, however, whether these three institutional factors as cultural characteristics (i.e., environmental actions, environmental consciousness, and temporal orientation) directly explain green entrepreneurship [9,17,22] in developing countries such as Saudi Arabia.

Thus, in this study, institutional economics [14,15] is used to enhance our comprehension of cultural influences (i.e., informal institutions) on green entrepreneurship in Saudi Arabian cities. Drawing on this, it is suggested that national culture affects environmentally-friendly policies [16]. In particular, we analyze the influence of three cultural factors on green entrepreneurship: (1) environmental actions, (2) environmental consciousness, and (3) temporal orientation. To test the suggested hypotheses, we rely on balanced panel data, with a sample of 84 observations during the 2015–2018 period. After testing the fixed-effects models for 21 cities in Saudi Arabia, we find that the three assessed cultural factors positively explain green entrepreneurial activity across cities in Saudi Arabia.

While the field of green entrepreneurship is relatively new and empirical documentation has started to make a contribution to existing knowledge, there is still no consensus on defining this term [10,22,26,27]. With this in mind, our contribution to the literature is twofold. Firstly, many scholars have studied the influence of informal institutions and values on the intentions and actions of entrepreneurs [17]. Scholars have assessed different informal factors in their studies, but this paper reveals a further connection between informal institutional factors, particularly cultural ones, and green entrepreneurship. Secondly, being both an oil producer and a new member of a consortium that focuses on the environmental consequences of economic activities, Saudi Arabia is an excellent case study of this subject, and scholars and practitioners may find these results useful for learning and decision making. Furthermore, the relationship between (informal) institutions and green entrepreneurship offers a fertile means of explanation that can contribute to policy-making. Knowledge of the consequences of green entrepreneurial practices may allow for forecasting the long- and short-term changes in society, and also for understanding which types of incentives could be provided in order to direct social and sustainable development [21]. A significant set of green-aware companies would be expected to change and encourage others to adopt green entrepreneurship.

After this brief Introduction, Section 2 contextualizes the case of Saudi Arabia, and Section 3 introduces the conceptual foundations for the literature analysis and hypothesis development.

In Section 4, the methodology and data are explained, and then, the findings are presented and assessed in Section 5. Finally, Section 6 focuses on the conclusions, implications and limitations for potential research avenues.

2. Green Entrepreneurship in Saudi Arabia

Previous academic work indicated a positive correlation between entrepreneurship and economic expansion [18]. Furthermore, entrepreneurship encourages the economy to improve through creative methods [28]. In general, the more active the entrepreneurship is, the more positive the influence on economic growth will be [18,28]. In addition, the actions of entrepreneurship are deemed an indication of the vital determinants concerning localized economic progression [29]. Indeed, policy-makers expect that entrepreneurship has a positive influence on the country's wealth and employment [29]. Likewise, several scholars have argued that when institutions are not properly working, the influence of entrepreneurship might be negative [29].

Indeed, this is the case of developing countries [29]. Accordingly, Saudi Arabia is enjoying an emerging global economic boost, relying at present on oil, but with ambitious strategies to diversify the economy away from these natural resources and toward the promotion of entrepreneurial expansion [30]. Currently, Saudi Arabia is living through a significant social and economic renaissance by guiding itself confidently toward a lucrative future, as well as creating a diversified and sustainable financial backbone by attracting knowledge-based investors [31]. As it grows, a corporate business has forwarded strategies, heralding the requirement to monitor entrepreneurship closely.

Due to worldwide affiliation toward the economy as the basis of supporting the state's competitive prowess, through close attention to youth creativity, the Saudi government has actively supported entrepreneurship to establish a competitive and sustainable Saudi nation [31]. Within Saudi Arabia, there are many obstacles and constraints that entrepreneurs must face, including the non-existence of an independent regulatory strategy and framework for the responsible progression of enterprises. This is considered to be one of the most significant challenges facing entrepreneurship. In addition, Saudi Arabia's involvement with the World Trade Organization concluded with several failed endeavors, unable to compete with international initiatives and resources [31]. Despite this, the Saudi government envisions a tendency toward green entrepreneurship among the younger generation [32]. Hence, Saudi Arabia has encouraged its youth to enhance free business through the offer of scholarships, examples being the Fastest 100 Growing Companies Award, the Prince Salman Award for Entrepreneurship, and the Most Competitive Youth Award [33]. This level of encouragement and innovative progression clearly motivates entrepreneurs to pursue green activities [33].

According to the 2019 Global Entrepreneurship Monitor report, almost 76.3% of the adult population in Saudi Arabia believes that the country offers better opportunities to start a business [34]. Part of this success can be attributed to the use of green entrepreneurship, which has allowed businesses to appreciate that there are environmental, economic, and social factors in running their businesses. Therefore, these businesses attempt to seek innovative solutions to the way in which products and services are procured and consumed. Similarly, Saudi Arabia has scaled-up its business operation models, which can assist in greening the Saudi Arabian economy. Saudi Vision 2030 believes that the Saudi Arabian economy should offer opportunities that can stimulate the economy, while at the same time generating revenues for other sectors [35].

The result is that businesses operate in an environment that is safe and healthy, which is important for the survival of any business and guarantees a competitive advantage over others. Entrepreneurship requires that a business discovers new ideas that can be used to make the business flourish over time. Through this, new business ideas are created while the businesses experience exponential growth. With regard to innovation, Saudi Arabia now has policies that mean to help entrepreneurs, while at the same time stimulate growth for a competitive edge [36]. In order to support innovation and entrepreneurship, the country uses Saudi Arabia Vision 2030 as a mechanism to encourage a national culture that ultimately promotes the growth of enterprises, as they play a critical role in the economy.

3. Literature Review

To comprehend the possible mechanisms behind the relationship between culture and green entrepreneurship, we used institutional economics [14,15]. It is suggested that institutions involve the deeper aspects of social strata, acting as authoritative guidelines and curbs in behavior [14,15]. North [14,15] classified institutions as formal (i.e., constitutions, contracts, common law, government policy) and informal (i.e., attitudes, values, norms, beliefs, or in broader terms, the culture of a society). Generally, institutions can be viewed as rules within society, shaping human interaction [14] (p. 3). Despite the lack of formal sanctions, they are pervasive and direct behaviors. Formal institutions can change quickly, yet informal ones are slower to change [37]. The institutional economics framework offered by North [14,15] may contribute to our understanding of how culture affects productive activities such as green entrepreneurship. Although there have been a number of studies analyzing formal institutions as initial steps toward entrepreneurial activity (see Bjørnskov and Foss [38], Urbano et al. [18], and Zhai et al. [39] for thorough literature reviews), it has been argued that informal institutions are more influential within society [18,40,41]. An additional conclusion relates to interactions between formal and informal institutions, with many regulations potentially working better depending on the cultural values of society [42]. Informal institutions limit the influence of formal bodies and vice versa [43].

Similar ideas, particularly focused on culture, have explored green entrepreneurship [17,18]. Although there is not a consensus about what green entrepreneurial activity means [44] (see Appendix A for different definitions), we adopt the approach offered by Gast et al. [10], who defined this sort of activity as “the process of identifying, evaluating and seizing entrepreneurial opportunities that minimize a venture’s impact on the natural environment and therefore create benefits for society as a whole and for local communities” [10] (p. 46). This is similar to the work of Silajdžić et al. [45] (p. 377), who suggested that green entrepreneurs “are those who start businesses based on the principle of sustainability with strong underlying green values and who sell green products or services”, and also Yi [46] (p. 4), who suggested that green entrepreneurship is “a kind of social activity that aims at protecting and preserving the natural environment”. Hence, green entrepreneurship is characterized by some basic features of entrepreneurial activity coupled with giving priority to the skills and initiative of the entrepreneurial seeking success through the social or environment innovations for sustainability [1].

Culture may be seen as heavily influential when pursuing sustainability [47] (p. 236). Several studies view culture as a significant variable in sustainability-related actions [48–51]. For instance, cultural habits play a vital role in assessing variation within corporate social responsibility (CSR) [52]. Similarly, regarding consumer views of corporate responsibility, studies advocate global culture-related differences [53,54]. Some scholars that have examined the relationship between the rate of green entrepreneurship and culture have provided a deeper understanding of how culture is defined in international and inter-cultural business management research [55,56]. Having a socially supportive culture affects the level of national entrepreneurship and its quality. In this paper, we focused on green entrepreneurship and its association with culture, through cultural habits as proxies of informal institutions, as Stephan et al. [54] suggested. Although there might be other important institutional factors affecting sustainable development, including green entrepreneurship [16,18], cultural aspects observed through actions, consciousness, and temporal orientation reflect what societies think and do to support entrepreneurship and other productive activities in the pursuit of sustainability [17].

Hence, the main cultural dimensions that we examined are environmental actions, environmental consciousness, and temporal orientation, which might have an association with green entrepreneurship. In regard to the latter (i.e., temporal orientation), it is suggested that long-term economic development reflects shared values and beliefs (i.e., informal), as well as laws and bureaucracy (i.e., formal institutions) that regulate human interactions [15]. This is due to cultural norms forcing limitations on formal institutional development [36]. The sedentary nature of cultural change also presents obstacles for extreme institutional change [56]. People thus observe dominant practices (e.g., in green entrepreneurship) and reflect them through their own values, attitudes, and behaviors. There is

no doubt that total entrepreneurial activity acts as a catalyst for economic growth [23,41], so those values, attitudes, and behaviors are transferred from entrepreneurs to society. The mechanisms are quite simple: institutions boost entrepreneurship, as they create the context for economic growth and other developmental outcomes [18]. From this point of view, the environmental actions focused on entrepreneurship can shed light on the processes that are common in a green approach to economic activity. Green entrepreneurs are a different type of entrepreneur [9]. Instead of building their life on profit-making, they are also concerned about social justice [9] (p. 828). Personal motivation and a forward-thinking approach to sustainability are also important characteristics of entrepreneurs [9] (pp. 837–840).

In general, green entrepreneurship plays a rising role in the protection of the environment [46]. Based on this idea, Ndubisi and Nair [57] suggested that there is a need for companies to adopt a green approach. This is embedded in a culture of reflexive development, where concern about environmental issues and the need for sustainability become the societal norm. This creates another link between existing institutions and environmental consciousness, which consists of the propensity to encounter examples of green entrepreneurship in the immediate area, as well as values reflected by entrepreneurs. It is important to contextualize the situation of green entrepreneurs [58], which is consistent with theories of post-modernization and reflexive modernization [11]. People become aware (or conscious) of the side-effects of technology and try to control them. This is exactly the case with environmental consciousness for green entrepreneurs, who tend to live in relative abundance and develop a culture of concern about the quality of the environment and sustainability. They are active both in the existing businesses that pursue a process of greening, but also as part of new businesses that become green as soon as they are set up [27].

The institutional perspective [14,15] enables us to understand the reasons why governments encourage all members in society to support sustainability initiatives actively such as green entrepreneurship [59]. Such a culture created is visible through social norms and policies that foster green entrepreneurial activity. Indeed, companies that promote green measures are even more visible for societies: they are easier to notice and create an institutional framework that individuals can observe and internalize. Evidence for this interpretation is found in a number of studies, such as Thang et al. [60], Papadopoulos et al. [61], Silajdžić et al. [45], and Karimi and Nabavi [62], which demonstrated relationships between social and structural interventions and subsequent attempts by organizations to engage in “greening” of their entrepreneurial activities. These studies showed different attempts of introducing green entrepreneurial practices in Vietnam [60], Greece and Cyprus [61], Bosnia and Herzegovina [45], and Tehran [62]. All these countries were engaged in a period of economic and social change, which required involvement and intervention with wider stakeholders.

Interpreting an institutional change entails that culture can be applied at various levels [56]. When considered at the aggregate level, one may observe cultural descriptive norms and practices, whereas at the individual level, cultural values trigger attitudes and behaviors focused on the environment. Policies that promote green entrepreneurship and corresponding green behaviors are based on a culture of caring for others, combined with promoting performance, as demonstrated or hypothesized by various scholars [16,22,27,63]. Several authors [9,19,64,65] have also noted such key cultural dimensions, which need further attention. Hence, in this paper, we focused on environmental actions, environmental consciousness, and temporal orientation.

It is worth noticing that embracing sustainability does not automatically lead to practicing it [44]. Cultural values may precede practices since they dictate behavior [66]. There are cultural differences regarding the initial mode of activity; some cultures emphasize action and outcomes [19], and in developing countries, environmental actions are of prime importance [21]. Green entrepreneurs run businesses to achieve dual environmental and business objectives to ensure their sectors are more sustainable [67,68]. For those wishing to be greener in their businesses, there is a disparity between self-principle customers’ interests, affecting public behavior [22]. Their motivation to act

is initiated by the desire to prevent and solve specific environmental issues or to alter their sectors; hence, wider alternatives and more environmentally-friendly practices become normalized [69]. Where businesses previously placed priority on cost-saving, environmental benefits may be of only minor concern, suggesting that a global, mainstream view of green principles is in its infancy. Consumers are partially motivated by sustainability itself, but are also motivated by simultaneously occurring underlying and/or societal sustainability issues [70]. Evans and Abrahamse [71] forwarded the argument that appealing to these underlying issues may expand sustainability commitment. While saving money may attract individuals to sustainable habits, it may have limited influence if wider consumption practices continue [22]. We thus suggest the hypothesis that:

Hypothesis 1 (H1). *Environmental actions are positively associated with green entrepreneurship in Saudi Arabia.*

There has recently been increasing environmental consciousness or interest in protecting the environment around the world [21]. Indeed, environmental awareness has recently increased in society at every level [17]; however, there are differences in cultures, and people's relationships differ regarding the natural environment [17]. In some cultures, individuals have complete control over their environment, while others live in environmental harmony and view people and nature as one. In yet other cultures, individuals are controlled by the environment, accepting the power it conveys [19]. Entrepreneurship and wealth/economic growth are closely linked, hence heavily promoted and encouraged in the modern world [41]. The environmental consciousness also leads green entrepreneurship to affect green innovation and social-environmental responsibility [72]. Recently, with increased interest in environmental and social issues, entrepreneurship conjoins the objectives of sustainable development and the accumulation of wealth [73,74].

This consciousness may be observed across age groups. However, there is increasing evidence from different cultural contexts showing that the younger generations (treated as a proxy for those of typically undergraduate age) are especially interested in environmental conscientiousness, actively seeking educational opportunities that support green entrepreneurship and/or sustainability initiatives. For example, Soomro et al. [32] and Yi [46] provided evidence about the positive association between environmental consciousness through education and its subsequent intent to engage young people in green entrepreneurial activities. These studies were carried out in Pakistan and China, respectively, indicating a broader global awareness of environmental conscientiousness and pointing toward the potential wider generalizability of this particular study on the basis of transferable concepts in rapidly developing economies. Similarly, evidence from Serbia also found that the social desirability for environmental education is translated into economic and environmental practice [75].

Environmental consciousness is related to the social image, which supports individuals to become green entrepreneurs and take care of the environment [76,77]. In emerging markets, there is a sensitivity to environmental issues and an effort to combine them with green entrepreneurship [77]. Furthermore, in developing countries, the need to produce environmentally-friendly and ecological resources has swayed entrepreneurs to give careful consideration to environmental issues in their objectives [21]. Entrepreneurs are now motivated to consider environmental issues to meet their social responsibility, so the exploration of green entrepreneurship extends research through non-financial desires [78]. Green entrepreneurs negotiate disparity between business activities, environmental mission statements, and wider contexts relating to sustainable and growth-focused economies [22]. As such, entrepreneurs interested in sustainability, as influencers, prioritize environmental issues over profits where possible, being conscious of the optimal effort to reduce damages to the environment. They may present a win-win situation for both economic growth and the environment and may meet their own personal goals. These entrepreneurs gradually enhance the environment and educate a wide audience on benefits related to environmental protection through products and services [27]. Green entrepreneurs are labeled as novel entrepreneurial investors, aiming to integrate environmental

awareness with business advancement through holistic measures; a unique logical approach as compared to conventional entrepreneurs [74]. Indeed, the commitment to the environment displayed by green entrepreneurs enhances their reputation compared to other entrepreneurs [64]. On this basis, we propose that:

Hypothesis 2 (H2). *Environmental consciousness is positively associated with green entrepreneurship in Saudi Arabia.*

Our final cultural factor deals with temporal orientation, utilized in the literature to evaluate cognitive involvement throughout history, the present, and into the future [79,80]. There are cultural differences regarding an individual's temporal orientation, that is to say orientation to the past, present, or future [25]. In past-oriented cultures, tradition is central to the wisdom of societal life [25], whereas future-oriented societies disregard the past and focus entirely on the future, resulting in an extensive long-term timeline [81]. In contrast, present-oriented cultures have a limited timeline, focusing on short-term gains [25]. This concept is vital, since it influences the manner in which individuals incorporate their perceptions of past experiences, present situations, and future objectives into their opinions, cognitions, and the way they behave [82]. For example, several authors have discovered that a present time perspective focuses less on future strategic processes than other differing cultures [81,83]. Individuals embedded in a present time perspective focus predominantly on the present, perceiving that future planning is futile, unlike those with a future time perspective [79]. Green entrepreneurs offer clear solutions regarding social transformation [84], creating long-term outcomes and an enhanced positive future.

Time itself is a factor that may help us to understand changing attitudes toward entrepreneurship [85]. For instance, organizational processes involve temporal dimensions that are implicit with no discourse, and temporal issues clearly and accurately describe the entrepreneurial process [25]. Past experiences and comprehension of previous activity are the basis on which present actions are taken, moving forward to future wealth gain. These temporal dimensions are carried out over many levels within entrepreneurial campaigns [25]. Entrepreneurs and the individuals working alongside them act in the present to ensure future gains [25]. Some of the characteristics of entrepreneurs derive from personal experiences and history, including temporal orientation (past, present, or future), along with the future time-based perspective, choosing deadlines, taking advantage of evolving opportunities, perceiving and anticipating problems and phase development concerns, as well as aims and ambitions for the future. This interpretation was observed in both Grinevich et al. [68] and Yi [46], who demonstrated the importance of both temporal and conceptual interpretations of green entrepreneurship is relative to prevailing circumstances. To a lesser extent, the earlier work of Papadopoulos et al. [61] supported this interpretation, although it was acknowledged that the main concerns of entrepreneurs were responding to government initiatives related to green entrepreneurship, which were still limited at that time. These are critical issues that need careful consideration for successful entrepreneurship [25]. At the industry or environmental level, time figures into the entrepreneurship equation on the basis of a quick response; the enhanced pace of technology results in obsolete software slowing down the process, leading to possible critical blockages in terms of meeting the demands of customers, suppliers, stockholders, and venture backers [25].

At the country level, there is an enhanced realization in entrepreneurial research that economic activity can be better comprehended within temporal, historical, spatial, institutional, and social contexts since they give individuals an enhanced opportunity to invest and set distinct boundaries for future activities [86]. A vital aspect of the social sustainability endeavor is that it emphasizes the business-based long-term benefits that society expects [87]. This is due to the fact that one of the objectives of sustainability is that of inter-generational equity [88]. The requirements of today's generations must not limit or compromise future generations [89]. It follows that in the future, society needs to be more aware of long-term impacts. Drawing on this idea, there is evidence on the

effect of green entrepreneurship on the organization's financial performance [72,77], which involves future planning. Furthermore, utilizing the green logic alongside the social and economic aspects in a flexible manner constitutes temporal adjustments [59]. Companies within these future-oriented cultures may well involve themselves in social sustainability practices, contributing to social justice, enhanced social recognition, and trust with and between stakeholders and society [89]. Based on these ideas, the following hypothesis is suggested:

Hypothesis 3 (H3). *Temporal orientation is positively associated with green entrepreneurship in Saudi Arabia.*

4. Methodology

4.1. Data and Variables

Extensive literature has prioritized the identification of major factors contributing to cultural differences. The concept behind this view is that human societies endure the same problems, for which there are many proposed solutions, and where each culture within society makes a choice. This suggests that societies may be classified in accordance with major cultural dimensions [90], which may in turn explain green entrepreneurial activities [17]. In order to understand this relationship, we used variables and data from a number of different sources, which are explained below.

4.1.1. Dependent Variable

For the dependent variable, we measured green entrepreneurship according to the Organisation for Economic Co-operation and Development (OECD) [91], which defines this particular type of entrepreneurial activity as an environmental commitment. This definition is also consistent with the conceptual foundation we adopted thanks to Gast et al. [10]. According to Kraus et al. [92], sustainability studies have focused mainly on issues involving the environment, which is an important issue in Saudi Arabia [13]. The information for our dependent variable came from annual reports (General Authority for Meteorology and Environmental Protection). This variable showed the percentage of small- and medium-sized enterprises (SMEs) that were environmentally friendly out of the total number of SMEs in the city. This variable was in line with Miska and Schiffinger's [59] focus on corporate sustainability practices and performance orientation practices as factors affecting green entrepreneurship. We note that there may be some methodological critique of using a dependent variable throughout a percentage [93], but in line with Liu and Xin [94], it was considered appropriate in the conditions of this study because the dependent variable was standardized.

4.1.2. Independent Variables

Environmental actions, which consisted of motivation for action and emphasize the value of the activity, were the independent variables. The motivation ratio was the development and growth of environmental capabilities. The value of the environmental actions was the percentage of the accomplished goals of the defined environmental measures in each city. According to Kraus et al. [92], environmental activities carried out are not only due to environmental awareness, but to meet legal regulations, minimize costs, and link to a community's sense of sustainability. In addition, green entrepreneurs show environmental actions by achieving dual environmental and business objectives and by wishing to transform sectors to become more sustainable [67,68]. The information for these variables came from annual reports (General Authority for Statistics in Saudi Arabia—Knowledge statistics) (see Table 1). The framing of mainstream and set "green" issues revealed evidence of the tensions and politics present when creating a green economy. Gibbs and O'Neill [22] presented a novel and interpretive concept, with the evolving issue of "being" and "becoming" a green entrepreneur, rather than the fixed categories presented in previous literature.

Table 1. Description of the variables.

	Variable	Description	Source
Dependent variable	Green entrepreneurship	This variable shows the percentage of the number of SMEs that are environmentally friendly out of the total number of SMEs in the city. Green entrepreneurship can be measured as environmental commitment [91]. The variable was standardized.	Annual reports of the General Authority for Statistics in Saudi Arabia.
	Environmental actions	The percentage of accomplished goals of the defined environmental measures in each city. The ratio involves the development and growth of environmental capabilities by the local government. There are environmental actions in achieving both environmental and business goals [67,68]. The variable was standardized.	
Independent variables	Environmental consciousness	The percentage of the maintenance of natural resources. This variable considers the reduction/control in the use of natural resources relative to outputs, by living in balance with natural forces [12]. The variable was standardized.	Annual reports of the General Authority for Statistics in Saudi Arabia.
	Time orientation	The percentage of public and private organizations that have adopted environmental measures in each city. As entrepreneurship needs to compete by taking advantage of fast-changing market conditions [94], this variable takes into consideration the speed at which organizations embrace environmental initiatives. The variable was standardized.	
Control variables	Annual growth rate	The value of a city's recourses for the agricultural sector. The variable was standardized.	Annual reports of the General Authority for Statistics in Saudi Arabia.
	The population of each city	The population of the area. The variable was standardized.	
	Size of the city	The size of the city in squared kilometers (km ²). The variable was standardized.	
	Education	The percentage of people who have a tertiary education in each city. The variable was standardized.	

General Authority for Statistics in Saudi Arabia: <https://www.stats.gov.sa/ar#>.

We considered environmental consciousness as the percentage of the maintenance of the natural resource, e.g., prudent use of water. The rate considered the reduction/control in the use of natural resources relative to outputs, by living in balance with natural forces [12]. Kirkwood and Walton [78] considered the environmental consciousness of green entrepreneurs as involving the manner in which they conduct their businesses while keeping to their environmental commitment. Hence, environmental preferences may allow for benefits exceeding simple cost-savings, since customers forge deals with entrepreneurship that are associated with a positive image and are recognized as “modern” [92]. The data for this variable came from annual reports (General Authority for Statistics in Saudi Arabia—Knowledge statistics). Kirkwood and Walton [78] studied the motivations and the key green aspects of entrepreneurs interested in sustainability issues, as well as the degree of the greening of the organization, so our variable could be comparable and useful and could build on the existing literature.

In temporal orientation, the percentage of public and private organizations that have adopted environmental measures in each city was considered. The information for this variable came from annual reports, which showed the speed at which organizations embrace environmental initiatives (General Authority for Statistics in Saudi Arabia—Knowledge statistics). Shipp et al. [82] examined the average percentage of temporal orientation. Entrepreneurs operating in such environments often need to compete by taking advantage of the fast-changing market conditions in terms of creating novel products or services, thus satisfying the requirements of emerging environmental needs [95].

4.1.3. Control Variables

We included other variables in our models to control for additional factors that might partly explain green entrepreneurship. The annual agricultural growth rate represents the value of a country's resources, which becomes increasingly sensitive to competitive forces in world markets. Environmental issues are also sensitive to world markets, as they shape the potential for economic growth by conditioning survival. In Saudi Arabia, unsustainable use of resources is an important issue, triggered mainly by the inadequacy of natural resources [13]. This challenges the sustainability of green entrepreneurship and requires many resources that depend on the annual growth rate of the agricultural sector [13]. The data used for this were from the annual reports of General Authority for Statistics in Saudi Arabia. The annual growth rate took into consideration the average value of the city's resources that each city produced yearly in the agricultural sector. We also controlled for the population of the city, as green entrepreneurship is aimed at minimizing threats to environmental resources, such as increased population rate [95,96].

One approach suggested for sustainability is a reduction in population growth [97]. Saudi Arabia is one of the world's most populous countries, growing from 4 million in 1960 to more than 33 million in 2018 [12]. The data here came from the annual reports of the General Authority for Statistics in Saudi Arabia, and the value of this control variable was the population in each area. The size of the city was also included as a control variable, as it may affect the number and quantity of environmental resources; a larger city is more likely to have access to more environmental resources than a smaller city [13]. We also controlled for the level of education; culture may be affected by the level of education, which may be needed for sustainable developmental objectives at all levels and social arenas, to transform society by re-classifying and updating education and to aid individuals in developing the skills and values required for sustainable development [98]. In addition, extant literature showed a significant and positive influence of education and sustainability orientation on green entrepreneurship inclination [32]. Furthermore, there was research suggesting that education had a positive correlation with entrepreneurial activity [99], and this variable was measured as a percentage of people with tertiary educational levels in each city. Both independent and control variables were also standardized. A summary of the variables we used in this study is presented in Table 1.

4.2. Method and Model

Fixed effects (FE) models were used to test whether environmental actions (EA), environmental consciousness (EC), and temporal orientation (TO) affect green entrepreneurship. In this regard, Equation (1) shows our main specification, which is estimated through linear regression:

$$\text{LnGE}_{it} = \alpha + \beta_1 \text{LnEA}_{it} + \beta_2 \text{LnEC}_{it} + \beta_3 \text{LnTO}_{it} + \phi_k \text{LnCV}_{k,it} + \varepsilon_{it} \quad (1)$$

where GE_{it} is green entrepreneurship in city i at time t ; EA_{it} represents the vector of environmental actions across city i and time t ; EC_{it} denotes environmental consciousness; TO_{it} is temporal orientation; ϕ_k represents the estimators for the k control variables (CV_{it} —population, size of the city, annual growth rate of agriculture, and education); and ε_{it} is the error term that captures those variables that might affect green entrepreneurship, but were unknown in this study. All variables were transformed into natural logarithms for a direct interpretation [41].

A city-level analysis enhances the more detailed exploration of entrepreneurship trends, both within and between states, as these can vary significantly [100]. In addition, since different cities may increase the level and regularity of observations, this may lead to having a higher level of confirmed and verified results. Considering different cities in an array of locations allowed us to evaluate any significant influence, while the panel data technique allowed us to observe time effects using a cross-regional approach [101]. Panel data are also better able to measure and identify effects not detectable simply in pure cross-section or pure time series data [101]. In this study, we focused only

on the fixed effects, since utilizing the full fixed model and carrying out the selection on the random effects within it resulted in additional noise, stemming from unnecessary fixed effects [101].

As noted, the advantages of this methodology in this study included that we were able to obtain a sample from Saudi Arabia with a regular time series. We also found that our final dataset contained a representative sample of this homogeneous group. Our completed sample consisted of panel data with 84 observations and 21 cities during the period spanning from 2015 to 2018.

5. Results

The statistics for the non-standardized variables in the study are presented in Table 2. Green entrepreneurship varied from 20.42 to 77.65%, with an average of 45.73%. Environmental actions ranged from 39.89 to 76.33%, with an average of 51.62% (standard deviation (SD) = 7.27%); environmental consciousness ranged from 34.52 to 86.53% (M = 56.56%, SD = 10.77%); and temporal orientation varied from 37.92 to 86.00% (M = 59.21%, SD = 10.89%). Pearson's correlation was run to assess the relationship between green entrepreneurship and environmental actions, environmental consciousness, as well as temporal orientation. The test revealed that some of the variables had significant positive relationships and some insignificant relationships. For example, environmental actions had no correlation with environmental consciousness ($r = 0.131$), although there was a small correlation between green entrepreneurship and environmental actions ($r = -0.024$) and temporal orientation ($r = -0.008$). Furthermore, there existed a correlation between green entrepreneurship and temporal orientation ($r = 0.216$), as well as between green entrepreneurship and environmental consciousness ($r = -0.014$). Lastly, there was a moderate correlation between environmental consciousness and temporal orientation ($r = 0.182$). Table 2 shows that the three cultural diminutions were statistically correlated with green entrepreneurship; thus, the correlations met our initial expectations.

Table 2. Descriptive statistics and correlation matrix.

	Variable	N	Mean	Std. Dev.	Min	Max	VIF	1
1	Green entrepreneurship	84	45.736	12.780	20.42	77.65		1
2	Environmental actions	84	51.620	7.272	39.89	76.33	1.120	−0.024
3	Environmental consciousness	84	56.595	10.778	34.52	86.53	1.410	−0.014
4	Temporal orientation	84	59.209	10.888	37.92	86.00	1.230	0.036
5	Population of the area	84	1983	2399	4761	8597	2.070	0.249 *
6	Size of the city	84	1230	1188	1200	5400	1.910	0.278 *
7	Annual growth rate	84	3.921	0.600	3.01	5.84	1.070	0.336 *
8	Education	84	62.177	7.123	47.85	81.45	1.150	0.653
			2	3	4	5	6	7
2	Environmental actions	84	1					
3	Environmental consciousness	84	0.131	1				
4	Temporal orientation	84	−0.008	0.182	1			
5	Population of the area	84	0.187	0.295 *	−0.256 *	1		
6	Size of the city	84	0.216 *	−0.079	−0.294 *	0.601 *	1	
7	Annual growth rate	84	−0.111	0.114	0.057	−0.086	−0.000	1
8	Education	84	−0.081	0.101	−0.247 *	0.224 *	0.222 *	0.060

* $p < 0.10$. Note: N, number of observations; Std. Dev., standard deviation; VIF, variance inflation factor.

Multicollinearity analysis was conducted prior to conducting the regression analysis, to check whether there were any problems due to linear combinations. A common technique, used to test for multicollinearity among the predictor variables in this study, is the variance inflation factor (VIF). Values above 0.90 were suggestive of a multicollinearity problem [102]. A VIF value in excess of 10 is also concerning [103]. In our case, we found an average VIF value equal to 1.42. This implied that multicollinearity was not a problematic issue or a concern for this study. We acknowledge that in smaller samples such as ours, there may be some methodological concerns with respect to collinearity, especially noted in the variable of education. However, given the pre-existing knowledge of the role of

education in these conditions [98,99] and that a potential collinearity is not harmful enough [104,105], we considered all independent and control variables relevant to support the internal consistency of our findings and analysis.

Table 3 illustrates all of the linear regression models, and only the controlled variables were included in Model 1, which was a starting point in predicting green entrepreneurship with demographic and economic variables. The other three models were then set, each with only one predictor representing each hypothesis. The first regressed green entrepreneurship on environmental actions (Model 2). The second considered the influence of environmental consciousness on green entrepreneurial activity (Model 3), whilst the third regressed green entrepreneurship on temporal orientation (Model 4). The control variables were then added to the three models, with one independent variable representing all hypotheses (Models 5, 6, and 7). Finally, an additional Model 8 was explored, which included all predictors (i.e., independent variables and controls). Throughout this empirical strategy, we tested whether differing linear combinations created different results or whether a robust specification was found otherwise. In addition, for robustness purposes, a new set of models without the control variable education was performed. Appendix B shows that the results for the main variables remained similar as compared to Table 3.

Table 3. Regression analysis (DV = green entrepreneurship).

	1	2	3	4	5	6	7	8
Environmental actions		0.215 * (0.113)			0.265 ** (0.111)			0.282 ** (0.115)
Environmental consciousness			0.274 ** (0.109)			0.292 ** (0.107)		0.305 *** (0.102)
Temporal orientation				0.275 * (0.147)			0.244 (0.160)	0.342 ** (0.132)
The population of the area	−0.056 *** (0.008)				−0.075 *** (0.012)	−0.065 *** (0.008)	−0.052 *** (0.009)	−0.080 *** (0.012)
Size of the city	0.000 (0.001)				0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Annual growth rate	0.246 ** (0.116)				0.268 ** (0.110)	0.250 ** (0.112)	0.197 (0.129)	0.204 * (0.106)
Education	0.080 (0.094)				0.096 (0.089)	0.092 (0.080)	0.113 (0.093)	0.156 ** (0.061)
Constant	0.564 * (0.294)	0.813 *** (0.221)	0.784 *** (0.179)	0.773 *** (0.247)	−0.039 (0.348)	0.046 (0.303)	0.177 (0.398)	−1.162 ** (0.517)
Observations	84	84	84	84	84	84	84	84
R ² within	0.081	0.054	0.076	0.055	0.16	0.166	0.121	0.31
R ² between	0.000	0.016	0.005	0.003	0.006	0.004	0.002	0.016
R ² overall	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. DV: Dependent variable.

Testing the hypothesis suggested a positive association between environmental actions and green entrepreneurship in different regions of Saudi Arabia, as stated in Hypothesis 1. We found that culture, such as environmental actions, had a positive influence on green entrepreneurship. Green entrepreneurs have to enhance the value of green entrepreneurship by balancing running a business with sustainability ideals [67]. A further variable employed to understand green entrepreneurship was that of environmental consciousness. Hypothesis 2 states that environmental consciousness is positively associated with green entrepreneurship in Saudi Arabia. We found that environmental consciousness was positively related to green entrepreneurship. The same positivity of influence was noticeable for the second hypothesis, but overall, the influence of environmental consciousness was not contrary to expectations, being positive. Green entrepreneurs could incrementally enhance the environment through their own businesses, and with their products and services, they are potentially able to educate a wide audience regarding many advantages in environmental protection [64]. Hypothesis 3, which suggested that temporal orientation was positively associated with green entrepreneurship in Saudi Arabia, was also fully supported. Individuals focus their attention on temporal orientation (past/present/future) and clarify responses to implicit and

explicit temporal orientation [82]. Temporal orientation had a significantly positive influence on green entrepreneurial measures within Saudi Arabia.

6. Discussion and Conclusions

At the present time, there is limited knowledge about the association between culture and green entrepreneurship with specific reference to Saudi Arabia. In particular, our study examined the influence of cultural factors (i.e., environmental actions, environmental consciousness, and temporal orientation) on green entrepreneurial activity in Saudi Arabia. We found that there was a positive relationship between culture and green entrepreneurship, which varied across regions. Our results might encourage entrepreneurs to adopt a green approach that aims to develop an entrepreneurial activity that solves environmental problems. This could mean that culture has had a strong influence on environmental commitment in Saudi Arabia to solve environmental issues.

We also found that environmental actions increased the level of green entrepreneurial activity in Saudi Arabia. Cultural practices act as an improved indication of sustainability endeavors [16]. Actions and motivations derive from the need to approach environmental issues, resulting in alternative and enhanced environmentally-friendly products and practices that are widely disseminated [69]. Additionally, we discovered that environmental consciousness had a positive influence on green entrepreneurship, given that green entrepreneurs have to consider the balance between business and environmental approaches [22]. Green entrepreneurs were thus identified as novel entrepreneurial players, in search of ways to fuse environmental awareness and business acumen in a holistic way [74]. Indeed, it is their overall objective regarding the sanctity of the environment that separates them from other entrepreneurs [64]. The main influence of temporal orientation on green entrepreneurship was also found to be positive and significant. The strategies of many successful entrepreneurs often involve time-based origins [25].

6.1. Implications for Theory

Green entrepreneurs are emotionally engaged by building a strong bond with society. Green entrepreneurs can also be cognitively engaged in understanding the clear mission and purpose of a new business by receiving information and appropriate feedback from social needs. If green entrepreneurs have a strong bond with society, then they feel that they are valued by local and national entities; thus, their opinions and actions may be taken into consideration to propose solutions for sustainable development processes [21]. This allows entrepreneurs to develop an emotional engagement that helps their venture to succeed in its sustainable goals by understanding contextualized societal culture. An important implication for the analysis of informal institutions [14,15], particularly for culture as an antecedent of green entrepreneurial activity, was found in this study. For example, the cultural dimensions of green entrepreneurship, in its three forms, are beneficial for more sustainable business activity in harmony with the environment. This may be the first step toward a more environmentally-friendly-focused society, leading to the conservation of resources for future generations.

Green entrepreneurship is a novel field of research, which needs further exploration regarding the role of entrepreneurial activity as a means for sustaining the environment and ecosystems, whilst forwarding both economic and non-economic gains for investors and society in general [73]. Research into informal institutions needs a theory-based consultation regarding the notion of such institutions being vital for certain outcomes in green entrepreneurship. Our findings present a more generalized perspective by illustrating the fact that informal institutions (culture) also ensure added general consensus, reinforcing the influence on green entrepreneurship (e.g., environmental actions, environmental consciousness, and temporal orientation). In this sense, further theoretical understanding may better guide scholars studying Saudi Arabia to further advance the comprehension of culture as the awareness of society toward sustainability. It may also serve

to encourage the advertising of results related to sustainability in order to increase legitimacy and support from the entire population, as well as from entrepreneurs.

6.2. Implications for Practice

We focused on different cities in different regions of the Kingdom of Saudi Arabia. Government and private individuals are both key instigators of entrepreneurial actions. It is hence vital that entrepreneurs enhance their understanding of how these approaches are determined and shaped. Consideration of uncertain influences on business-based sustainability strategy, such as the cultural characteristics evaluated in this study, may well be of benefit to entrepreneurs in assessing, more appropriately, the significance of the informal institutional application of pressure on both corporate and strategic activities. As our findings illustrated, cultural influence on sustainability may apply to many cities sharing similar cultures, rather than being limited to individual ones. By achieving the formation of productive clusters, entrepreneurs that operate on an intra-city basis may benefit from such an approach. Our study offers insight to aid entrepreneurs in coping with the challenges of strategically balancing sustainability practices as international ventures with the expectation to be local between cities that have common shared cultural values and corporate sustainability.

Future entrepreneurs may be interested in finding and applying environmentally-friendly solutions for green market needs, and market needs overall. Their contribution to social development can also effectively create enhanced opportunities in green entrepreneurship. In doing so, they not only contribute to their own careers, but also to the employment of others.

6.3. Limitations and Future Research

In spite of these strengths, there are other limitations to this study. Firstly, as the present paper explored the relationship between culture and green entrepreneurship, represented by environmental commitment in Saudi Arabia, it would be beneficial to consider other cultural dimensions that may affect green entrepreneurial activity [17]. For example, it would be supportive to consider variables at the city level, such as crime rates, air pollution, unofficial companies, etc. Secondly, we used secondary data for the 2015–2018 period; subsequent studies should focus on a wider time span to achieve long-term analyses, in which dynamic effects may also illustrate the different or similar responses of entrepreneurship when institutional factors change in developing countries [106]. Thirdly, future research may extend the analysis to cross-country comparisons, such as examining other regions in the Arab Gulf. Fourthly, there are no global databases for green entrepreneurship, so future research could experiment with various proxies for green entrepreneurship and could determine whether the results remain stable across variables and techniques. We are aware that a lack of data sources poses a challenge to overcome, particularly when attempting to conduct cross-country comparisons, due to the limited number of indicators and the differences in measurements across countries [107]. Further efforts are needed to create homogenous information concerning green entrepreneurship, as well as its antecedents and those consequences beyond economic terms [108]. Future research should improve the quality and scope of the indicators, for both dependent, as well as independent variables, which may increase reliability and the ability to analyze causal relationships in a cross-sectional setting [18].

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Appendix A

Table A1. Definitions of green entrepreneurship and related concepts.

	Labels	Definitions	Citations
1	Green entrepreneurial activity	"The process of identifying, evaluating and seizing entrepreneurial opportunities that minimize a venture's impact on the natural environment and therefore create benefits for society as a whole and for local communities"	[10]
2	Green entrepreneurship	[Green entrepreneurs engage in ...] "a kind of social activity that aims at protecting and preserving the natural environment"	[46]
3	Environmental orientation	"The recognition by managers of the importance of environmental issues facing their firms by mainstreaming green product strategies"	[61]
4	Green logic	"Part of a complex institutional environment, facing a sharing platform, alongside the social and economic logic"	[68]
5	Green entrepreneurs	"Those who start businesses based on the principle of sustainability with strong underlying green values and who sell green products or services"	[45]

Appendix B

Table A2. Regression for green entrepreneurship without the control variable education.

	1	2	3	4	5	6	7	8
Environmental actions		0.215 * (0.113)			0.259 ** (0.115)			0.270 ** (0.118)
Environmental consciousness			0.274 ** (0.109)			0.288 ** (0.107)		0.296 ** (0.106)
Temporal orientation				0.275 * (0.147)			0.219 (0.156)	0.304 ** (0.136)
The population of the area	−0.058 *** (0.008)				−0.076 *** (0.012)	−0.067 *** (0.008)	−0.055 *** (0.009)	−0.082 *** (0.012)
Size of the city	0.000 (0.000)				0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Annual growth rate	0.248 * (0.121)				0.269 ** (0.116)	0.252 ** (0.117)	0.204 (0.135)	0.214 * (0.116)
Constant	0.732 *** (0.231)	0.813 *** (0.221)	0.784 *** (0.179)	0.773 *** (0.247)	0.175 (0.360)	0.246 (0.277)	0.449 (0.292)	−0.741 (0.487)
Observations	84	84	84	84	84	84	84	84
R ² within	0.074	0.054	0.076	0.055	0.149	0.157	0.107	0.284
R ² between	0.000	0.016	0.005	0.003	0.006	0.004	0.002	0.016
R ² overall	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.002

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

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